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NRC COMMENTS

PP&L COMMENTS

2. TECHNICAL SUPPORT CENTER

Note: EP indicates that information was found in the emergency plan.

2.1 Integration with Overall Planning

1. The design of the Technical Support Center (TSC) addresses the following goals:

- a. Provides plant management and technical support to plant operations personnel during emergency conditions;
- b. Relieves the reactor operators of peripheral duties and communications not directly related to reactor system manipulations;
- c. Prevents congestion in the control room; and
- d. Performs EOF functions for the Alert Emergency class and for the Site Area Emergency class and General Emergency class until the EOF is functional.

Adequate response. Pg 2-1

Implied.

Implied.

Adequate response. Pg 2-1

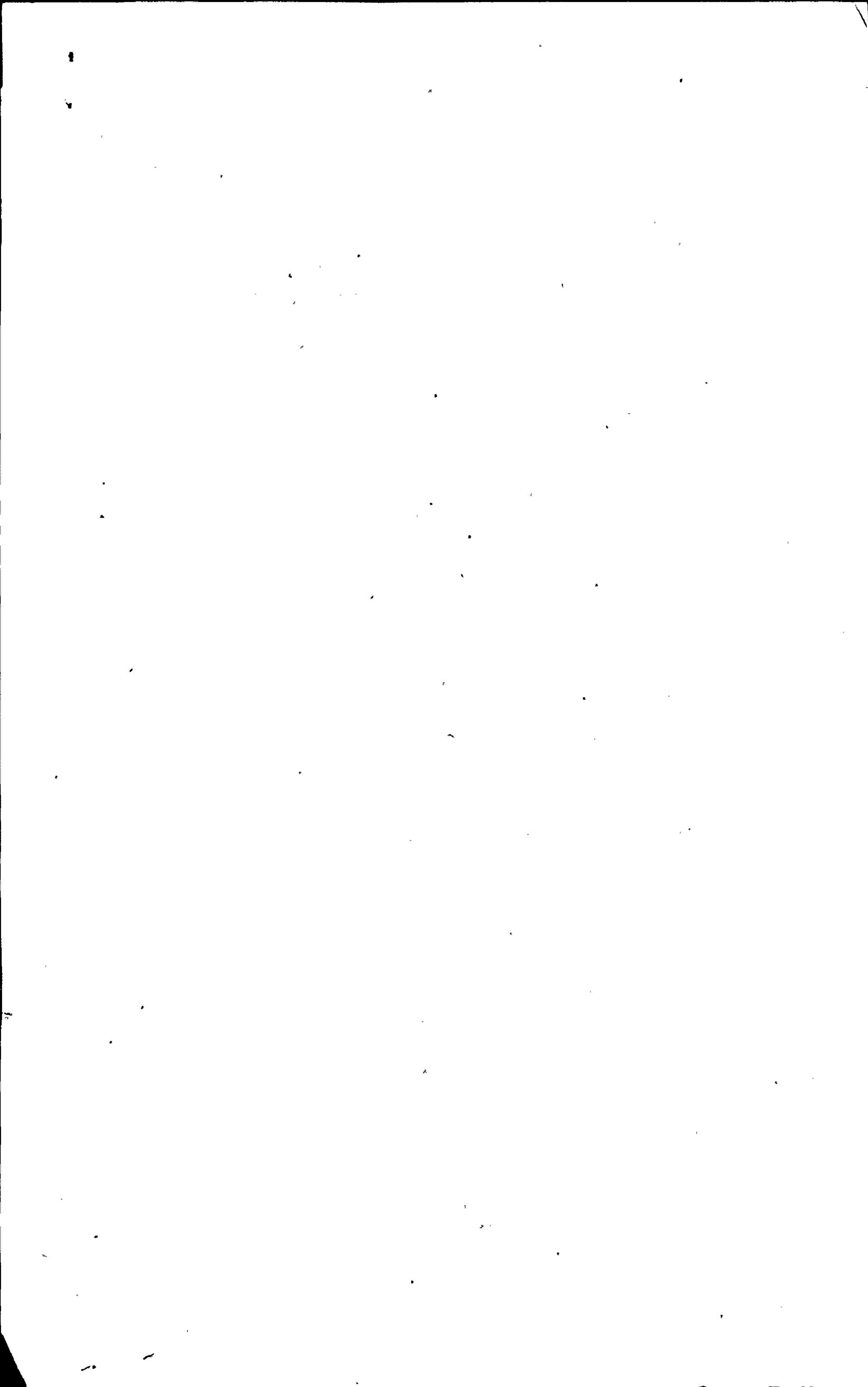
2. The TSC shall be the emergency operations work area for designated technical, engineering, and senior licensee plant management personnel; any other licensee-designated personnel required to provide the needed technical support; and a small staff of NRC personnel.

Adequate response. EP 5-1

3. The TSC shall have facilities to support the plant management and technical personnel who will be assigned there during an emergency and will be the primary onsite communications center for the plant during the emergency. TSC personnel shall use the TSC data system to analyze the plant steady-state and dynamic behavior prior to and

Adequate response. Pg 2-1 EP 5-1

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Date 1/2/82 of Document
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throughout the course of an accident. The results of this analysis will be used to provide guidance to the control room operating personnel in the management of abnormal conditions and in accident mitigation. TSC personnel will also use the environmental and radiological information available from the TSC data system to perform the necessary functions of the EOF when this facility is not operable.

4. Since the specific allocation of functions assigned to emergency facilities will differ from design to design, the proposal should clearly state which functions (Operations, Radiological Assessment, etc.) are assigned to the TSC.

Adequate response. Pg 2-1 EP 5-1

2.2 Location

1. The TSC should:

- a. Be in the same building as the control room if possible; if not, then where is it located?

The TSC is located on the observation gallery of the control room. Pg 2-1

- b. Be within 2 minutes walking distance from the control room.

Adequate response.

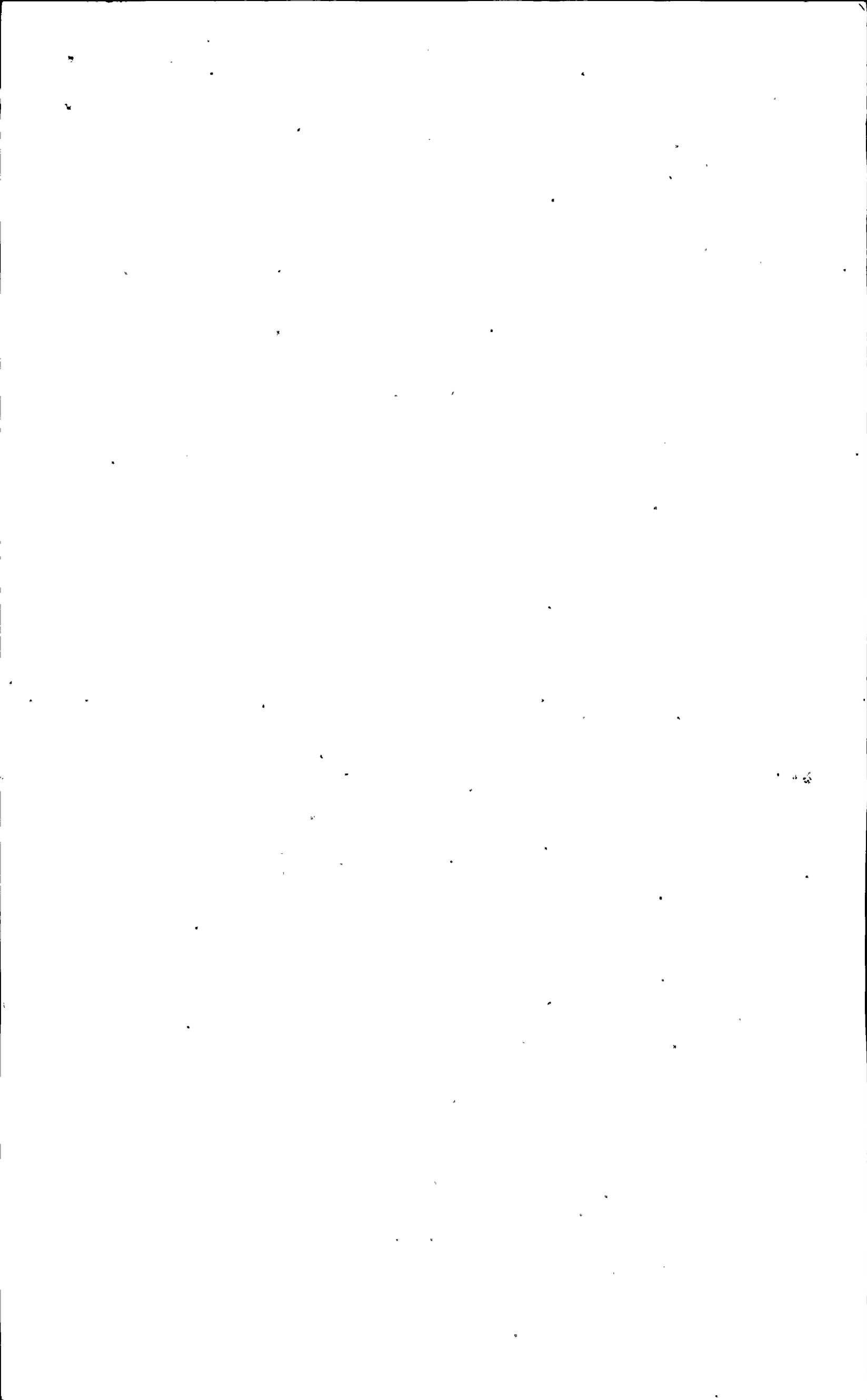
Is the TSC within the security perimeter?

Yes.

Must someone pass through security checkpoints to move from the TSC to the control room?

No.

NRC comment is incorrect. Personnel moving from the TSC to the control room pass through access control points.



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What provisions have been made for passing through security checkpoints quickly and easily?

Not applicable.

Doors into the TSC and the control room are card reader controlled. Personnel having security clearance into these areas are issued a keycard. Inserting the keycard into the card reader will unlock the door providing quick and easy ingress or egress.

What stairways, corridors or equipment spaces must be traversed?

The TSC can be reached from the control room by stairs or an elevator.

Is the route between the TSC and control room exposed to air-scattered or direct radiation from the containment?

Subject not addressed.

The route between the TSC and the control room is contained within the control structure and is exposed to the same environment as the TSC and the control room. The habitability systems for the TSC and control room are described in Section 6.4 of the FSAR.

What is the maximum exposure a person will receive while walking from the control room to the TSC during a design basis accident (less than or equal to 5 rem. including all other exposures, during the course of an accident)?

Subject not addressed.

Results from our shielding-design review (NUREG 0737, Item II.B.2) indicated that the maximum exposure a person can receive while in the TSC, control room, or in route to the TSC from the control room is 1.6 Rem. for the duration of the accident. Personnel integrated exposures were calculated based on 100% occupancy for the first day, 60% occupancy from day one to day four, and 40% occupancy for the duration of one year.

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

Subject not addressed.

Since the route between the control room and the TSC has the same environment as the control room and TSC, radiation monitors are not needed in this area. Radiation monitors are provided in the control room and TSC to monitor their respective exposure rates.

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

The TSC is within two minutes walking distance of the control room.

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

In addition, visual contact can be made through the observation window overlooking the control room. Pg 2-1

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

Subject no addressed.

Face to face communications between control room and TSC personnel are impeded to a small extent due to the time delay caused by transit between the facilities and use by the "card-readers" in the security system.

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

Subject not addressed. Pg 2-1 .

Control room information not available in the TSC data system can be obtained by:

- a. Walking from the TSC to the control room.
- b. TSC to control room hotline.
- c. TSC to control room PABX.

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

By means of the observation window, but methods for doing this are not described.

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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).

The TSC is 2250 sq. ft. which meets the minimum size requirements. Pg 2-3

How much space is assigned to each work work station?

Not specified.

Each work station has an approximate 6 foot x 6 foot working area.

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

Subject not addressed.

The interaction among operators, work stations and items of equipment is covered in the Emergency Plan Implementing Procedures.

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?

Yes. Fig. 2.14.3.

Is each work station equipped for its function?

Inadequate response.

Each work station in the TSC is equipped with status boards, technical data and telephone links to facilitate performance of desired functions.

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

Not specified.

Personnel are grouped by functional and space consideration in the TSC.

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

A description of work stations, including including their size, function and equipment, is lacking.

The TSC layout is designed to be consistent with the patterns of interpersonal interaction and machine utilizations as summarized in Table 1. Additionally, a document control area (technical library) is provided for staff utilization (see Figure 2.14.3 of Appendix I to the Emergency Plan.

Who needs access to which machines?

Subject not addressed.

Access to the UMC is required for the Emergency Director, Operations Coordinator and the Technical Coordinator.

Access to the stack monitoring panel is required by the Radiological Coordinator.

Access to the technical library is required by all personnel but primarily by the Technical Coordinator.

Access to the VHF radio is primarily required by the Radiological Coordinator.

What is the flow of information between persons and groups?

Subject not addressed..

Information flows from the members of each coordinator's staff to the coordinator. The coordinators then pass this information to each other or to the emergency director as necessary in order to perform their function.

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PP&L COMMENTS

- Are personnel performing related tasks located adjacent to one another?
- 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).
- 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.

Not specified.

Not specified.

Inadequate response. Display consoles are located in a crowded control corridor.

Adequate response. Fig. 2.14.3

In the "Monitoring Area" Fig. 2.14.3

Subject not addressed.

Personnel performing related tasks are located adjacent to one another or in close proximity.

Work stations closely correspond to Figure 2.1.

The TSC is designed to minimize crossing traffic. The personnel in each functional group are located adjacent to one another and in close proximity to equipment required to perform their job functions. Noise control will be accomplished through the use of acoustical barriers in high noise areas.

The TSC data is displayed in several areas:

1. The UMC, SPDS and Stack Monitoring Panels are located in the center of the TSC in the Emergency Director's work area.
2. The Radiological Status Boards located in the radiological area of the TSC.

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NRC COMMENTS

PP&L COMMENTS

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

Not specified.

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

Not specified.

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 and Kinkade. Human Engineering Guide to Equipment Design)?

Subject not addressed.

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

Subject not addressed.

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

Subject no addressed.

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

Subject not addressed.

3. The Technical Status Boards located in the technical area of the TSC.

The TSC Technical Library (approx. 13 feet by 25 feet) and the Conference Room (approx. 13 feet by 25 feet) are available for working with maps, diagrams, drawings, etc.

Maps, diagrams and drawings are located in the TSC Technical Library.

Refer to Aydin controls literature on Model 8040 CRT monitors and 5115A keyboards. Also, refer to Conrac literature on the 5111 monitors.

Yes (See 2.3.1.b(6)).

A maintenance shop is in close proximity to the computer room within the control structure. A maintenance shop is also being provided in the EOF building.

CRT monitors and keyboards will be mounted on tables, thereby presenting no equipment accessibility problems. (Display generators will not be located in the TSC.)

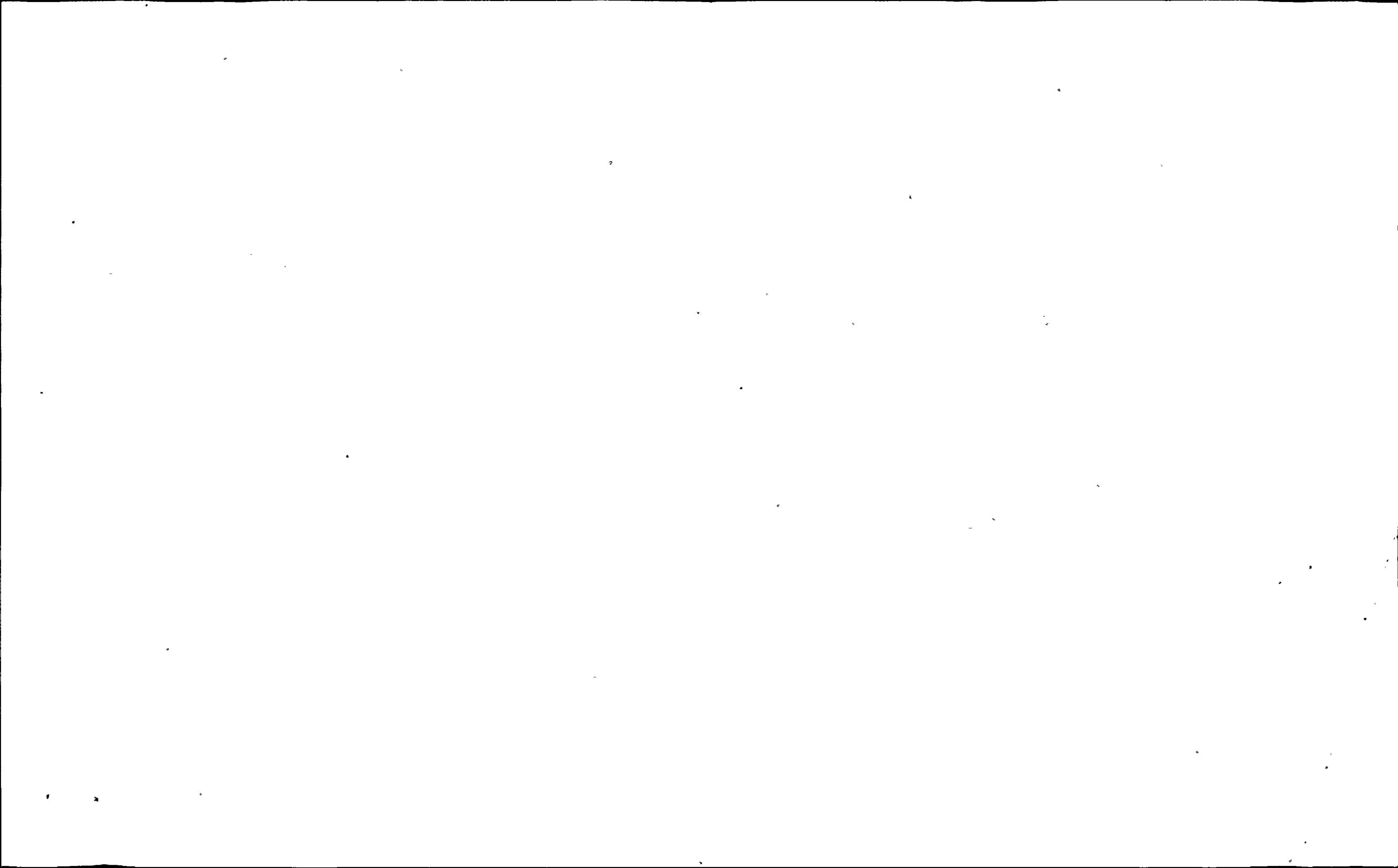


TABLE 1

TSC STAFF INTERPERSONAL INTERACTION AND MACHINE UTILIZATION

<u>STAFF POSITION</u>	<u>FUNCTION</u>	<u>EQUIPMENT</u>	<u>SIZE OF WORK AREA</u>
Emergency Director	Overall Control	UMC, Telephones, Hot lines, Visual	TSC
Radiological Coordinator	Dose projection, On-site monitoring, Off-site Monitoring	VHF and UHF Radio, Telephones, Status Boards, Stack Monitoring Panel	Approx. 20 feet by 15 feet.
Technical Coordinator	Technical support for on-shift personnel	Telephones, Status Boards UMC, UHF Radio	Approx. 20 feet by 20 feet.
Operations Coordinator	Operations support for on-shift personnel	Telephones, Status Boards, UMC, UHF Radio	Approx. 10 feet x 10 feet.
Administrative Coordinator	Administrative support for on-shift personnel	Telephone	Desk

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What spare modules are available?

Subject not addressed.

PP&L COMMENTS

The following SPDS spare parts are provided for the control room, TSC, and EOF:

DEC Equipment

M713300 11/24 CPU Board
KEF11AA Floating Point
KT24 Memory Expansion & Mapping
DZ11A 8 Line Comm Mux
SDR11B DMA Interface Spares Kit
KW11W Watchdog Timer
MS11LD 256KB Main Memory
H7550BA Battery Backup
BC11AØ2 2 Ft. UNIBUS Cable
SRL02A RL02 Spares Kit
4ARX02AS RX02 Spares Kit
4AVT100 VT100 Spares Kit
RX01K-10 10 Blank Floppy Disks
M9302 UNIBUS Terminator
M9305 UNIBUS Jumper
M912 Bootstrap Terminator
ML11 Auxiliary Memory (256KB)

Aydin Equipment

TVD-191 Synch Generator -5215
TVD-193 10C -5215
TVD-194 PRO-204 -5215
460-0893 Extender Card
352-5133 Power Supply
TVD-293 DR11B/5215 Interface
TVD-190 5215 A/N CHANNEL
TVD-192 5215 A/N CHANNEL
TVD-195 5215 Data Trend Edit
TVD-196 5215 Data Trend Video
REL-001 5115A Logic/Relay Board

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Data Acquisition System & R.D.C.

CPU Card
Memory Card
Analog Buffer
Communication Card
Digital Input
Analog Input
5V Power Supply
±15V Power Supply
Contact Panel Assy.
+8V Power Supply
A/D Card
Fiber Optic Interface

Stack-Monitoring Panel

A redundant panel is located in the control room. Spare parts are maintained.

UMC Display

CRT Monitors
Complete set of spare cards for display generator spare keyboard

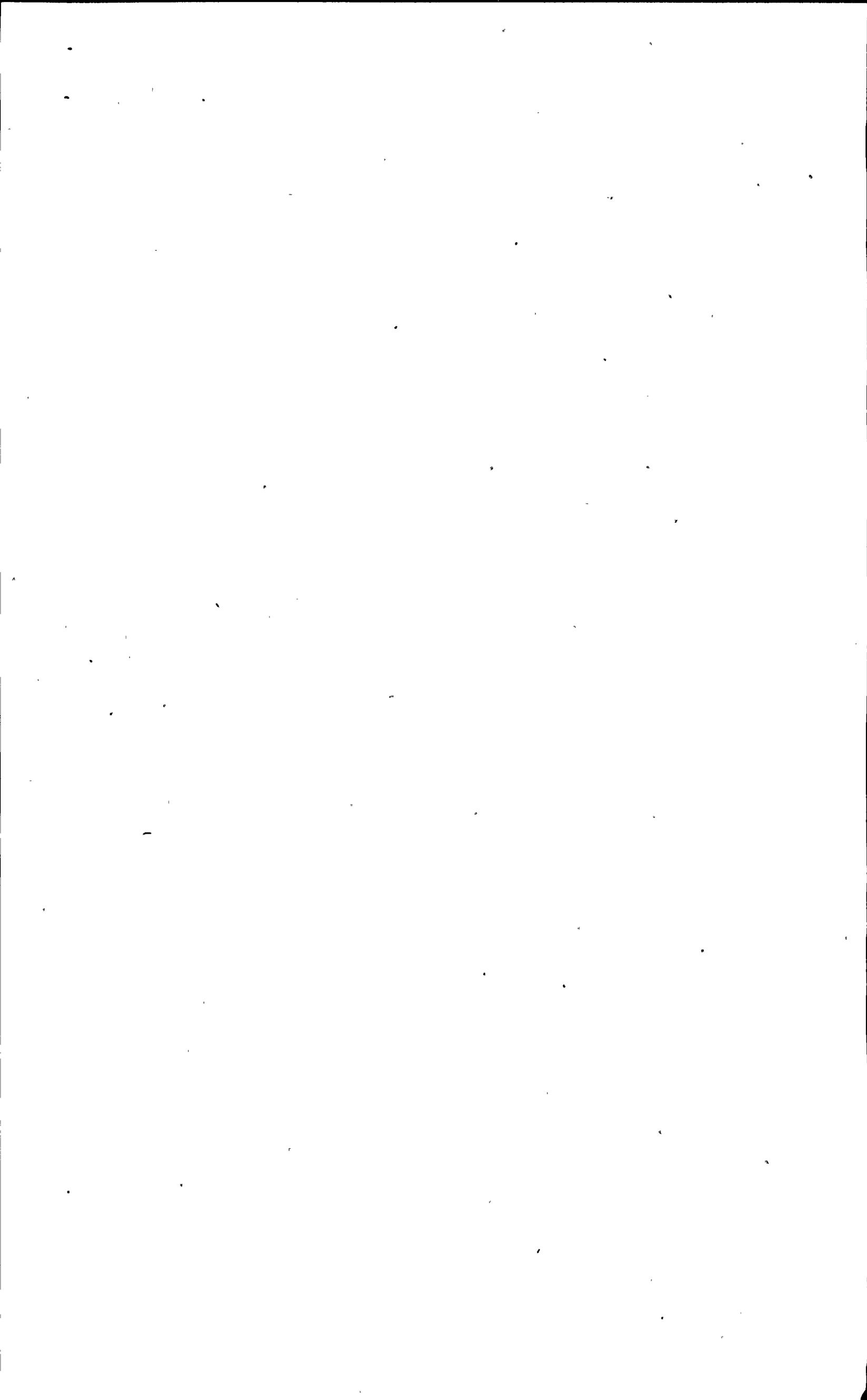
- d. Space for unhindered access to communications equipment by all TSC personnel who need communications capabilities to perform their functions.

Subject not addressed.

See below.

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

Adequate response. (Given in Figure 2.14.3)



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

Subject not addressed.

The one square foot minimum criteria is satisfied.

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

Subject not addressed.

A dedicated light is provided for each telephone line. When a call is received the applicable light flashes and an audible sound annunciates. The light stays lit and the audible sound stops when the telephone line is answered.

e. Space for storage of and/or access to plant records and historical data.

Subject not addressed. Fig. 2.14.3

Plant records and historical data are available in the technical library in the TSC.

How much work space is dedicated to this task?

Not specified.

Approx. 13 feet x 25 feet.

f. A separate room, adequate for at least three persons, to be used for private NRC consultations.

An NRC conference room is available. Fig. 2.14.3

Are three of the five NRC work stations afforded sufficient privacy for meetings and telephone conversations?

Yes. Fig. 2.14.3

Does this room have a speaker telephone?

Yes. Pg 2-7

NRC comment is incorrect. There is no speaker telephone provided.

What size is this room? (200 sq. ft. minimum)

The room is slightly less than 200 sq. ft. Fig. 2.14.3

Although the space is less than 200 sq. feet, we believe it will adequately accommodate three NRC personnel for private consultations.

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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.

Adequate response. Fig. 2.14.3

How many people are assigned to the TSC by the emergency plan, including five NRC personnel?

The plan indicates 18 people minimum.
EP Table 5.2

Is the work space adequate for these people to perform their functions?

Yes.

2.4 Structure

1. The TSC complex must be able to withstand reasonably expected adverse conditions.

The TSC has the same structure as the control room. Pg 2-5

The TSC is contained within the control structure. The control structure has been designed to withstand the effects of a 100-year windstorm as described in Chapter 3.0 of the FSAR. Special flood protection measures are unnecessary since the control structure is above the probable maximum flood level. The TSC is accessible during floods and storms.

Can the TSC be operable during a 100-year flood?

Not specified.

Can the TSC withstand a 100-year windstorm?

Not specified.

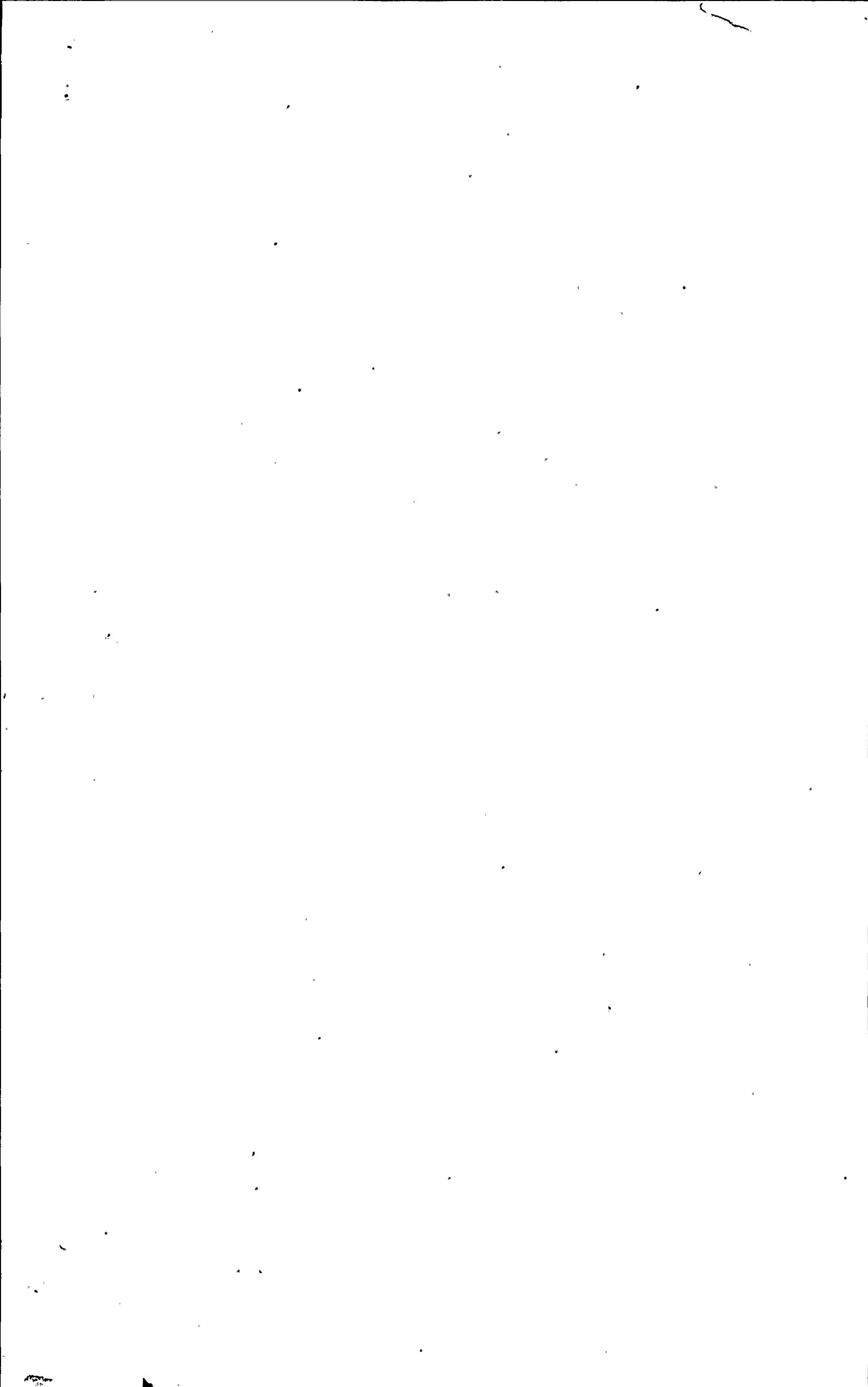
Is the TSC accessible during floods and storms?

Not specified.

2.5 Habitability

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

Adequate response. Pg 2-5



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

Subject not addressed.

Radiation doses to TSC personnel were based on the assumption of a post-accident release of radioactivity equivalent to 25% of the core radioiodine, 100% of the core noble-gas invention, and 1% of the core solids in accordance with NUREG 0737 Item II.B.2.

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

The radiation dose to personnel occupying the TSC is the same as the control room.
Pg 2-5

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.

Adequate response. Pg 2-6

Briefly describe the HVAC system filtration system.

Adequate response. Pg 2-6

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

Adequate response. Pg 2-6 FSAR 9.4.1

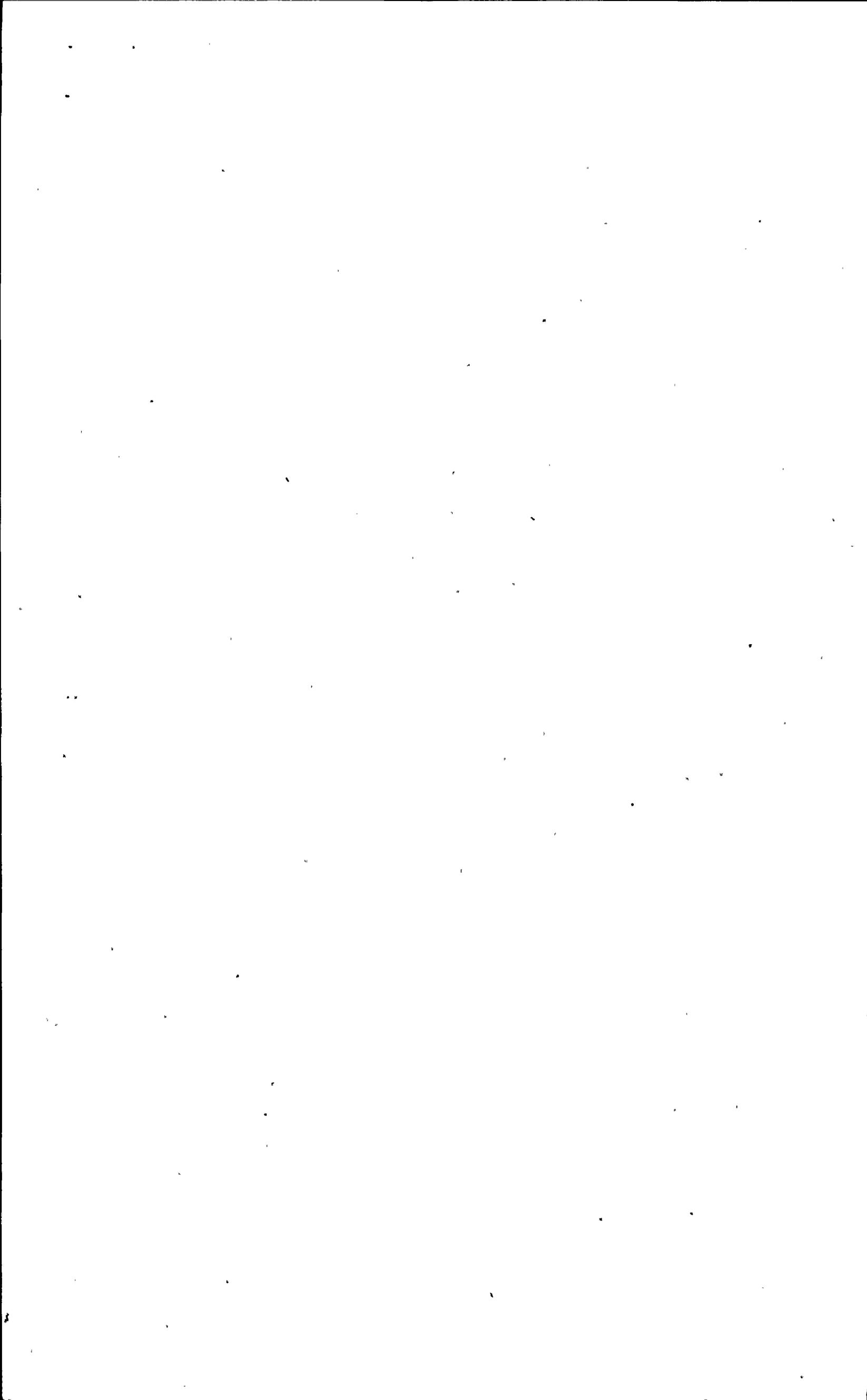
Is the HVAC system controlled to isolate the intake?

Yes.

At what airborne activity level does isolation occur?

Not specified.

This level will be determined during per operational testing. The setpoint for the isolation is dependant on background radiation which cannot be determined until the plant is in operation. A temporary setpoint is presently being calculated based on estimates of background radiation fields.



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How is the level determined?

Not specified.

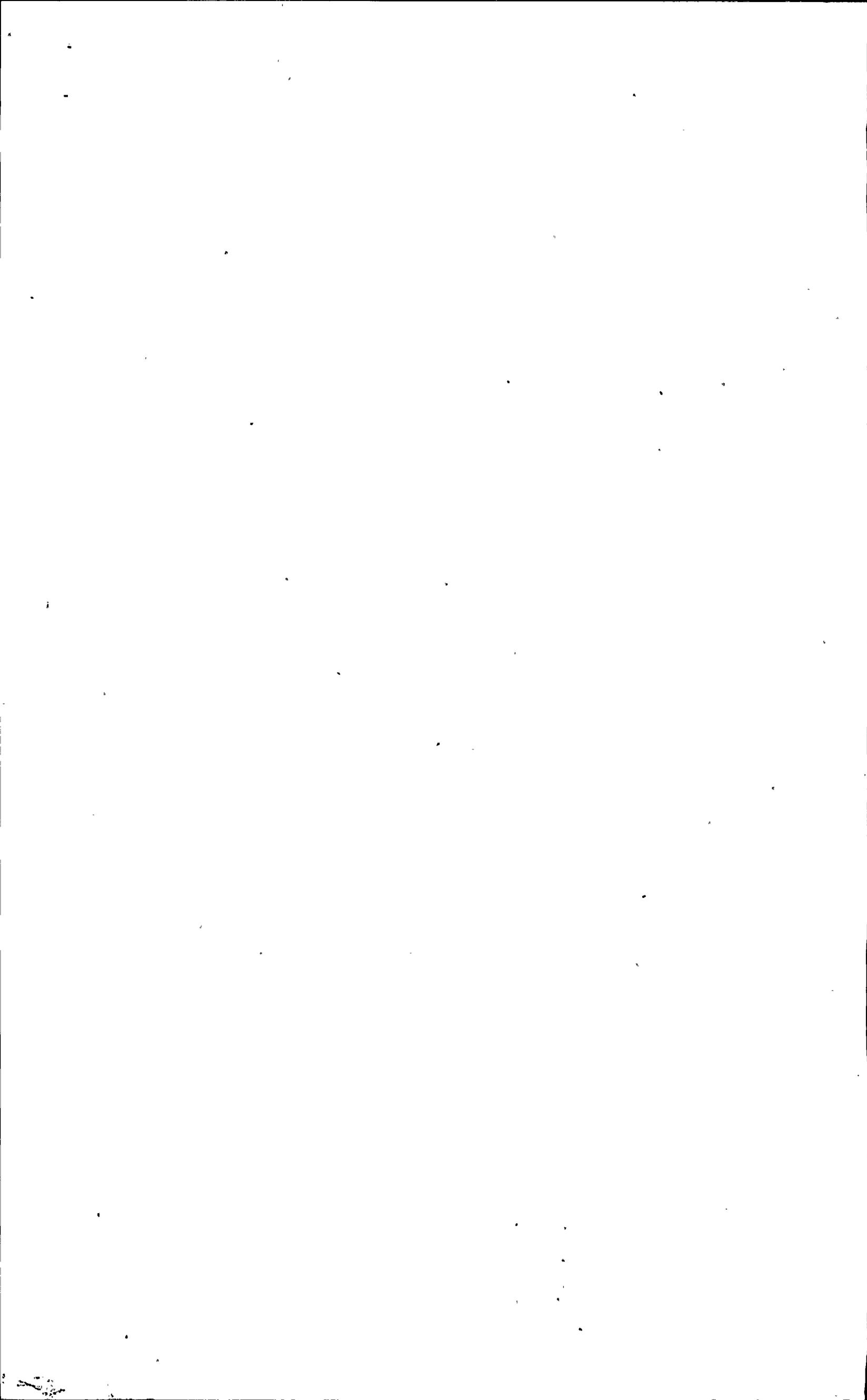
The level is measured by two detectors in the air intake wall opening from the outside for the control room ventilation system. When radiation levels exceed pre-set trip points, electronic circuits will actuate alarms and appropriately route the inlet air through the emergency air clean-up trains and shift to increased recirculation flow.

Detectors RE-ON018 A&B are gamma scintillation detectors with a range of .01 to 100 mR/hr. Radiation levels from both detectors are recorded on recorder R610 located in panel 1C600 (backrow panel in the control room). Meter indications for RE-ON018A are displayed on panel 1C606 in the upper relay room while the indications for RE-ON018B are displayed on panel 1C633 located in the lower relay room.

Where are the sensors located?

Not specified.

The detectors are located in the air intake wall opening to monitor the outside air intake to the control structure ventilating system.



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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.

Permanent monitors will be installed. Means to distinguish the presence or absence of iodine will be provided.
Pg 2-6

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

Yes. Pg 2-6

Which instruments will be used?

Not specified.

How many of each?

Not specified.

Where are they located?

Not specified.

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

Not specified.

What are the ranges of these instruments?

Not specified.

Dose rate - ion chambers (Portable)
Airborne - PING 2A (when required)
(Portable)

1 - Dose rate ion chamber (either Model R0-2 or R0-2A)
1 - PING 2A
3 - Area Radiation Monitors (ARM) - Permanently installed

1 - ARM in the document control area
1 - ARM in the conference area
1 - ARM in the monitoring area

Input from other operating plants

Ion Chambers
R0-2, 0-5000 mR/hr.
R0-2A, 0-50 R/hr
Area Radiation Monitors, .01-100 mR/hr.

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

Not specified.

The TSC HVAC system is part of the Control Room HVAC which is safety related and redundant. An instrument with a range of 50 R/hr is available.

Who is assigned to monitor the TSC habitability?

Not specified.

This concern is not applicable to Susquehanna. The TSC is part of the control structure. As such, it is served by the same alarm and ventilation system as the control room and does not need specific monitoring as a separate structure would.

What are the qualifications of this person?

Not specified.

Not applicable to Susquehanna, see above response.

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

Adequate response. EP Page 7-2

At what radiation levels will these instruments alarm?

Not specified.

60 mR/hr.

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

Yes. EP Pg 7-2

Are unattended instruments in continuous operation?

Yes. EP Pg 7-2

How is iodine monitored?

Not specified.

A grab sample will be obtained if required.

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

Not specified.

Yes

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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?

Not specified.

ARMS are not provided with back-up power. The PING 2A is provided with a spare battery. The instruments satisfy the requirements of manufacturer's specifications for availability and accuracy. Calibration is done quarterly.

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

Subject not addressed.

Protective clothing will be available to TSC personnel from the health physics supply station. Respirators and potassium iodide will be available in the TSC for all TSC personnel.

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

Subject not addressed.

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

Subject not addressed.

Yes

Where?

Subject not addressed.

Additional respirators and potassium iodide will be available from the health physics supply station.

Are instructions for use of KI available?

Subject not addressed.

Instructions for the use of potassium iodide and respiratory equipment will be covered by a health physics procedure.

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

Subject not addressed.

See above response.

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

Subject not addressed.

Respiratory equipment is equivalent to a full face mask.



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PP&L COMMENTS

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

1. The TSC shall:

- a. Be fully functional within 30 minutes of activation.

The TSC will be fully functional within 30-60 minutes after initial notification.
EP Pg 5-1

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).

Adequate response. EP Pg 5-1 and Pg 5-2.

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?

Partially addressed. The tasks to be performed by the onsite emergency organization are specified.

Yes, see Section 5.2 of the Emergency Plan. Reference Subsection 13.1 of the FSAR for individual qualification by position.

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.

Subject not addressed.

The allocation of tasks to personnel have been validated by an analysis of error likely situations through drills and scenarios written for testing the Emergency Plan Implementing Procedure.

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

Not specified, but at least 12 people are assigned.

The maximum number of personnel assigned to the TSC is 30.

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

Insufficient information. The total number of personnel assigned to the TSC is not specified.

Yes, see above response.

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.

Not specified.

The telephone system will undergo an acceptance test to verify functionability. The acceptance test is required by the Quality Assurance Plan for the TSC. Performance of this test will be documented.

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

Not specified.

The normal AC power to the plant private automatic branch exchange telephone system is backed up by a battery having an eight hour capacity.

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

Not specified.

All hotlines bypass the plant private automatic branch exchange (PABX). Two local Schickshinny and two Allentown General Office extensions bypass the PABX.

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

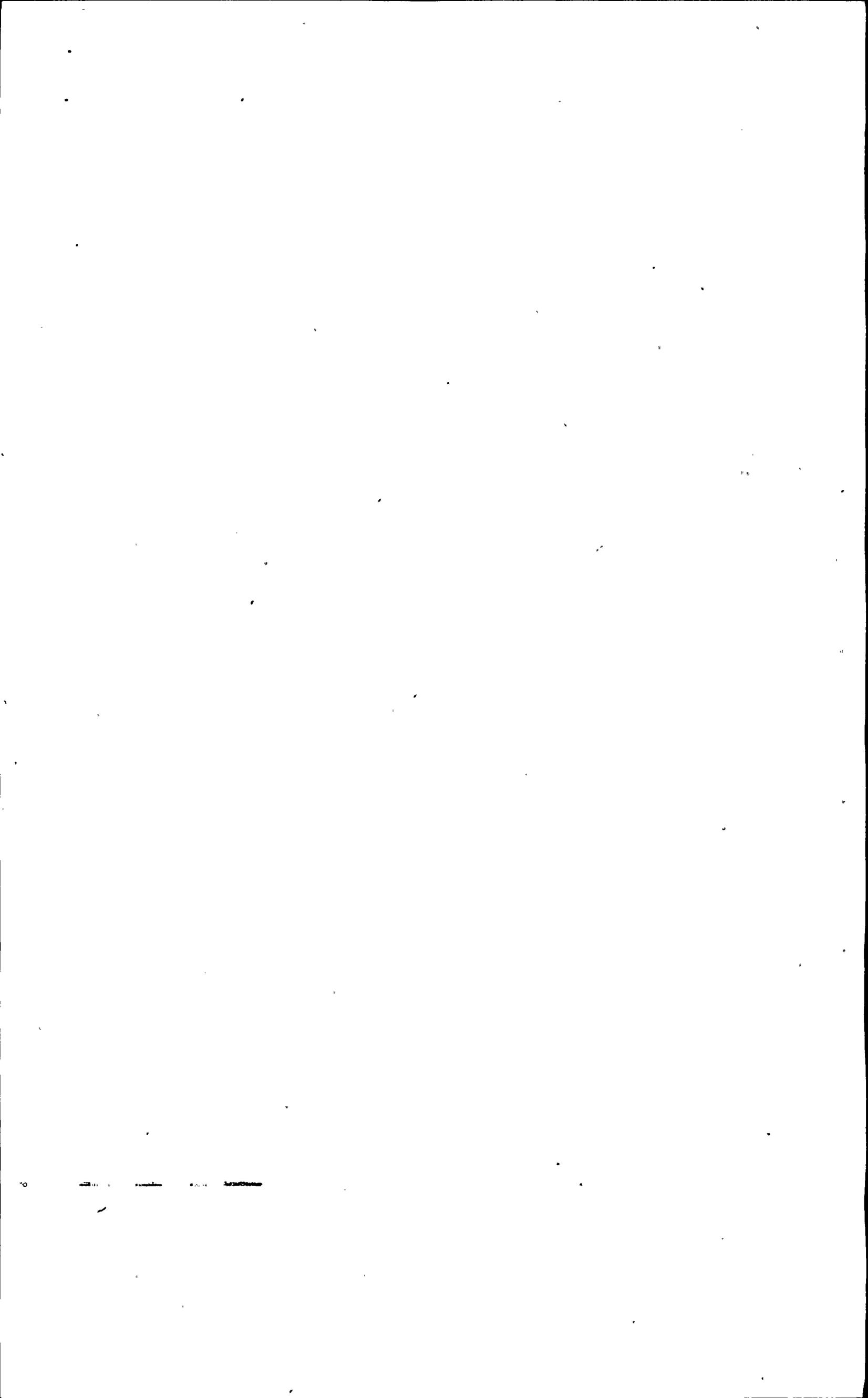
a. Hotline telephone in the NRC consultation room on the ENS to the NRC Operations Center.

Adequate response. Fig. 2.14.3 Pg 2-7

What is the backup system for communications to the NRC?

Not specified.

Backup is provided via a PABX telephone and/or a Schickshinny telephone. Also, shared use of the VHF radio.



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- b. Dedicated telephone in NRC office space on the NRC Health Physics Network. Adequate response. Fig. 2.14.3 Pg 2-7
- What is the backup system for communications to the NRC? Not specified.
- c. Dedicated telephones to the control room, OSC, and EOF. Adequate response. Pg 2-7
- Do these telephones provide non-interruptable service between the TSC, EOF or control room? Not specified.
- d. Dial telephones that provide access to onsite and offsite locations. Yes. Pg 2-7
- e. Intercommunications systems between any separate work areas within the TSC. Not specified.
- Is there an intercom to connect the TSC manager and supervisors? Not specified.
- f. Communications to licensee mobile monitoring teams. Adequate response. Pg 2-8
- g. Communications to State and local operations centers. Adequate response. Pg 2-7
- h. Radio communications with onsite and offsite organizations and response groups. Adequate response. Pg 2-8

Backup is provided via a PABX telephone and/or a Schickshinny telephone. Also, shared use of the VHF radio.

Yes, these are dedicated hotlines between the TSC, EOF and/or control room. Power for these hotlines come from the plant's vital AC UPS system.

The telephone and plant public address systems are available for intercommunications. A TSC intercom system is not planned.

See above response.

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

Not specified.

In addition to the NRC emergency notification and health physics network hotlines, a plant extension and local Schickshinny telephone line are available for use by the NRC.

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

Adequate response. Pg 2-8

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).

Implied in the EP on Pages 5-2, 6-2 and 6-3.

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

Implied in the EP on Pages 5-2, 6-2 and 6-3.

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

Not specifically addressed. Descriptions of communications are given, but not with reference to job titles.

TSC Manager with:
Corporate HQ

Control Room

EOF

OSC
NRC
State/local governments
Vendors

Telephone Tie Line, Telephone Hotline, VHF Radio
Telephone Hotline, PBX, PA system, Intercom, Visual
Telephone Hotline, PBX, UHF Radio, VHF Radio
Telephone Hotline, PBX
Telephone Hotline, Telephone
Telephone Hotline, Telephone, VHF Radio
Telephone

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NRC COMMENTS

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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.

8 Instrumentation, Data System Equipment, and
Power Supplies

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

9 Technical Data and Data System

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

Telephone Tie Line, VHF Radio
VHF Radio, UHF Radio
UHF Radio, PA System, PBX
PBX, UHF Radio, VHF Radio

UHF Radio, VHF Radio
UHF Radio, PBX, PA System
PBX, PA System, UHF Radio
PBX, PA System, UHF Radio
PBX, UHF Radio, VHF Radio
Telephone Hotline, Telephone, VHF Radio

Telephone Tie Line, VHF Radio
Telephone Hotline, PBX, PA System,
Intercom, Visual
Telephone Hotline, PBX
Telephone Hotline, PBX, UHF Radio,
VHF Radio
Telephone
Telephone Hotline, Telephone
UHF and VHF Radio

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NRC COMMENTS

PP&L COMMENTS

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: | Not all specified. | |
| a. Plant meteorological data, | Adequate response. | |
| b. SPD systems, | | |
| c. Plant technical specifications, | Adequate response. | |
| d. Plant operating procedures, | Adequate response. | |
| e. Emergency operating procedures, | Adequate response. | |
| f. Final Safety Analysis Report, | Adequate response. | |
| g. Plant operating records, | | Will be available. |
| h. Plant operations reactor safety committee records and reports, | | Will be available. |
| i. Records needed to perform the functions of the EOF when it is not operational, and | | Will be available. |
| 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. | Contains selected as-built drawings.
Pg 2-4 | |
| k. Checklists, guides, worksheets and other job performance aids. | | Will be available. |

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NRC COMMENTS

PP&L COMMENTS

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

Adequate where specified.

See previous PP&L comment.

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

Subject not addressed.

No procedures have been established. It is planned that PP&L's document control center will perform this function.

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

A vertical stick file is provided as well metal cabinets for microfilm and microfiche. Book cases are also provided.
Pg 2-4



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NRC COMMENTS

PP&L COMMENTS

3.0 CONTROL ROOM

Information for the Control Room was found in the Emergency Plan.

3.1 Integration with Overall Planning

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:

Implied.

nuclear systems,

>

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

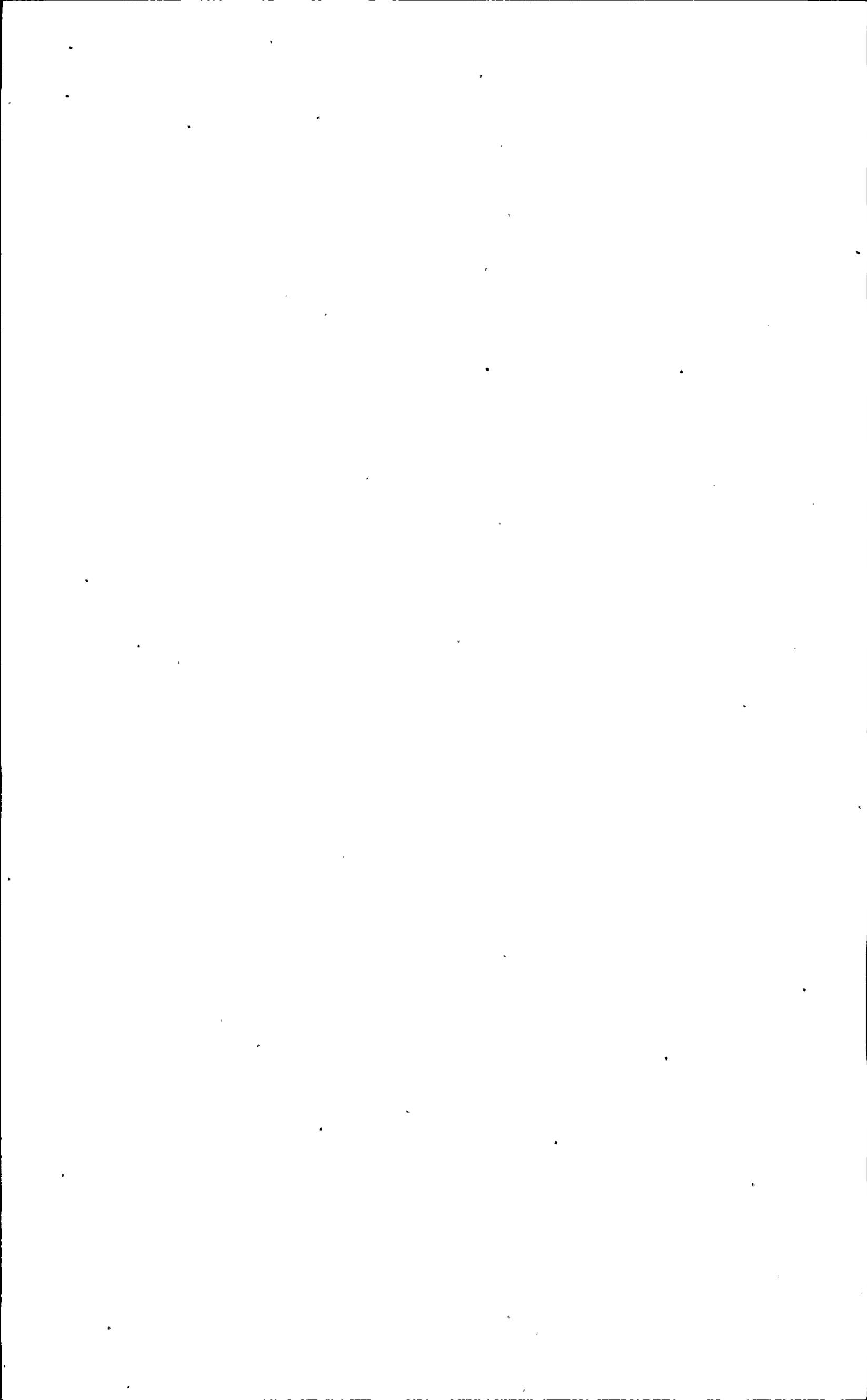
b. The control room is staffed during normal operations by a minimum of:

Adequate response.

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;



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NRC COMMENTS

PP&L COMMENTS

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

Implied.

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

Adequate response.
EP Page 7-1.

- 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.

Staffing

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

Adequate response. EP Table 5-1

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NRC COMMENTS

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2. The succession of authority if the senior person is incapacitated or unavailable must be addressed.
3. The functional organization to the control room during an abnormal event is shown in Figure 3-2.

Adequate response. EP 5-4

Adequate response. EP Table 5-1

3.3 Communications

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

Adequate response. Page 2-7

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.

Adequate response.

Subject not addressed.

Subject not addressed.

TSC communication links with emergency teams are established via UHF radio for onsite teams and VHF radio for the off-site teams. The control room can confirm these links by monitoring these radio communications.

See previous PP&L comment.



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NRC COMMENTS

PP&L COMMENTS

3.4 ERF Phase

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

Implied.

managing plant operations, and

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

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NRC COMMENTS

PP&L COMMENTS

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.

Adequate response. Pg 4-1

Inadequate response. Pg 4-1

Personnel entrance into the control room from the OSC is administratively controlled. Admission to the OSC is controlled by a key card system.

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.

Adequate response. Pg 4-1

Where is it located?

Unit 2 Shift Supervisor's office. Pg 4-1

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

Not isolated. The OSC is at the south end of the Control Room. Pg 4-1

The OSC is separated from the control room by a two-hour rated fire wall.

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

A backup OSC is not addressed. The OSC is as habitable as the Control Room.

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

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

Subject not addressed.

The alternate health physics control point will be located in the control structure where needed.

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NRC COMMENTS

PP&L COMMENTS

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

Subject not addressed.

The OSC is contained within the health physics control point. Thus, personnel will receive less than 5 rem.

Subject not addressed.

According to our shielding design review (NUREG 0737, Item II.B.2) OSC personnel can access storage facilities without receiving greater than 5 rem. during the course of the accident.

4.2 Habitability

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

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

Yes. Pg 4-2

Is the shielding comparable to the control room? Discuss.

Yes. Pg 4-2

Is the ventilation comparable to the control room? Discuss.

Yes. Pg 4-2

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.

Not applicable.

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

Not applicable.

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NRC COMMENTS

PP&L COMMENTS

- | | | |
|--|---|---|
| Have key people been selected to remain onsite (or nearsite) to continue OSC functions? | Not applicable. | |
| Are other personnel, evacuated offsite from the OSC, available to provide additional OSC functions if required? | Not applicable. | |
| 3. How are radiation levels determined in the OSC? | A permanent commercial grade monitor is provided. Pg 4-3. | Radiation levels in the OSC are monitored by a radiation detector in the control room. The radiation detector should sufficiently monitor the OSC environment since:

<ol style="list-style-type: none">1. The OSC and Control Room are not separated by any shield walls.2. The same HVAC system serves the Control Room and OSC. |
| 4. Emergency supplies (protective clothing, respirators, survey meters, dosimeters and KI) shall be available in the OSC for all personnel assigned at the facility. | Subject no addressed. | OSC protective clothing, respirators, survey meters, dosimeters and KI are available from the health physics supply station located on elevation 676 of the control structure. Limited supplies are available within the OSC. |
| What alternate supply arrangements have been made? | Subject not addressed? | None. |
| Where are equipment and supplies stored? | Subject not addressed? | Equipment and supplies are stored in the health physics supply station. |
| How does OSC staff obtain their equipment? (i.e., is it signed out, just taken, etc.) | Subject not addressed. | These OSC staff obtains equipment as needed. There is no sign-out procedure used. |

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NRC COMMENTS

PP&L COMMENTS

4.3 Communications

- | | | |
|--|--------------------|--------|
| 1. There shall be a direct and dedicated primary communication link with the control room and TSC. | Adequate response. | Pg 4-3 |
| 2. Communications with the TSC and control room shall be available at the backup OSC. | Not applicable. | |
| 3. A dial phone shall be available in the OSC for other onsite and offsite locations. | Adequate response. | Pg 4-3 |
| 4. Direct voice intercommunications and/or reliable direct radio communications may be used for supplementing telephone links. | Adequate response. | Pg 4-3 |

4.4 Staffing

- | | | |
|---|--------------------|---|
| 1. Personnel shall be assigned to the OSC for: | Not specified. | Personnel have been assigned to the OSC for the listed functions. |
| 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. | Adequate response. | Pg 4-1 |
| Who will be in charge of the OSC? | OSC coordinator. | Pg 4-1 |

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NRC COMMENTS

PP&L COMMENTS

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

Subject not addressed.

Team leaders are assigned as shown in Table 5.2 of the Emergency Plan. The most qualified person being the team leader.

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).

The OSC is approximately 340 sq. ft.

2. Decontamination facilities should be readily available.

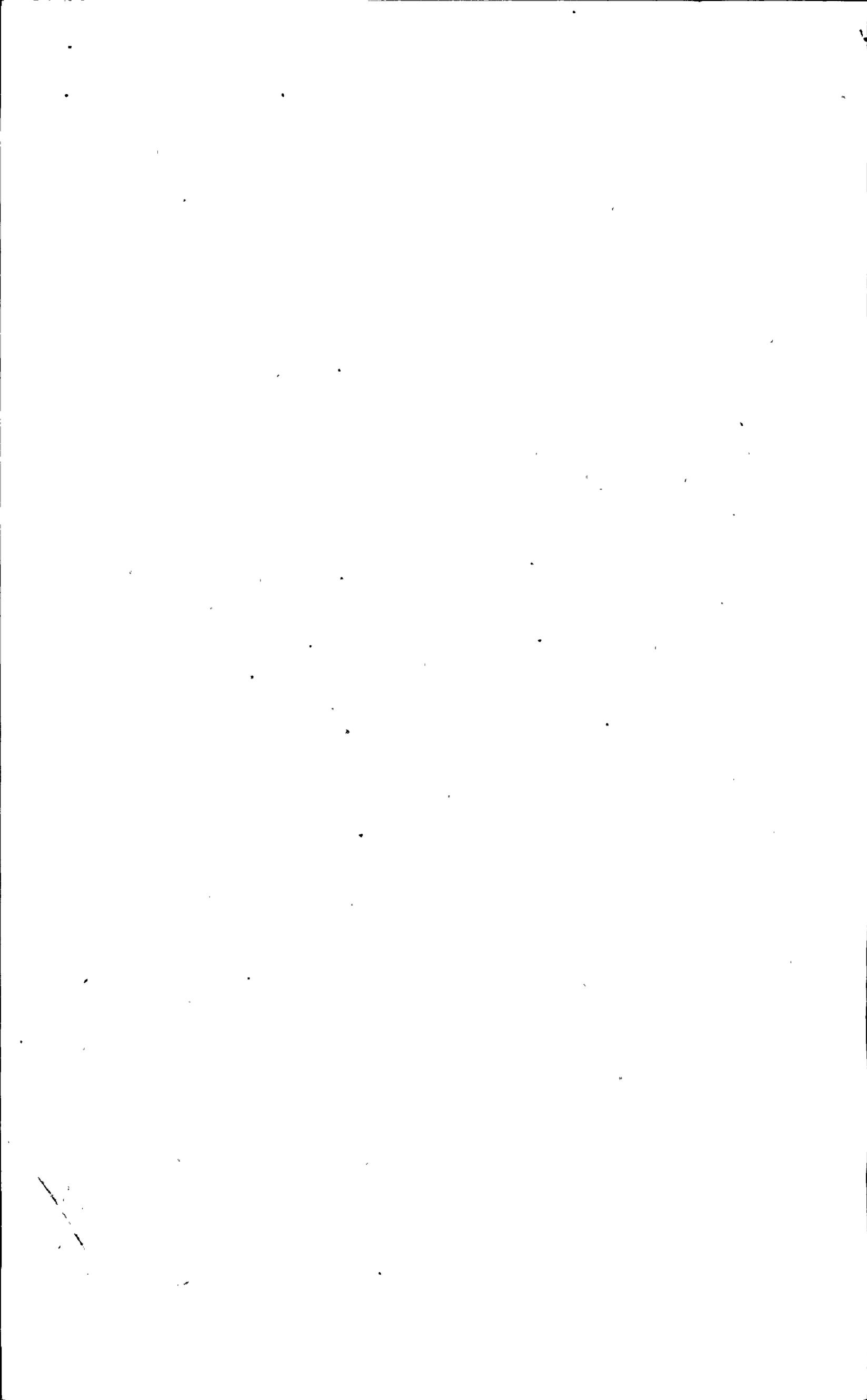
Subject not addressed.

Decontamination facilities are readily available.

Where are they located?

Subject not addressed.

Elevation 676' of the control structure.



5. EMERGENCY OPERATIONS FACILITY

5.1 Integration with Overall Emergency Planning

1. The design of the Emergency Operations Facility (EOF) addresses the following goals:
 - a. Management of overall licensee emergency response;
 - b. Coordination of radiological and environmental assessment;
 - c. Determination of recommended public protective actions; and
 - d. Coordination of emergency response activities with Federal, State, and local agencies.
2. The EOF shall be staffed by licensee, Federal, State, local and other emergency personnel designated by the emergency plan.
3. Facilities shall be provided in the EOF for the acquisition, display, and evaluation of all radiological, meteorological and plant system data pertinent to determining offsite protective measures.
4. The licensee shall use the EOF to coordinate its emergency response activities with those of the local, State, and Federal agencies, including the NRC. Licensee personnel in the EOF will assess potential offsite effects and make

The EOF will provide coordination and evaluation of PP&L activities during an emergency.
PG 3-1

Adequate response.

Adequate response.

Adequate response.

Adequate response.

Adequate response. EP Page 7-3

Adequate response. EP Page 7-4.

Adequate response. EP Page 7-3

appropriate protective action recommendations for the public to State and local emergency response agencies. The EOF may be used as a location for information dissemination to the public via the news media by designated spokespersons in accordance with the licensee's emergency plan. The licensee also may use the EOF as the post-accident recovery management center. Since the specific allocation of functions assigned to emergency facilities will differ from design to design, the proposal should clearly state which functions (Radio-logical Assessment, Security, Coordination with Offsite Agencies) are assigned to the EOF:

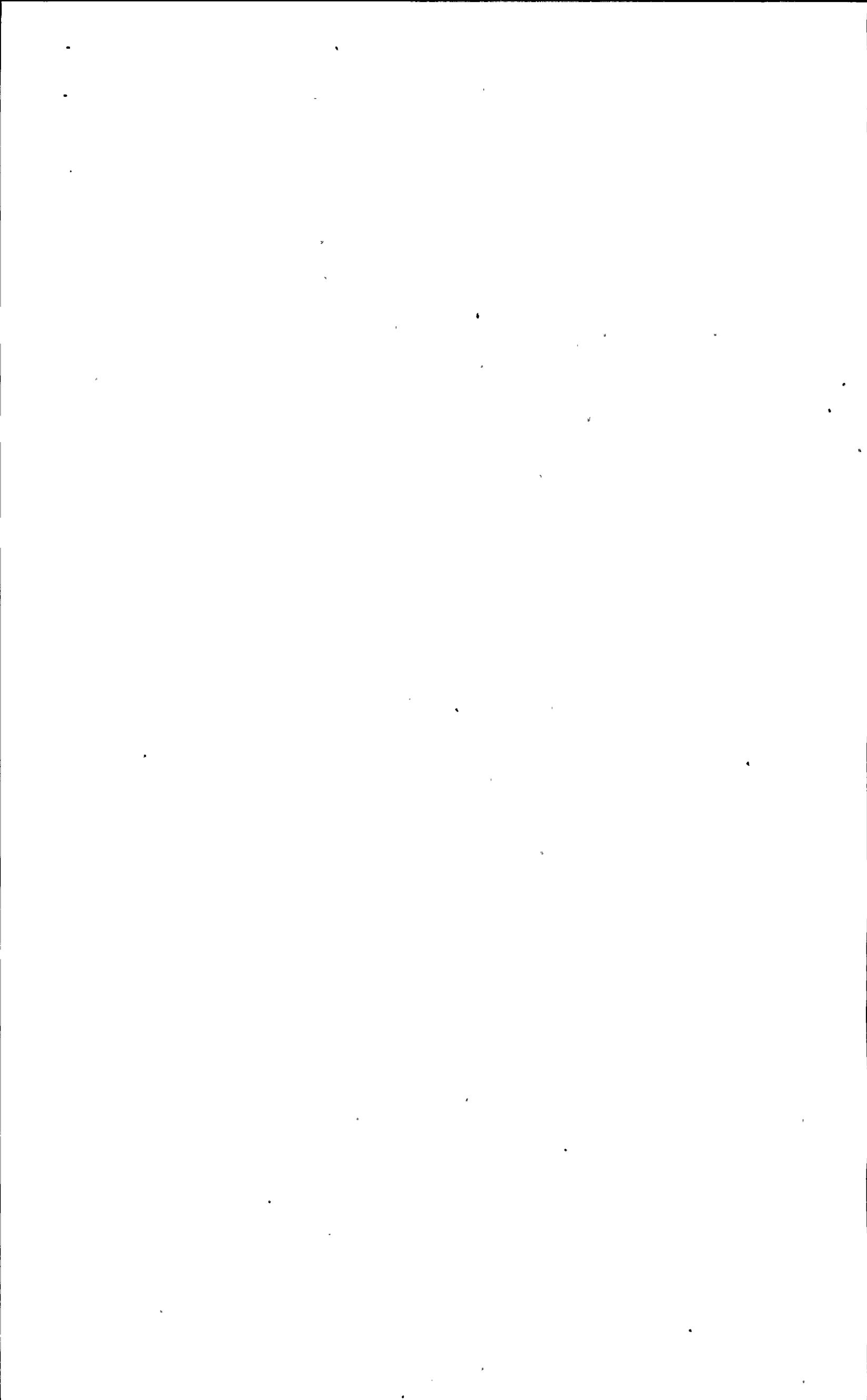
5.2 Location, Structure and Habitability

1. The siting of the EOF should include the following criteria:

- a. Whether the location facilitates carrying out the functions specified for the EOF (i.e., determination of public protective actions to be recommended by the licensee to offsite officials, and coordination of the licensee with Federal, State, and local organizations).

Not specified.

The EOF location is within a mile of the Susquehanna plant. Communication between the EOF and the plant/TSC ensures that the EOF maintains a current status of the emergency and that they have the latest information with which to determine protective actions. The telephone and radio communications network provides close contact between the EOF and off-site agencies.



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NRC COMMENTS

PP&L COMMENTS

Describe the transportation network in the vicinity of the EOF adequate to assure rapid coverage of the EPZ by monitoring teams.

Not specified.

Access from the EOF to environmental monitoring points is by township roads (12 feet wide, stoned surface) and state and federal highways. The near site roadways are shown in Emergency Plan Figure 3.15.1 of Appendix 1 and Figure 2.1. In addition, offsite monitoring teams will be equipped with 4-wheel drive vehicles to ensure they reach monitoring locations.

Is the EOF placed in a location that is readily accessible by road to Federal, State, local government officials as well as the licensee's corporate and site operations personnel?

Not specified. There is direct access to the site over a 12 foot wide stoned roadway. Pg 3-2

Yes.

Has the selection of the EOF location been coordinated with State/local officials?

Not specified.

Yes.

b. What radiation doses would be expected when the EOF is accessed during DBA or other specified accident (less than or equal to 5 rem)?

Not specified.

The EOF is designed for a protection factor of five in accordance with NRC guidelines.

Is the EOF accessible during periods of radiation releases?

Not specified.

The EOF is accessible for short periods of time following a radiation release of the magnitude of a DBA.

Is there an alternate EOF?

Yes, located in Hazleton, PA.

2. The EOF must be able to withstand reasonable expected adverse conditions. (e.g., 100 year floods and high winds)

Adequate response. The EOF is outside of the flood stage.

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NRC COMMENTS

PP&L COMMENTS

How would the maximum 100-year water levels and winds affect the operation of the EOF?

3. The EOF shall have a protection factor greater than or equal to five if located within 10 miles of TSC; no protection level is necessary if located beyond 10 miles of the TSC. Protection factor is defined in terms of the attenuation of 0.7 MeV gamma radiation.

Adequate response. Page 3-10

4. The EOF ventilation system shall be functionally comparable to the control room system and TSC (i.e., high efficiency particulate air filter; no charcoal) if located within 10 miles of TSC. If located beyond 10 miles from the TSC, the EOF needs no ventilation protection.

Adequate response. Pg 3-10

To what level will the HEPA filters reduce particulate levels?

Not specified.

HEPA filters are designed to provide 99.97% efficiency by MIL Standard 282 dop test method on .3 micron particles.

Is the HVAC system controlled to permit isolation to the intake?

Yes. Pg 3-10

At what level of airborne activity is isolation performed?

Not specified.

Isolation will be performed at occupational MPC levels as defined in 10CFR20.

How is the level determined?

Not specified.

A gamma detector (GM type) with a range of .01 to 100mR/hr is used to determine HVAC activity in the EOF ventilation intake.

Where are the sensors located?

Not specified.

The sensor is mounted on the main HVAC intake duct upstream of the HVAC fans and filter media.

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NRC COMMENTS

PP&L COMMENTS

Where is this level monitored?

Not specified.

The level will be monitored in the radiological and environmental monitoring office in the EOF.

5. Protective clothing, respiratory equipment and potassium iodide shall be readily available to all EOF personnel.

Subject not addressed.

Supplies will be available to all EOF personnel (50 people max.).

If not, how many people would be supplied?

Subject no addressed.

See previous PP&L comment.

Are reserves of supplies available?

Subject not addressed.

Reserves are available at the plant. Also, contracts with outside vendors ensure additional equipment may be obtained if required.

What are they located?

Subject not addressed.

See previous PP&L comment.

How is the need for these supplies determined? (i.e., when will respiratory equipment be used?)

Subject not addressed.

The EOF ventilation system is designed to preclude the necessity for using protective equipment in the EOF. See the response to Section 5.5.4 of this document for further information.

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

Subject not addressed.

Protection factor is at least equivalent to full face mask.

Are instructions for KI use provided in the EOF?

Subject not addressed.

Instructions for the use of KI are included in the Emergency Plan Implementing Procedures which are available in the EOF.

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

1. The EOF shall:

- a. Be functional within one hour of activation;

Not specified.

See Section 5.3.1.6 of the Emergency Plan.

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

- | | | |
|---|-----------------------------|---|
| What equipment takes more than 60 minutes to become operational? | Not specified. | None. |
| How long does it take to fully staff the EOF? | Not specified. | The EOF will be fully staffed as soon as reasonable possible. (Appx. 1.5-2 hrs). |
| What is the procedure to ensure notification of the minimum EOF staff? | Not specified. | The procedure for notification of the EOF staff is described in Emergency Plan Implementing Procedures. Minimum staffing will be accomplished in 30-60 minutes. |
| 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.) | Adequate response. Pg 3-2 | |
| 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? | Adequate response. Page 5-2 | |
| 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. | Subject not addressed. | The total EOF staff consists of twenty nine PP&L employees. In addition, four people will be present to support computer operations. As discussed in Section 3.3.1.2 of Appendix I to the Emergency Plan, space for seven NRC/PEMA representatives and eleven more general staff are available. This allows the flexibility to augment the staff if required. |

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NRC COMMENTS

PP&L COMMENTS

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?

Not specified.

In addition, there is a communication link to the general office providing access to engineering support as well as outside agencies such as INPO and project vendors.

Allocation of tasks is being validated by a series of drills which test the emergency plan implementing procedure. These procedures define the tasks of individuals and the required interactions.

5.4 Size

1. The EOF building or building complex shall be large enough to provide:

a. Working space for the personnel assigned to the EOF as specified in the licensee's emergency plan, including State and local agency personnel, at the maximum level of occupancy without crowding (minimum size of total working space provided shall be approximately 75 sq. ft./person);

Adequate response. Fig. 3.15.3

How much space is assigned to each work station?

Adequate response. See Fig. 3.15.3

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

Subject not addressed.

An implementing procedure will be written describing EOF operation.

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?

Adequate response. Fig. 3.15.3

Each work station is provided with the equipment required to perform the required function. Figure 5-1 shows personnel and equipment locations.

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NRC COMMENTS

PP&L COMMENTS

Is each work station equipped for its function (i.e., manager, liaison, dose assessment, engineering, administration, etc.)?

Not specified.

Yes.

Are personnel grouped by function?

Not specified.

Yes.

Does each work station have sufficient space to carry out its assigned function?

Yes. Fig. 3.15.3

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

Not specified.

Grouping personnel by function is the primary means of facilitating interpersonal interaction. The bulk of the interactions which take place will be between personnel performing the same function.

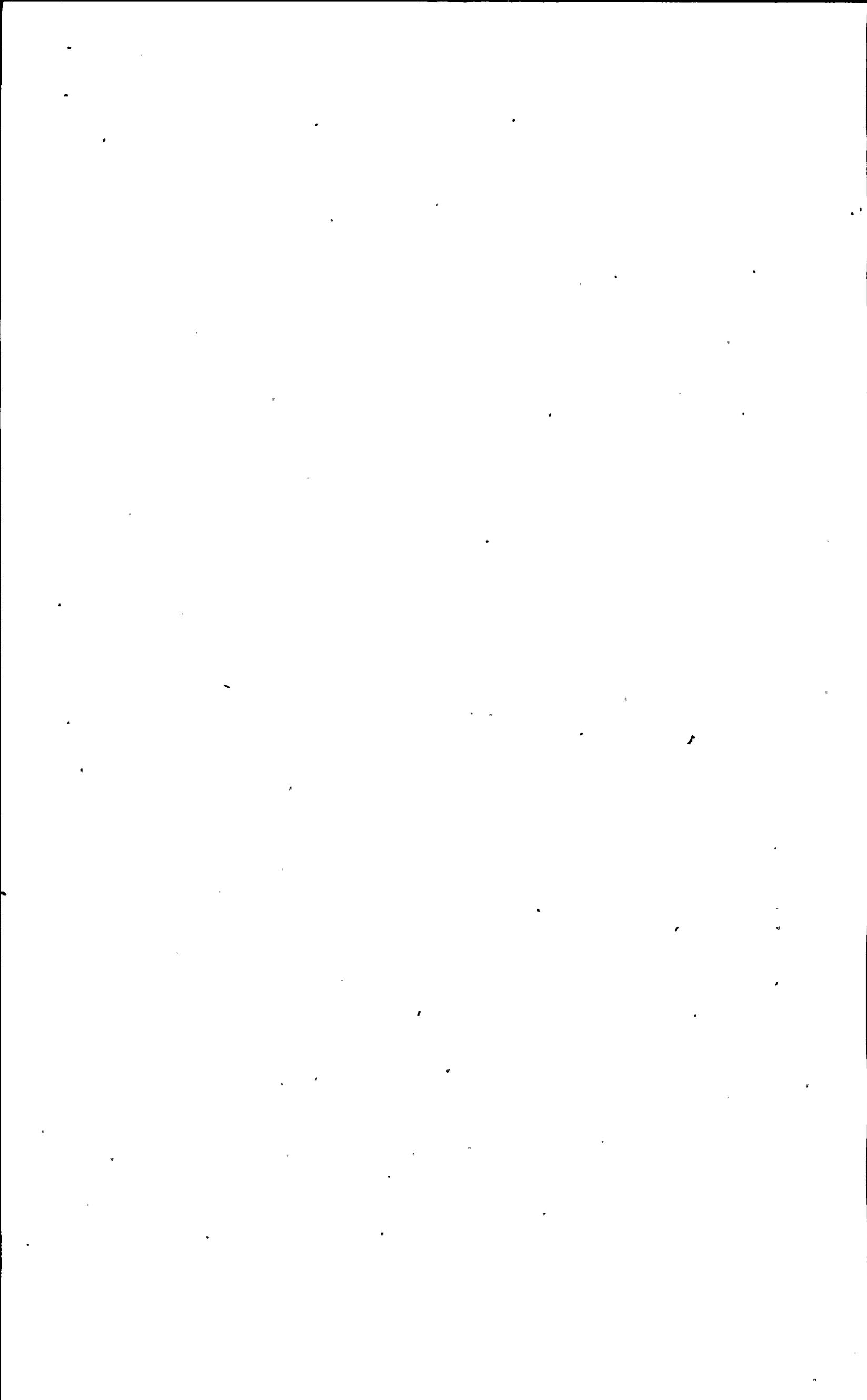
The Emergency Managers are given rooms which facilitate managing the emergency and improve interaction between the managers. In this area we needed to balance the Manager's need for communications with other disciplines and their need for privacy and individual contact with their staff. The offices are grouped together with the Recovery Manager's office the focal point.

Who needs access to which machines?

Not specified.

Access to machines

- o Recovery Manager & Site Support Mgr. - Hotlines and normal phonelines for communications
- CRTs for plant data and SPDS
- 150 & 450 hz radio systems



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NRC COMMENTS

PP&L COMMENTS

- o Radiological Support Mgr - CRT for plant data & dose projections
- 150 hz radio
- DER Radiological hotline
- normal phone lines
- o Technical Support Mgr - CRTs for plant data & SPDS.
- DER Technical hotline
- normal phone lines
- o FEMA/PEMA/DER - Normal phone lines
- o Support Staffs & Other - Normal phone lines
- possible access to CRT for plant data.

NOTE: Status boards will be maintained which will provide most of the radiological and technical information of interest.

What is the flow of information between persons and groups?

Not specified.

- o Technical Parameters - From CRT or TSC Hotline to Site Support Staff
- to: status boards, Recovery Manager, Site Support Mgr., Technical Support Mgr. and Radiological Support Mgr.

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NRC COMMENTS

PP&L COMMENTS

Are personnel performing related tasks located adjacent to one another?

Not specified.

- May also go directly from CRT to any of the Managers or staff members on demand.
 - o Radiological Parameters and Dose Projections
 - From CRT to Radiological Support Staff.
 - to: status boards, Recovery Manager, Site Support Mgr., Technical Support Mgr., and Radiological Support Mgr.
 - Parameters may also go directly from CRT to any manager or staff member on demand.
 - o The Managers will exchange information frequently (approx. every hour).
 - o Managers will be in virtually constant contact with their staff.
 - o Limited interaction between staffs is also expected.
- Yes, personnel expected to interact frequently are located near each other.

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NRC COMMENTS

PP&L COMMENTS

Describe the organizations of the work stations. Are they organized according to Figure 5.2?

Not specified.

Susquehanna's EOF is effectively organized as shown in figure 5.2 of this document. The EOF layout groups people to facilitate these interactions. NOTE: our titles are not the same as figure 5.2, but each function is present.

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

Not specified.

As seen in Figure 5-1, the walls and partitions in the EOF are designed to separate the functions while maintaining sufficient visual and verbal contact to satisfy communications requirements. Traffic is through wide isles, primarily around the outside of the open work area. This provides ready access to all areas and all Managers without unnecessary interruptions.

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

Adequate response. Fig. 3.15.3

Where is the data displayed?

Adequate response. See Fig. 3.15.3

Are layouts of displays coordinated with working space layouts?

Yes.

How much space is there for working with maps, diagrams, drawings, etc.

Not specified.

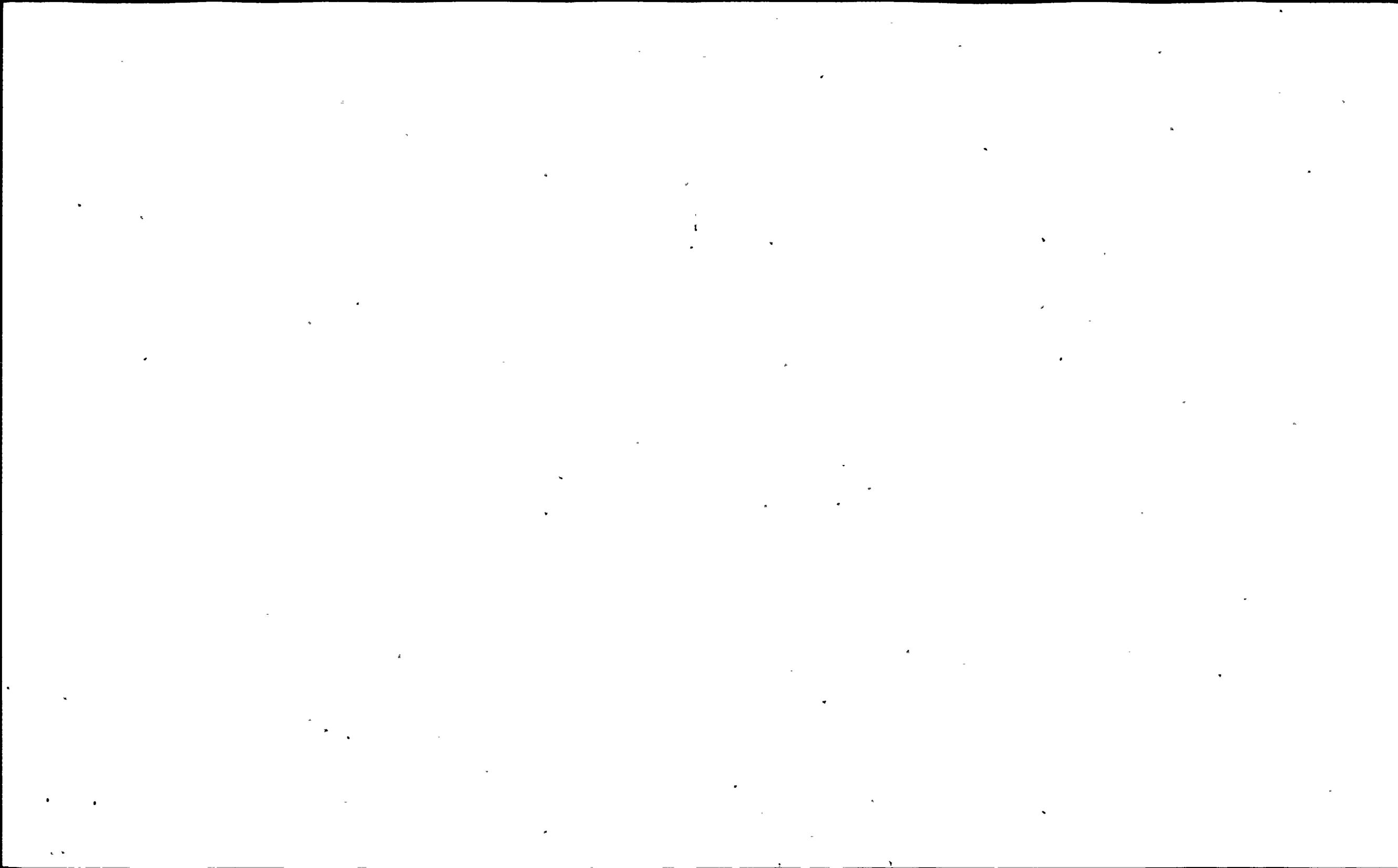
As shown on Figure 5-1 there are numerous desks and tables available for this purpose. Many of the desks are assigned to individuals for their use. Every person in the EOF has desk space. In addition, there are three large tables and approximately ten desks available for general use.

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

Where are the maps, diagrams, drawings, etc., located?	In map and document room.	Fig. 3.15.3	
Is there a description of the characteristics of the machines in the EOF that provides a basis for determining their compatibility with anthropometric guidelines (e.g. Van Cott & Kinkade, Human Engineering Guide to Equipment Design)?	Subject not addressed.		Refer to Aydin Controls literature on Model 8040 CRT monitors and model 5115A keyboards. Also refer to Conrac literature on the Model 5111 monitors.
Are the characteristics of the data display devices compatible with anthropometric guidelines?	Subject not addressed.		Yes, see 5.4.1.b(6)
c. Sufficient space to perform repair, maintenance, and service of equipment, displays, and instrumentation;	Subject not addressed.		An area is being provided in the EOF for equipment maintenance. It is in close proximity to the computer systems area.
How much space is provided to allow access to back panels for repair?	Subject not addressed.		CRT monitors and keyboards will be mounted on tables, thereby presenting no equipment accessibility problems. Display generators and other hardware will be mounted in cabinets in the computer room in the EOF; accessibility will pose no problem.
What spare modules are available?	Subject not addressed.		See PP&L comment to 2.3.1.C.
Is a working station assigned for repair and maintenance?	Subject not addressed.		Yes, see Figure 3.15.3 of Appendix I to the Emergency Plan.
d. Space of unhindered access to communications equipment by all EOF personnel who need communications capabilities to perform their functions.	Not specified.		See below.



SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

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

Subject not addressed.

Yes

How much space is provided for each telephone (about 1 sq. ft.)?

The one square foot criteria is satisfied.

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

A dedicated light is provided for each telephone line. When a call is received, the applicable light flashes and an audible sound annunciates. The light stays lit and the audible sound stops when the line is answered.

e. Space for ready access to functional displays of EOF data.

Not specified.

There are six CRTs available for interactive display and several status boards which will display pertinent information.

Is there space to display maps of the EPZ?

Not specified.

Yes, most walls are suitable for displaying several maps.

f. Space for storage of plant records and historical data. Records, data and drawings may be kept in TSC if they can be displayed in the EOF by an automated method of retrieval.

A map and document room is provided in EOF. Fig. 3.15.3

How much work space is dedicated to this task?

The room is approximately 150 sq. ft. Fig. 3.15.3

g. Separate office space to accommodate at least five NRC personnel during periods that the EOF is activated.

Adequate response. Pg 3-4 Fig. 3.15.3

How much office space is allocated for NRC use (at least 250-375 sq. ft.)?

The NRC room is approximately 250 sq. ft. Fig. 3.15.3

Does this room have a speaker telephone?

Not specified.

Yes.

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

2. The EOF working space shall be large enough for at least 35 persons, including 25 persons designated by the licensee, 9 persons from NRC, and 1 person from FEMA. This minimum space shall be increased if the maximum staffing levels specified in the licensee's emergency plan, including representatives from State and local agencies, exceeds 25 persons.

Adequate response. Fig. 3.15.3

How many people are assigned to the EOF by the Emergency Plan including the NRC personnel and one FEMA person?

Not specified.

Thirty-nine, including five NRC and one FEMA representative. Also included are four people for the computer staff.

Is the workspace adequate for these people to perform their functions?

Yes.

Are workspaces designed to control noise and traffic and to avoid unintended dissemination of confidential information?

Subject not addressed.

Yes, the work spaces are designed to control noise and traffic flow as discussed in PP&L's comment to 5.4.1A of this document.

Dissemination of confidential information is not a major problem for two reasons:

- (1) All personnel in the EOF are part of the Emergency Organization who should have access to essentially all information.
- (2) PP&L has a full disclosure policy for interaction with the public.

Are provisions made for liaison persons from offsite organizations (if desired by these organizations)?

Yes. Figure 3.15.3

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NRC COMMENTS

PP&L COMMENTS

5.5 Radiological Monitoring

1. The licensee shall provide the EOF with installed radiation monitors or dedicated, portable monitoring equipment.

Two wall mounted local radiation monitors will be installed at opposite ends of EOF.
Pg 3-13

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

Yes.

Which instruments will be used?

G-M tube detectors. Pg 3-13

Where are instruments located?

Opposite ends of the EOF. Pg 3-13

How many of each?

2 GMs.

How were types of, number of, and placement of monitors determined?

Not specified.

The type of radiation monitors were chosen to provide the maximum available sensitivity for this type of application and to provide a type of instrument which is similar in operation to others at the plant. The number and placement of monitors was chosen to provide general coverage of the building and was determined by reviewing traffic flows and work activities against the building layout.

What range do these instruments have?

0.01 to 100 mr/hr. Pg. 3-13

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.

Adequate response. Pg. 3-13

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

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

Not specified.

The radiological support manager is responsible for monitoring EOF habitability. Either he or one of his staff will be assigned to perform this function.

What are the qualifications of this person?

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

Yes. Pg 3-13

At what radiation levels will these instruments alarm?

Not specified.

60 mR/hr

Are unattended instruments in continuous operation.

Yes.

How is iodine monitored?

By a portable low volume air sample with silver zeolite cartridges.

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

Subject not addressed.

Yes.

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?)

Subject not addressed.

ARMs are provided with backup power. The PING 2A is provided with a spare battery. The instruments satisfy the requirements of manufacturer's specifications for availability and accuracy. Calibration is done quarterly.

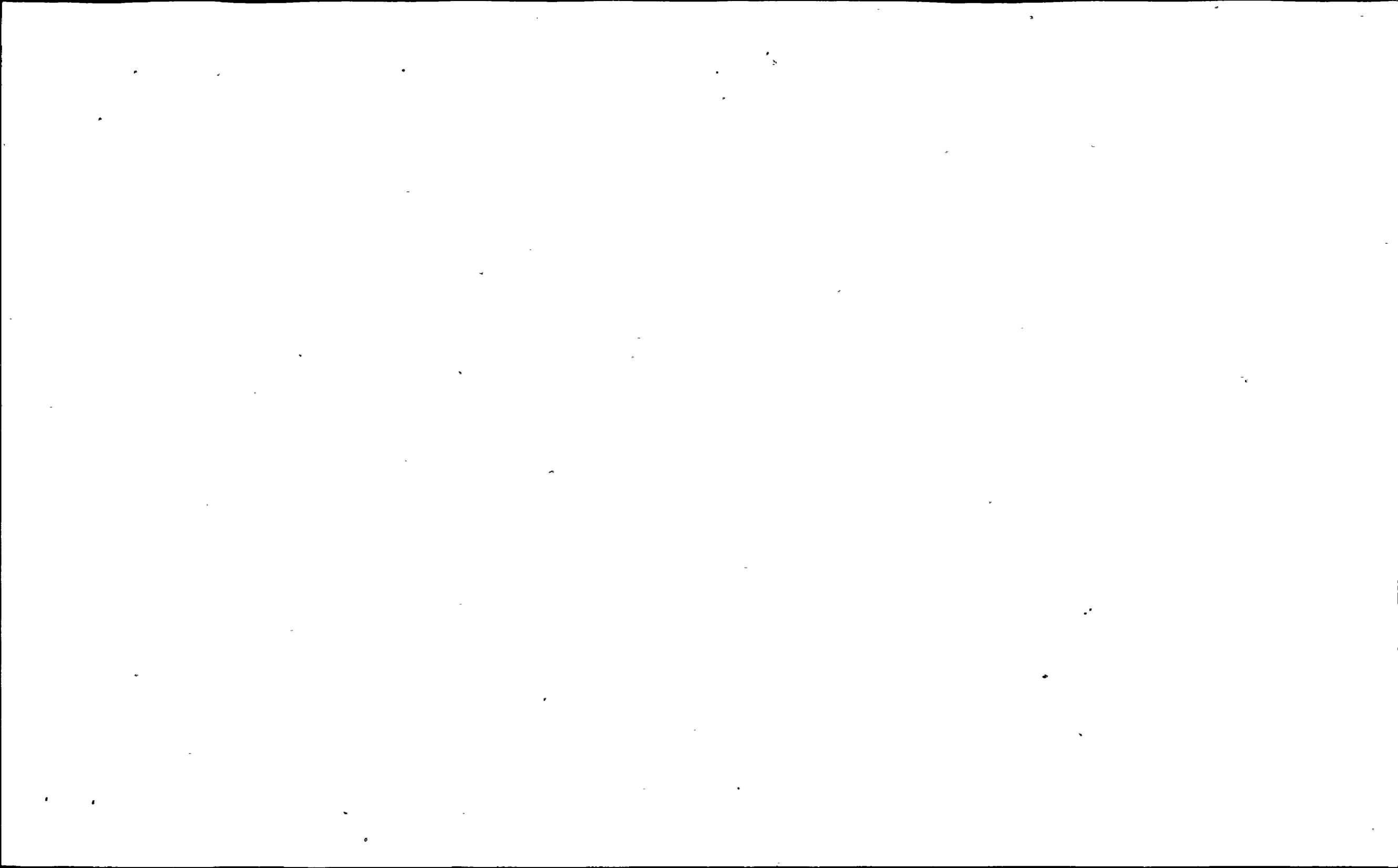
3. These monitoring systems shall include local alarms with trip levels set to provide early warning to EOF personnel of adverse conditions that may affect the habitability of the EOF.

Adequate response. Pg 3-13

What are the trip levels of these instruments?

Not specified.

60 mR/hr



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NRC COMMENTS

PP&L COMMENTS

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

Not specified.

Yes, this setting is the precautionary warning. If the alarm sounds, the radiological protection manager will monitor the situation and determine what protective actions are required, if any.

4. Does the EOF have a counting room?

Yes. Fig. 3.15.3

What instruments are available in the counting room?

Not specified.

1. Hyper-pure germanium gamma-ray spectrometer system.

2. "Frisker"

3. Surveymeter.

Where are backup counting rooms located?

Subject not addressed.

The health physics area at the training center. A contract with an off site vendor to supply a portable counting laboratory ensures facilities will be available even if both the EOF and training center cannot be used.

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

Implied.

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

Not specified.

Yes, in a separate closet, not part of the counting room.

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 airborne plume.

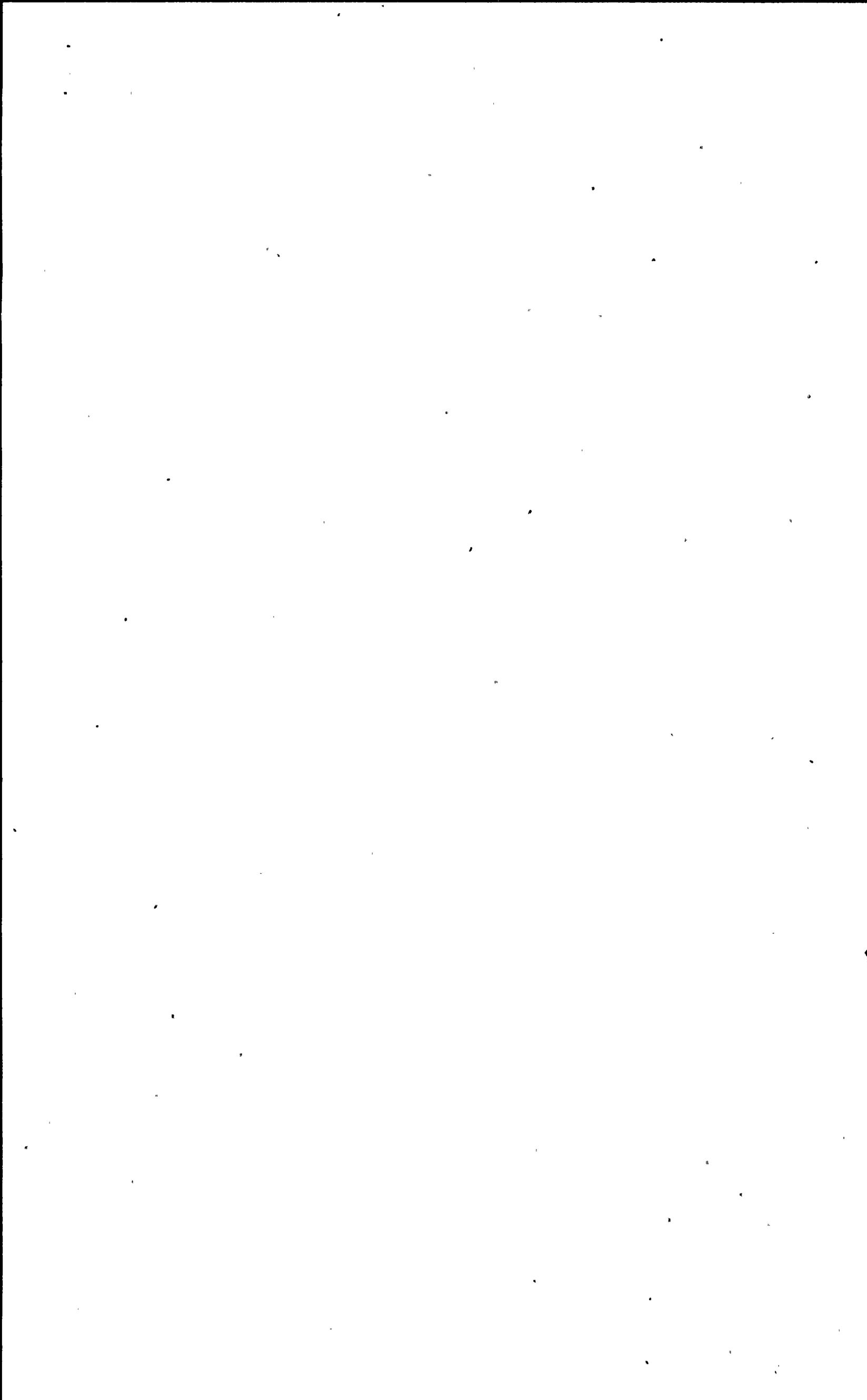
Subject not addressed.

See below.

Are instructions for the use of KI available?

Subject not addressed.

Yes, in the emergency plan implementing procedure which is available in the EOF.



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NRC COMMENTS

PP&L COMMENTS

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

Subject not addressed.

Reserves of equipment are described in PP&L's comment to Section 5.2.5 of this document.

Where?

Subject not addressed.

See previous PP&L comment.

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

Subject not addressed.

Personnel will don respiratory equipment when the estimated exposure exceeds 5 MPC/hr.

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

Subject not addressed.

Yes.

4.6 Communications

1. EOF telephone access to commercial telephone common carrier services must bypass any local telephone switching facilities that may be susceptible to loss of power in emergencies.

Subject not addressed.

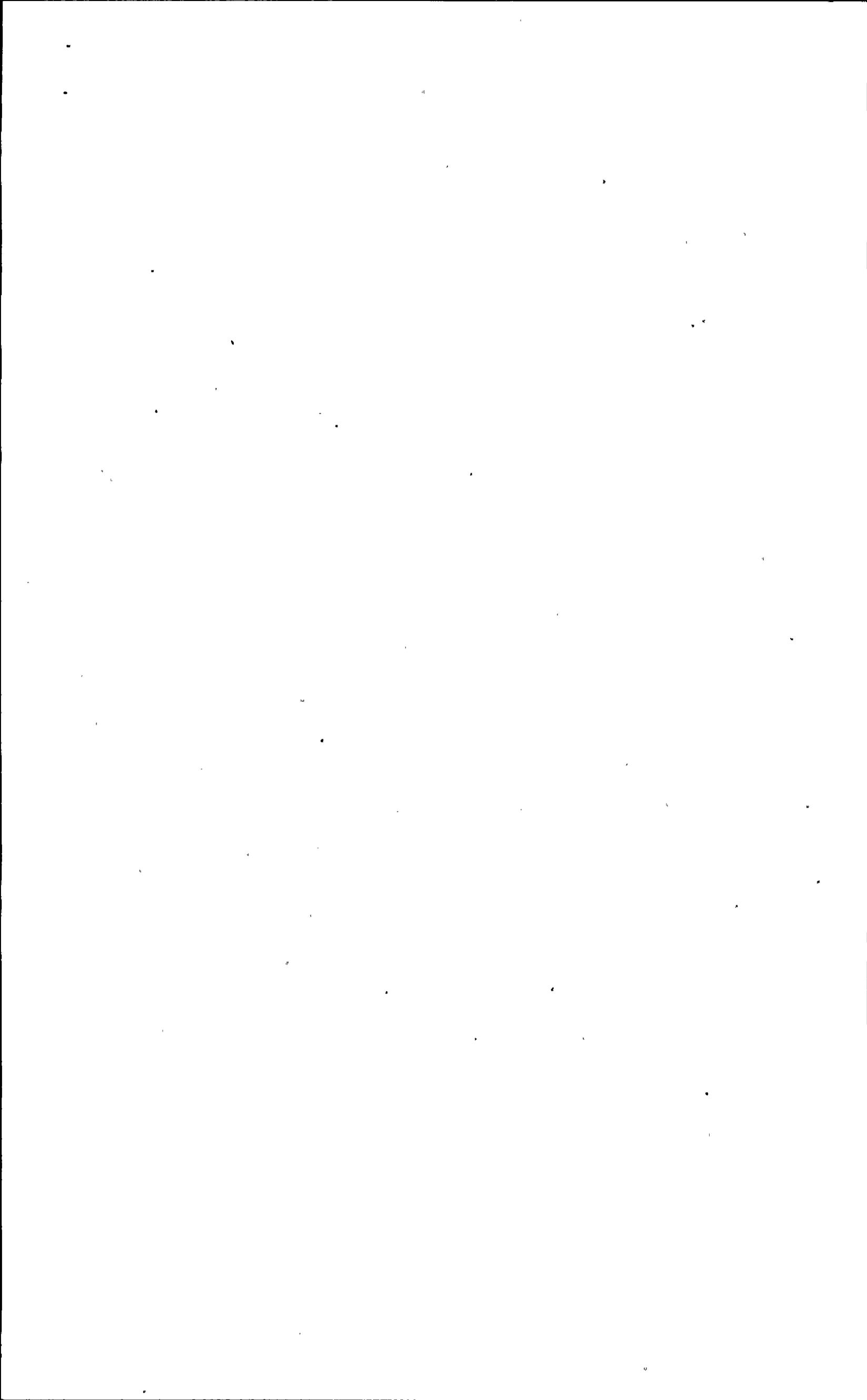
Telephone service to the EOF will be divided between two diverse routes. The first route is via a hardwire telephone line to Berwick and the second route is via a fiber optic cable from the EOF to the plant PABX. Circuits such as local lines and hotlines will by-pass the PABX. The fiber optic system is powered from the EOF UPS system. The plant PABX is powered from normal AC with backup from an 8 hour battery.

How many switchboard independent commercial telephone lines are available in the EOF?

Subject not addressed.

Ten hotlines and eight local commercial lines all of which are independent of the plant PABX.

2. EOF voice communications must consist of a reliable primary and backup system and include:



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NRC COMMENTS

PP&L COMMENTS

- a. Hotline telephone located in the NRC office space and also in the licensee space if desired by the licensee) on the emergency notification system (ENS) to the NRC Operations Center;

Adequate response. Not addressed for licensee Pg. 3-15.

The NRC emergency notification system hotline will be located in the NRC office and in the emergency coordinators office.

What is the backup system for communications to the NRC?

Adequate response. Pg 3-14

- b. Dedicated telephone located in the NRC office space (and also in the licensee space if desired by the licensee) on the NRC Health physics network (HPN);

Adequate response. Not addressed for licensee. Pg 3-15.

The NRC health physics network is planned to go only in the NRC office at this time.

What is the backup system for communication to the NRC?

Adequate response. Pg 3-14

- c. Dedicated telephones for management communications with direct access to the TSC and the control room;

Adequate response. Pg 3-15

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

Not specified.

Yes, these are dedicated hotlines between the TSC, EOF and/or the control room. The hotlines are powered off the EOF UPS system.

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

Adequate response. Pg 3-14

- e. Intercommunications systems between work areas of the EOF, if needed for the EOF functional performance and if the EOF is comprised of separate functional areas;

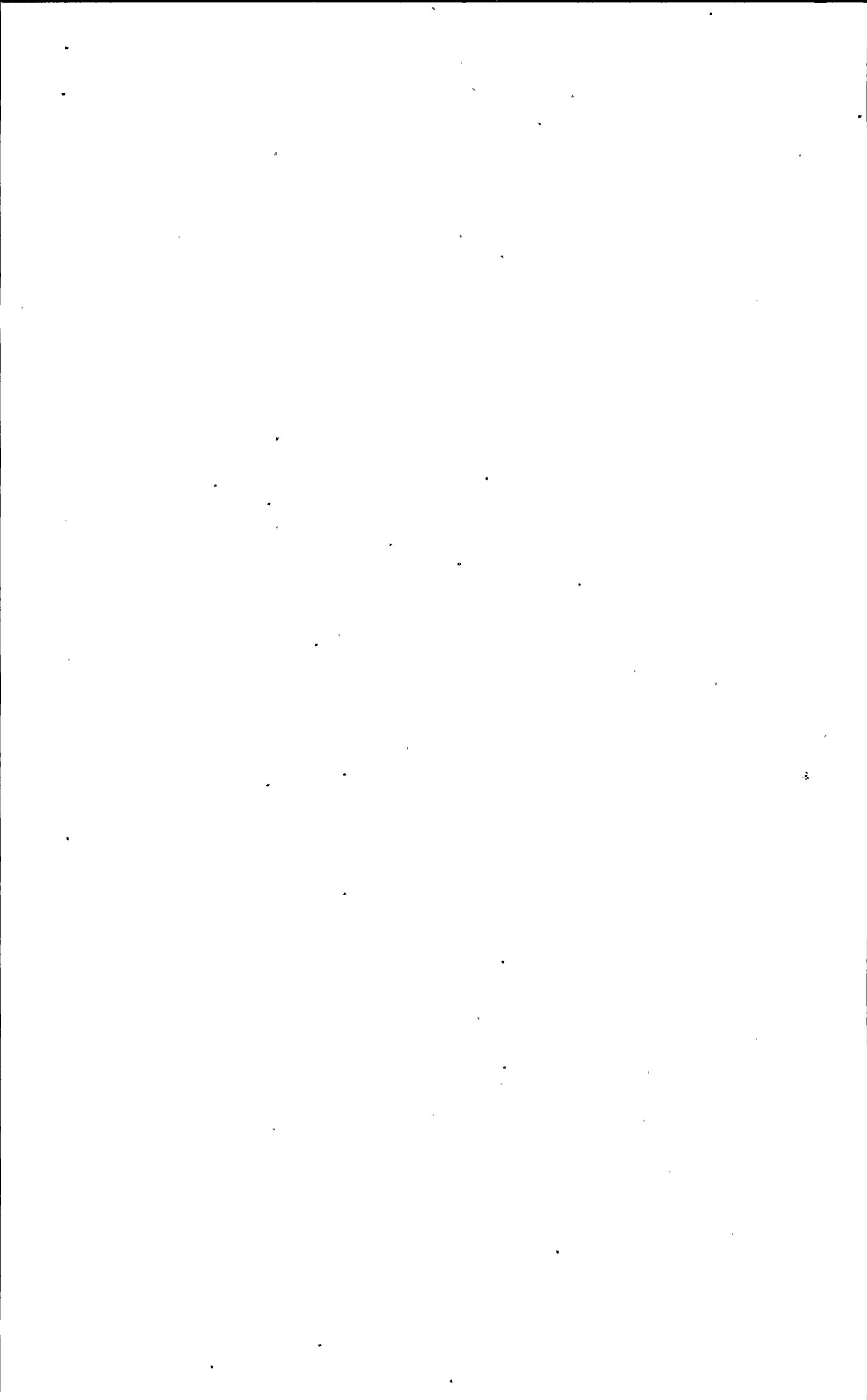
Not specified.

The EOF telephone system will serve as the intercommunication system.

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

Not specified.

No.

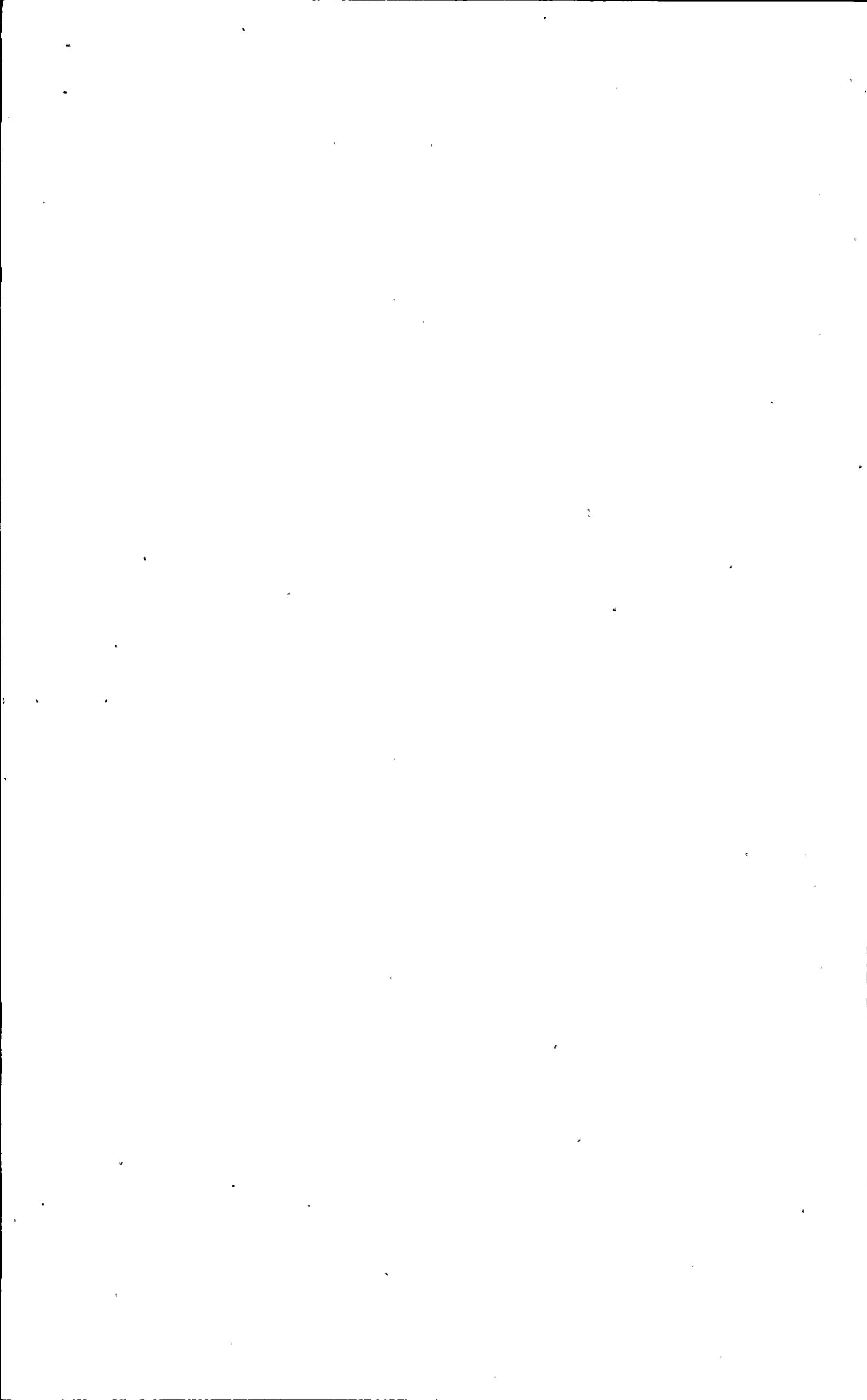


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NRC COMMENTS

PP&L COMMENTS

- f. Radio communications to licensee mobile monitoring teams; Adequate response. Pg 3-15
- Are there provisions to use commercial telephones as a backup? Yes. Pg 3-14
- g. Communications to State and local operations centers; Adequate response. Pg 3-15
- What are the primary and backup communications? Addressed. Pg 3-14
- Are they diverse, redundant and dedicated? Yes. Pg 3-14
- h. Communications to facilities outside the EOF used to provide supplemental support for EOF evaluations. Adequate response. Pg 3-14
- Are there primary and backup communications to corporate HQ? Yes. Pg 3-14
3. The EOF communication system shall also include designated telephones (in addition to the ENS and HPN telephones) for use by NRC personnel. The licensee shall provide at least two dial telephone lines for such NRC use when the EOF is activated. The licensee shall also furnish the onsite access facilities and cables to the NRC for the ENS and HPN telephones. Adequate response. Page 7-4
4. Facsimile transmission capability between the EOF, the TSC, and the NRC Operations Center shall be provided. Adequate response. Pg 3-15



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NRC COMMENTS

PP&L COMMENTS

Is facsimile transmission capability installed and tested for compatibility with NRC and offsite authorities?

Subject not addressed.

When the facsimile is installed it will be tested.

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

Not specifically addressed. Descriptions of communications are given, but not with respect to job title.

The Emergency Plan Implementing Procedures and Appendix I to the Emergency Plan describe specific communication paths and the facilities available.

EOF manager with

Corporate HQ
TSC
Control Room
NRC
State Government
Local Government
EOF Supervisors

Administrative supervisor with

Corporate HQ
TSC Security Communication Center
Outside Telephone Lines
EOF Manager.
Telefax
Photocopying

Dose Assessment Supervisor with

HPN telephone
TSC
EOF Manager
Outside line
Radio to Monitoring Teams

Engineering Supervisor with

Control Room
TSC
Corporate
Outside lines
Vendors

Liaison Supervisor with

Corporate HQ
NRC
State Government
Local Government
TV Monitor (news stations)

5.7 Instrumentation, Data System Equipment, and Power Supplies

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

5.8 Technical Data and Data System

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

5.9 Records Availability and Management

1. EOF 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.

Record storage is available. Fig. 3.15.3

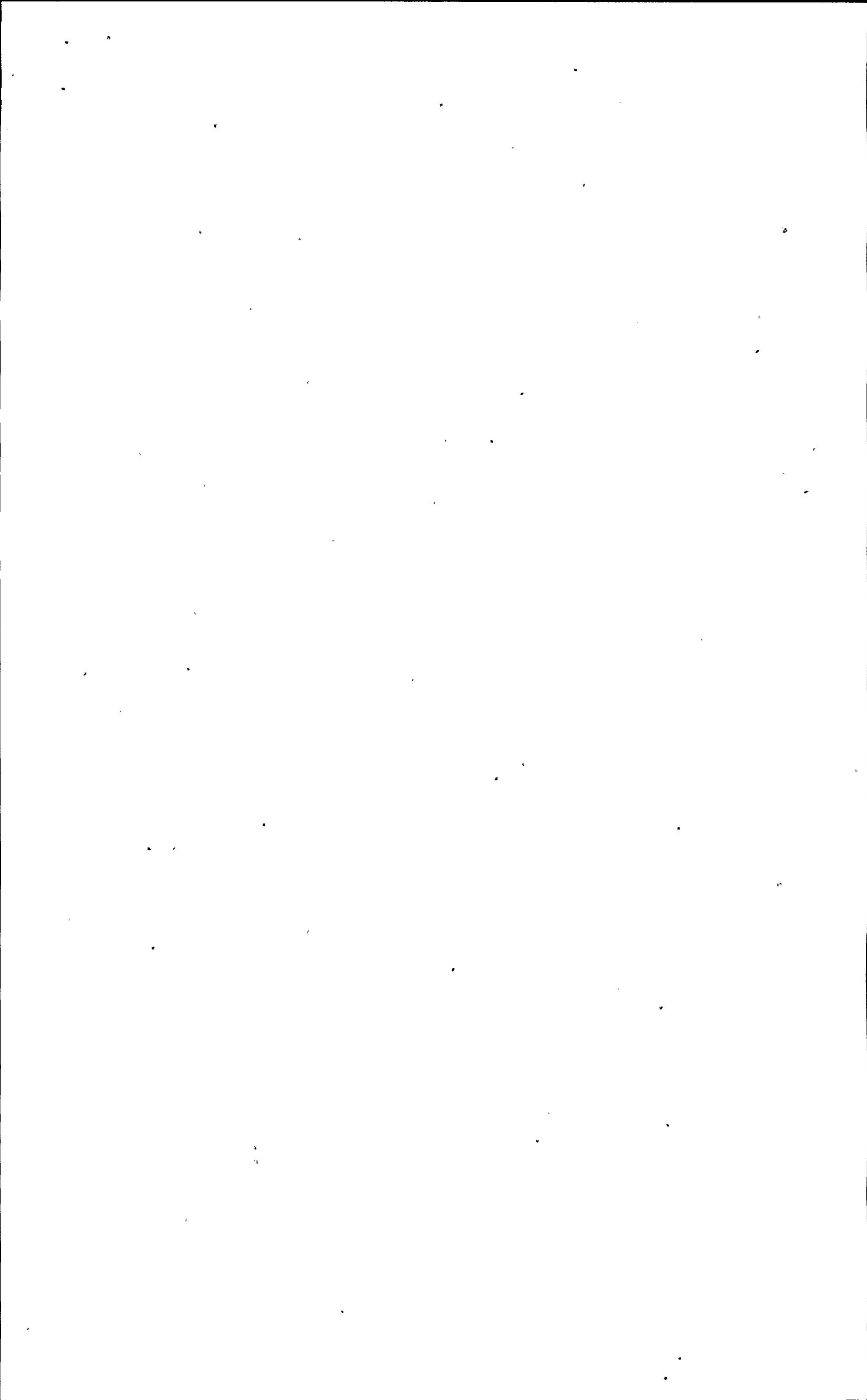
Addressed.

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NRC COMMENTS

PP&L COMMENTS

Does the EOF have access to primary and backup meteorological data?	Not addressed.	The EOF will have access to data from both levels on the primary towers and the single level on the backup tower. This data will be presented on formats available through the UMC.
Are does assessment procedures designed to use either data set?	Not addressed.	Yes.
b. Up-to-date records related to licensee, State, and local emergency response plans.	Addressed.	
Does the EOF have up-to-date copies of State, local and Federal emergency response plans and procedures?	Addressed.	
c. Safety Parameter Display System.	Not addressed.	CRTs will be provided in the EOF for the display of SPDS related data. These displays will be identical to SPDS displays in the control room and TSC.
d. Offsite population distribution data.	Addressed.	
e. Plant technical specifications.	Addressed.	
Are specifications, records, drawings, and reports the current ones (what are the most current dates)?	Yes.	
f. Evacuation plans.	Addressed.	
g. Plant operating procedures.	Addressed.	
h. Environs radiological monitoring records.	Addressed.	



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NRC COMMENTS

PP&L COMMENTS

- | | | |
|--|--|---|
| i. Emergency operating procedures. | Addressed. | |
| j. Licensee employee radiation exposure histories. | Addressed. | |
| k. Final Safety Analysis Report. | Not addressed. | Yes. |
| 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. | Addressed.

Not specified.

Not specified. | These records are stored in the maps and documents room of the EOF.

See above comment.

See above comment. |
| m. Checklists, guides, worksheets and other job performance aids. | Not addressed. | Applicable procedures, checklists, aids, etc. will be set up in the managers offices as part of the EOF activation procedure. |
| 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. | Adequate response. | EP Page 7-4 |

How are records stored and maintained in the EOF?

Records are updated and managed by the SES Document Control Center (DCC). Utilizing DCC administrative procedures. Page 3-18

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

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

Are records stored as to be readily and easily accessible?

How are records updated?

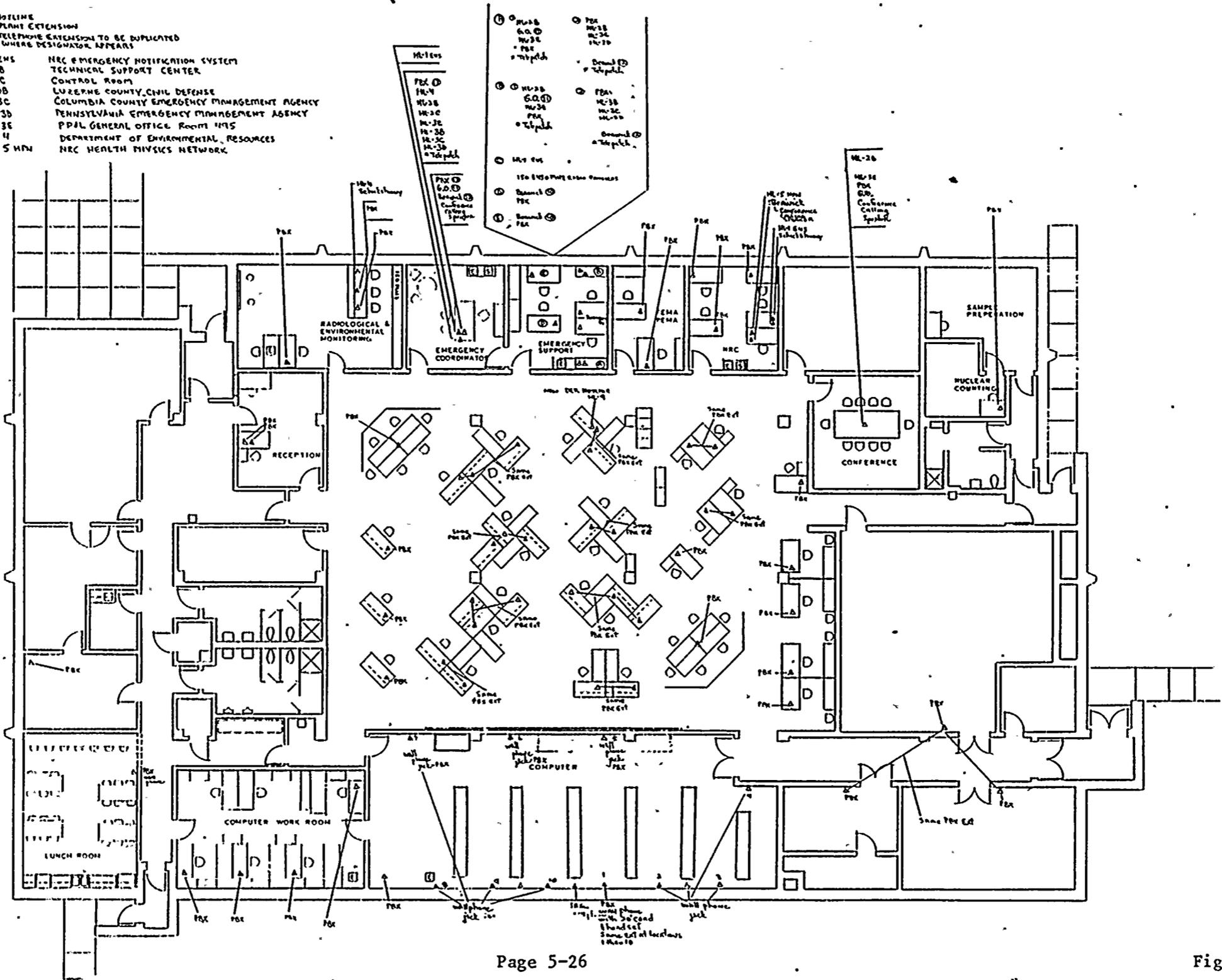
How are the records accessed?

(MG/41-A)

- HL - HOTLINE
- PBX - PLANT EXTENSION
- ⊙ - TELEPHONE EXTENSION TO BE DUPLICATED WHERE DESIGNATOR APPEARS

- HL-1 EMS NRC EMERGENCY NOTIFICATION SYSTEM
- HL-2B TECHNICAL SUPPORT CENTER
- HL-2C CONTROL ROOM
- HL-3B LUZERNE COUNTY CIVIL DEFENSE
- HL-3C COLUMBIA COUNTY EMERGENCY MANAGEMENT AGENCY
- HL-3D PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY
- HL-3E PPAI GENERAL OFFICE ROOM 1195
- HL-4 DEPARTMENT OF ENVIRONMENTAL RESOURCES
- HL-5 HWY NRC HEALTH PHYSICS NETWORK

A Telephone jacks



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.

Adequate response. Fig. 7.1, 7.2.

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.

Adequate response. Figures 2.14.3, 3.15.4

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

2. DAS Environment

a. Where is the DAS located?

p. 7-1, 7-2, & 7-4. Central computer in EOF for all except Seismic SPDS. Dedicated computer for Seismic SPDS in CR.

b. What fire protection facilities are provided?

Adequate response. P. 3-8

c. Is the room temperature controlled?

Yes. P. 3-5, 3-10

What is the heat output of the equipment?

Not specified.

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

Not specified.

d. What humidity controls are provided?

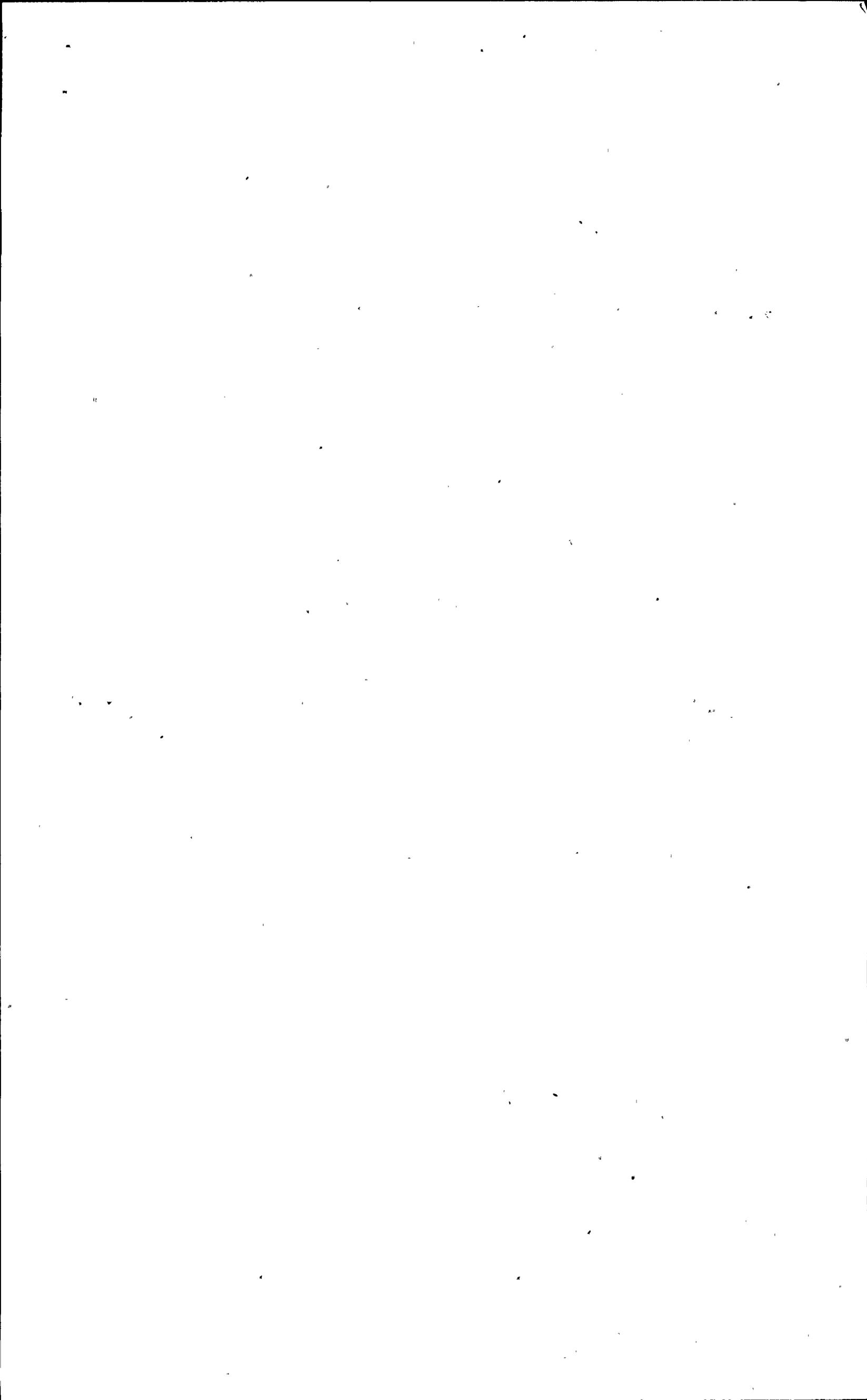
Insufficient information. P. 3-11

SPDS equip. in control room - 22,600 BTU/hr
SPDS equipment in EOF - 13,500 BTU/hr
SPDS equipment in TSC - 2,525 BTU/hr
SPDS Data Acquisition Equip.- 2,050 BTU/hr
CRTs in EOF tied to Plt.Com.- 3,750 BTU/hr
CRTs in TSC tied to Plt.Com.- 3,750 BTU/hr

Cooling for the EOF computer room is provided by three computer room air conditioning units each with a heat removal capacity of 78.8 MBH. Two are required to satisfy the room cooling load and the third is for standby.

The control room and ESC cooling system maintains a temperature of 75°F ±5°F and a relative humidity of 50% ±5% in these areas. For further details see FSAR Subsection 9.4.

Humidity control is provided as part of the computer room cooling system which uses "EDPAC" coolers. "EDPAC" coolers have panel humidifiers with electric water heaters. The humidity in the room is controlled by humidity sensors.



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NRC COMMENTS

PP&L COMMENTS

Humidity control for the control room and TSC is discussed in FSAR Subsection 9.4.

e. Concerning electrical power:

What power sources are available?

Adequate response. P. 2-8, 3-16

What are the DAS power requirements?

Not specified.

SPDS equip. in control room - 6620 watts
- SPDS equipment in EOF - 3944 watts
SPDS equipment in TSC - 740 watts
SPDS Data acquisition equip.- 600 watts
CRTs in EOF tied to Plt.Com.- 1100 watts
CRTs in TSC tied to Plt.Com.- 1100 watts

Is the source uninterruptable?

Yes. P. 3-16

What is the backup source?

Diesel generator will accept load in 10 sec. P. 2-9, 3-16

3. DAS Physical Security and Access

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

Card reader-controlled access to TSC. P. 2-12, 3-18

b. Identify the authorized personnel.

Not specified.

Nuclear Plant Engineering's Computer Group.

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

Not specified.

No.

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

Not specified.

No.

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NRC COMMENTS

PP&L COMMENTS

6.3 DAS Equipment Specifications

In order to evaluate the capability of a proposed DAS to acquire the 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.

Not specified.

No specific information is given regarding the DAS configuration.

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: _____

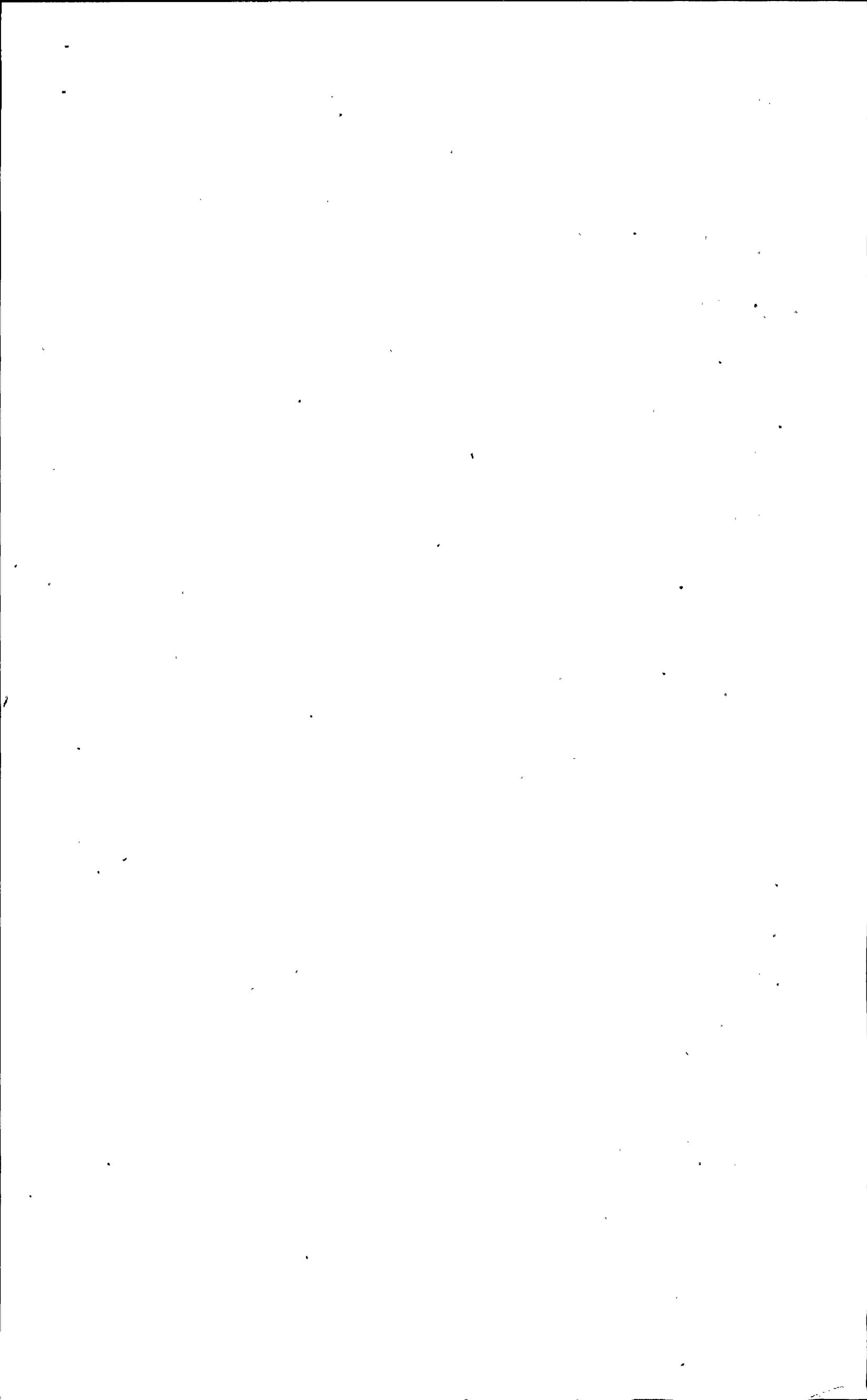
Digital Equipment Corporation

PDP 11/24

5×10^5 instr./sec.

One 11/24 per each unit (control room)
One 11/24 in the EOF

For each processor or subsystem indicate the following:



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NRC COMMENTS

PP&L COMMENTS

Working storage: _____ bytes.

What type? (core, MOS, etc.)

Error detection and/or correction capability?

On-line disk storage:

256K bytes per each 11/24

MOS

Error detection is provided for in the 11/24

Control Room

EOF

Number of controllers: _____

Number of drives: _____

Total capacity: _____ bytes.

Maximum access time: _____ sec.

Minimum transfer rate: _____ bytes/sec.

One DEC ML 11 on each 11/24

One Controller/disc

ML 11 is a solid state disc with 4M byte cap.

Access time of 55 microsec

None.

Two DEC RL02 disc drives on the single 11/24.

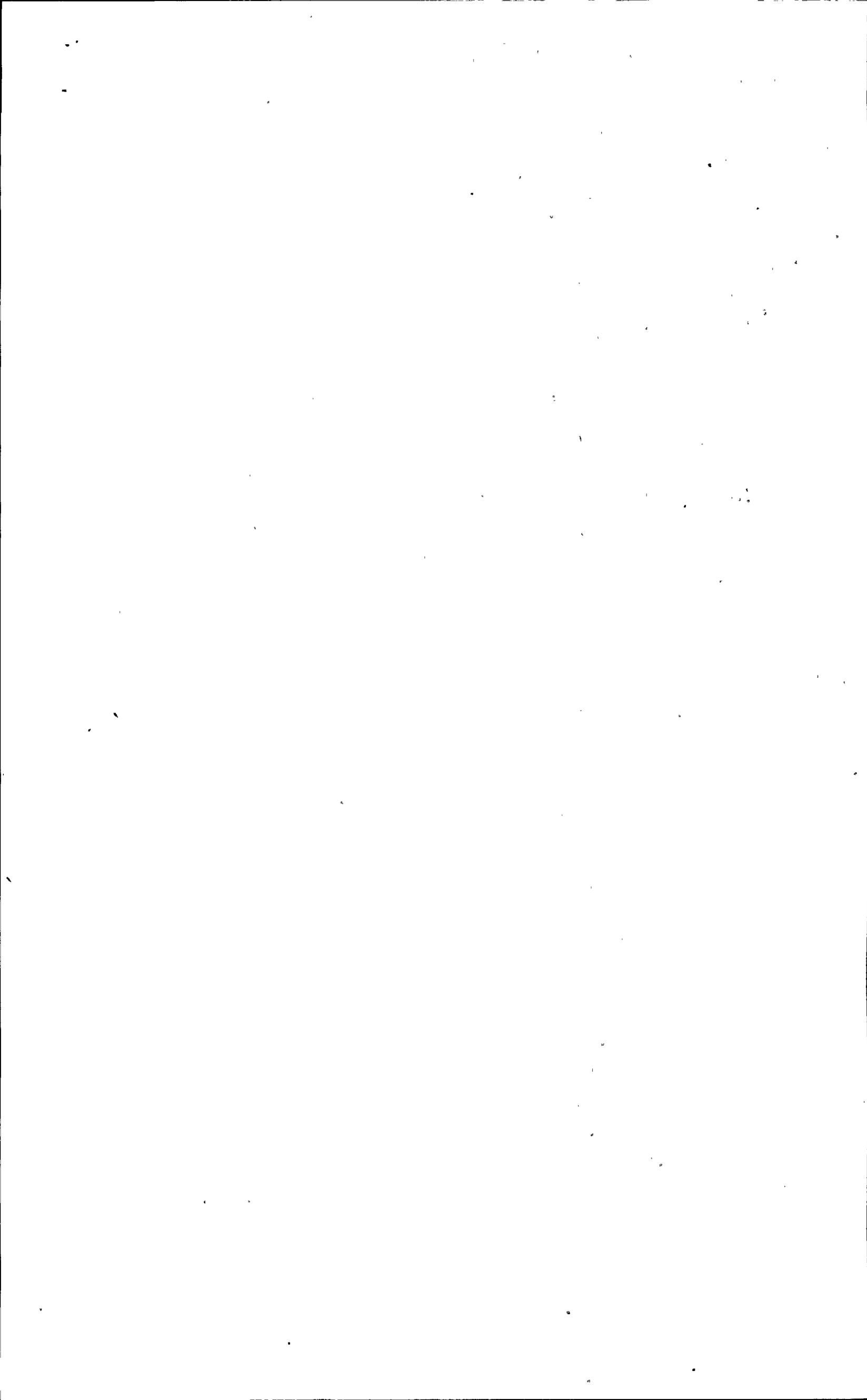
10M bytes of memory per drive.

Ave. access time is 67.5 millisecs

Peak transfer rate is 512K bytes/sec.

Tape storage:

Drive type: (7 or 9 track)



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NRC COMMENTS

PP&L COMMENTS

Number of drives: _____

Maximum density: _____ bytes/inch.

Speed: _____ inches/sec.

Data Acquisition Hardware:

Number of analog channels: _____

168

Sampling rate per channel: _____
samples/sec.

1000

Resolution per channel: _____ bits.

12

Number of digital channels: _____

160

Bits per digital channel: _____

2

Data communications hardware:

Number of ports: _____

1 data port will be implemented on each of the 11/24s in the control room and 2 data ports will be implemented on the 11/24 in the EOF. Front-end data is transmitted over fiber optic link to an 8-channel asynchronous multiplexer operating at 38.4K bits/sec.

Type of ports: (RS-232, V35, etc.)

Average data rate per port:
_____ bits/sec.

b. What software operating system is used?

RSX11M.

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NRC COMMENTS

- c. Will this operating system software be specifically modified for use with the DAS? If so, describe the proposed modifications and their justification.
- d. Identify any other software components of the DAS and their source.

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.

The interim ERCS will use the plant process computer.

The following information is therefore required, and is not provided.

PP&L COMMENTS

Drivers will be added for communications with the front-end hardware.

Intelligent remote multiplexers provided by Simmonds Precision.

The SPDS functions will be accomplished by stand-alone systems. A stand-alone data acquisition system and computer with CRTs, housed in the control room, will be implemented for each unit. A stand-alone SPDS system will also reside in the EOF for processing of SPDS data for Unit 1 and 2. This configuration will be implemented as part of the interim ERCS.

CRTs in the TSC and EOF tied to the Plant Computer System, specifically, the BOP computer, will handle other interim ERF functions. The primary plant functions are handled by a computer other than the BOP computer.

The BOP computer is a Honeywell 4400. Refer to Honeywell RTMOS documentation for operating system descriptions.

In the Ultimate ERCS Configuration the functions provided by the plant computer will be provided by a separate, dedicated computer system.

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NRC COMMENTS

PP&L COMMENTS

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

Not specified.

The majority of instrument loops are 4-20 mA current loops. A signal resistor unit is in series with each of these loops. The voltage signal developed across these resistors is fed to indicating instruments. The high impedance (1 Megohm) DAS inputs are paralleled across the signal resistor units. Where voltage signals are directly produced by amplifiers in the signal conditioning equipment the high impedance DAS inputs are paralleled across these outputs.

At what rate is the sensor sampled: _____ samples/sec.

One sample per second will be the FASTEST any variable will be scanned. P 8-2

At what resolution is the sensor data read: _____ bits.

Not specified.

Twelve bit resolution on the data.

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

Not specified.

Specific procedures for performing data entry have not been finalized, however, design will follow standard keyboard manual entry procedures.

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.

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

6.5 Data to be Provided for Dose Assessment

Not specified.

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 of 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.

The interim system in the EOF will access this data through the Plant Computer System.

Data is transmitted via multiplexers at the tower to millivolt converters in the control room. The converters are tied to both hardwired instrumentation in the control room and the Plant Computer System data acquisition hardware.

Model results: will include meteorological inputs, dispersion equation outputs, and accumulated dosage outputs (whole body and thyroid).

Telemetered data will be scanned every two seconds.



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.

Insufficient detail: Sec. 7.1.1.3 "Output devices will, as a minimum, consist of color CRT's with limited graphics capabilities to be located in "[the control room, TSC, EOF]," and printers and/or plotter/printers to be located in the TSC and EOF".

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.

Adequate response. Fig. 7.2

b. TSC Displays

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

Adequate response. Pg. 2-10.
Sec. 2.10.1(1)

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.

Not specified.

Two Aydin Controls Model 8040 CRT's (one for each unit) will be provided in the TSC. Each will have trend capability.

SUSQUEHANNA 1/2

NRC COMMENTS

PP&L COMMENTS

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

Implied. Pg 2-10 Sec. 2.10.1(2)

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.

Not specified.

Two CRT monitors will reside in the TSC and be connected to the plant computer system which will provide for the display of these variables.

There must be at least one hardcopy device available for printing information displayed on the CRT's.

Not specified.

A video copier will be provided for printing displays generated by the plant computer system.

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 of color equivalent of the graphics screen.

Not clear. Pg 2-10 Sec. 2.10.1(3)

A line printer and/or printer/plotter will be provided in the TSC as part of the ultimate ERCS configuration.

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.

Not specified.

Not applicable.

c. EOF Displays

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

Adequate response. Sec. 3.10.1(1) and Fig. 3.15.4

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NRC COMMENTS

PP&L COMMENTS

There must be a dedicated display device for the monitoring function to monitor radiological, meteorological and plant variable data.

Not dedicated. . . Pg 3-17 & Fig. 3.15.4

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.

Not dedicated. Pg. 3-17 & Fig. 3.15.4

There must be a dedicated display device for obtaining information needed by offsite officials.

Implied. Fig. 3.15.4

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).

Not specified.

Aydin Model 8040 CRTs will be provided in the EOF and will have the capability of displaying SPDS trend information.

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.

Not specified.

Not applicable.

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

Not specified.

None.

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

Not specified.

A video copier will be provided for printing displays generated by the plant computer system

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NRC COMMENTS

PP&L COMMENTS

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.

Insufficient information. Sec. 3.10.1(3)
"a printer and/or printer/plotter"

A 600 line per minute printer will be provided in the EOF.

2. Display Device Functional Descriptions

Relating to SPDS data, this information can be provided following completion of the vendor's design of the system.

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.

Insufficient information. Pg 8-1,
Sec. 8.1.1.1

Inadequate response. Pg. 7-5
Sec. 7.1.1.3

Inadequate response. Pg 7-5
Sec. 7.1.1.3

Not specified.

Insufficient information. Pg. 7-4,
Sec. 7.1.1.2 gives an overview.

3. Display Device Hardware Description

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

Not specified.

CRTs will be used to display data.

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NRC COMMENTS

PP&L COMMENTS

CRT Terminals:

Not specified.

Vendor name / Model Number?

Aydin 8040 CRT monitors.

I/O data rates?

Approximately 50K bytes/sec.

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.

CRT screen will be 48 lines by 72 characters. (The Aydin 5215 is a field proven color graphic display generator. It has a minimum capability of 48 lines per page.)

Define any special function keystroke input to be used.

Special function button description can be provided following completion of the vendor design.

What is the physical screen size?

19 inches measured diagonally.

Is there control over the character brightness?

Control exists for brightness.

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

Typical keyboard input and character output associated with an Aydin 5115A keyboard and 5215 display generator.

Hardcopy printers:

Not specified.

Vendor name/Model Number?

<u>Line Printer</u>	<u>Video Copier</u>
---------------------	---------------------

DEC LP11	Teleronix 4632
----------	----------------

Print rate (lines/minute)?

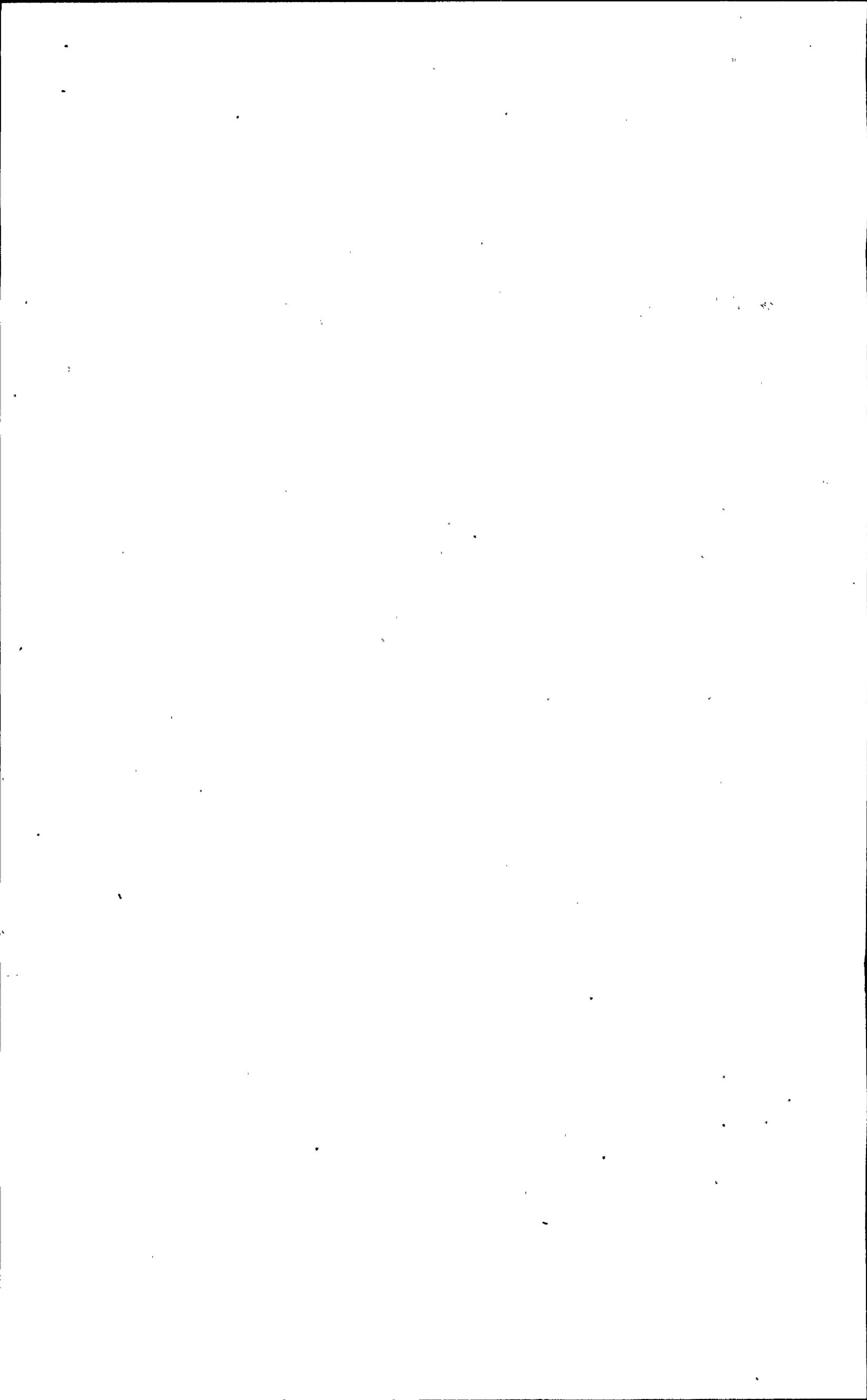
600 lpm	Copytime - 18 sec.
---------	--------------------

What is the number of characters per line?

136 cpl	Resolution: 100 discernible lines per inch
---------	--

What is the character set available?

64 characters



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NRC COMMENTS

PP&L COMMENTS

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

No graphic characters

Is the noise level generated by the printer when it is operating acceptable for the environment in which it is located?

Line printer will be located in the computer room in the EOF.

Graphics equipment:

Not specified.

Raster driven display

Is the display hardware raster or vector driven?

N/A

If the device is vector driven, what is the addressability (number of spatial resolution points on the display screen)? 512 x 256 is the minimum acceptable.

What is the line width of vectors drawn? 0.05 inches is the maximum acceptable.

N/A

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.

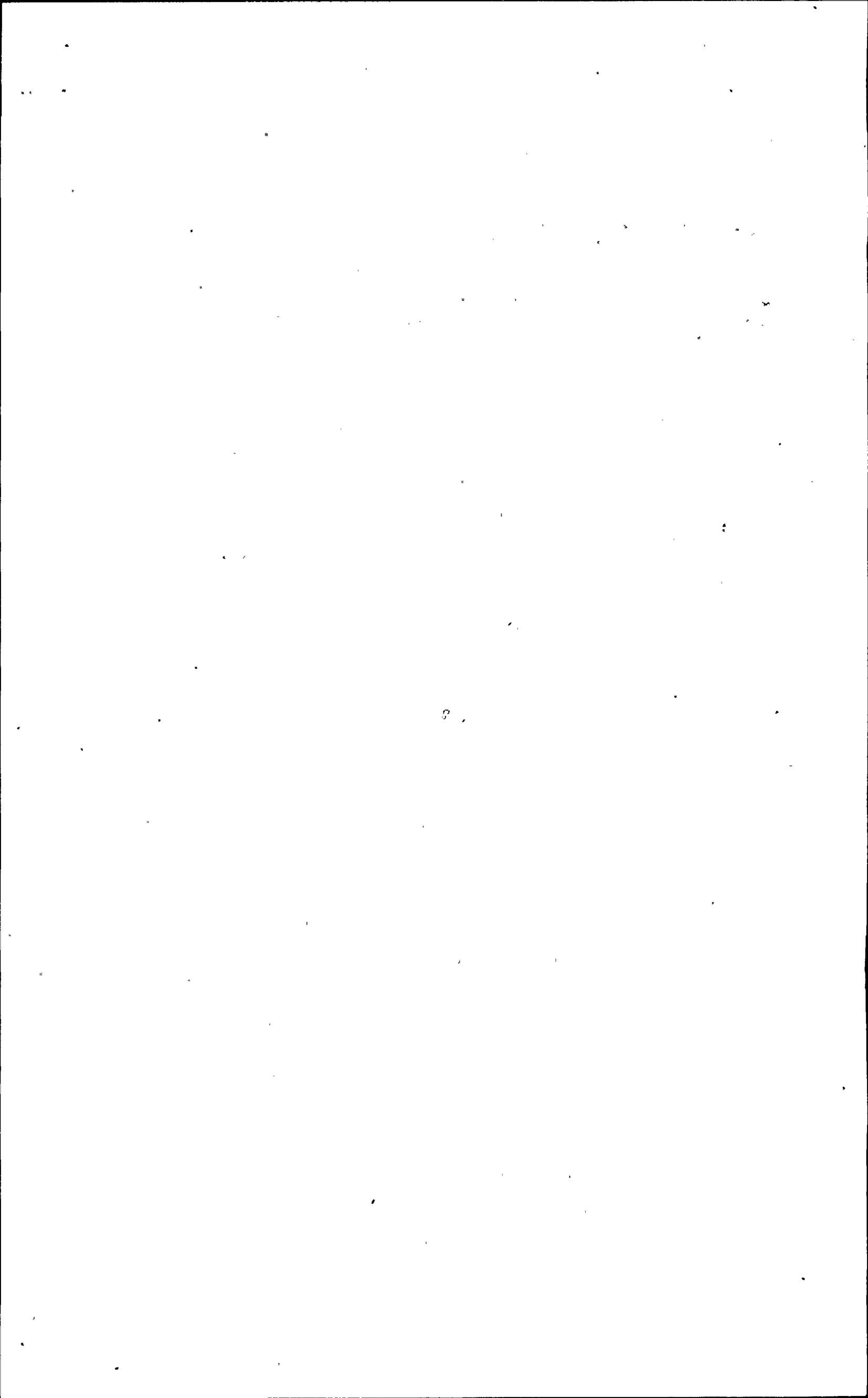
N/A

If the display is a raster device, what is the pixel size and resolution (number of pixels on the screen)?

800 pixels per line

If the raster device is monochrome, how many levels of gray are available? How many are actually used?

Color CRT



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NRC COMMENTS

PP&L COMMENTS

If the device is color, how many different colors may be displayed simultaneously?
How many are actually used?

Eight different colors available, use of colors can be supplied following vendor's design completion.

What is the data transfer rate to the device? (specify pixels/seconds, vectors/second, or bits/second).

Field (page) refresh - 50 Hz

Does the data transfer rate support the device's display capability?

Yes.

What is the refresh display rate of the display device? 30 Hertz is the minimum acceptable refresh rate.

50 Hz repeat field, noninterlaced.

Does the device have hardware vector generation capability?

No hardware vector generation

Does the device have hardware character generation capability?

Yes

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

Not specified.

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.

Three seconds response time.

b. If a response takes longer than 2-3 seconds, is the operator informed that the requested operation is in progress?

Information can be provided following vendor's design completion.

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NRC COMMENTS

PP&L COMMENTS

- c. If the displayed data is inconsistent or faulty, how is this deficiency indicated?

Color coding is a method used to denote faulty data.

5. Functional Display Format

- a. What is the primary format used for data display? (Actual examples are preferred).

Insufficient information. Pg 7-5, Sec. 7.1.1.3. "Data will be presented in formats which will be easy to understand and interpret."

All information relating to this section can be provided following completion of vendor's design.

- b. Is the display of sufficient quality and simplicity that is 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?

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NRC COMMENTS

PP&L COMMENTS

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?

No examples given. Pg. 7-5, Sec. 7.1.1.3 "relatively simple keystroke sequences will cause display of critical information.."

Not specified.

Not specified.

As is typical with most data acquisition systems, displays are callable via keyboard pushbuttons. Examples can be provided following design completion.

Less than 30 seconds will be required.

The operation of the SPDS system requires simple display callup and is similar to that used on the plant computer system and is, therefore, operable by a plant operator.

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?

Numbers not specified.

Position in room not specified.

Not specified.

Not specified.

Approximately 15 SPDS related displays will be provided.

Refer to Figures 2.14.3 and 3.15.4 of App. I to the Emergency Plan.

Usually, one person at a time must review the UMC. Three people can simultaneously view the UMC. A total of fourteen people require access to the UMC.

A video copier and status boards are available in the TSC to minimize individual UMC access requirements.

This information can be provided following design completion.

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NRC COMMENTS

PP&L COMMENTS

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

"Local dimmer switches will be provided in the data display area". Pg 3-6

7.2 SPDS

- 1. Availability of safety parameter data for the SPDS displays.

What are the safety parameters available to the SPDS?

Parameters listed in Table 8-1.

See Section 6.4.1 of this document.

Are there any times when any such parameters are unavailable?

Not specified.

These parameters will be available at all times when the instrument loops are properly functioning.

- 2. Recognizability of the SPDS displays

What features of the SPDS display distinguish it from the other displays and devices in the ERF and control rooms?

Not specified.

An individual SPDS console is provided in the control room for each unit.

- 3. SPDS Location

- a. Describe the location of the SPDS displays in the ERF's and control room.

Not specified.

SPDS control room consoles will be located near the center of the control room area in close proximity to the plant monitoring console. Refer to Figures 2.14.3 and 3.15.4 of Appendix I to the Emergency Plan for information of the TSC and EOF.

- b. How does the location of the SPDS insure that it can be easily accessed by the staff members requiring the safety information displayed?

Pg. 7-5. "Human factors engineering criteria will be used to determine how to set up a display that is easily accessible and visible.



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NRC COMMENTS

PP&L COMMENTS

c. Is the SPDS physically compatible with the existing facilities.

Pg. 7-5. "Any display located in the Control Room will be of such size and location as to be compatible with the existing space."

d. Does the SPDS present a hazard or obstacle to normal operation of the ERF?

4. SPDS Staffing

The SPDS should require no staff in addition to that necessary for the operation of that necessary for the operation of the ERF. How does the design of the SPDS insure that this is the case?

Not specified.

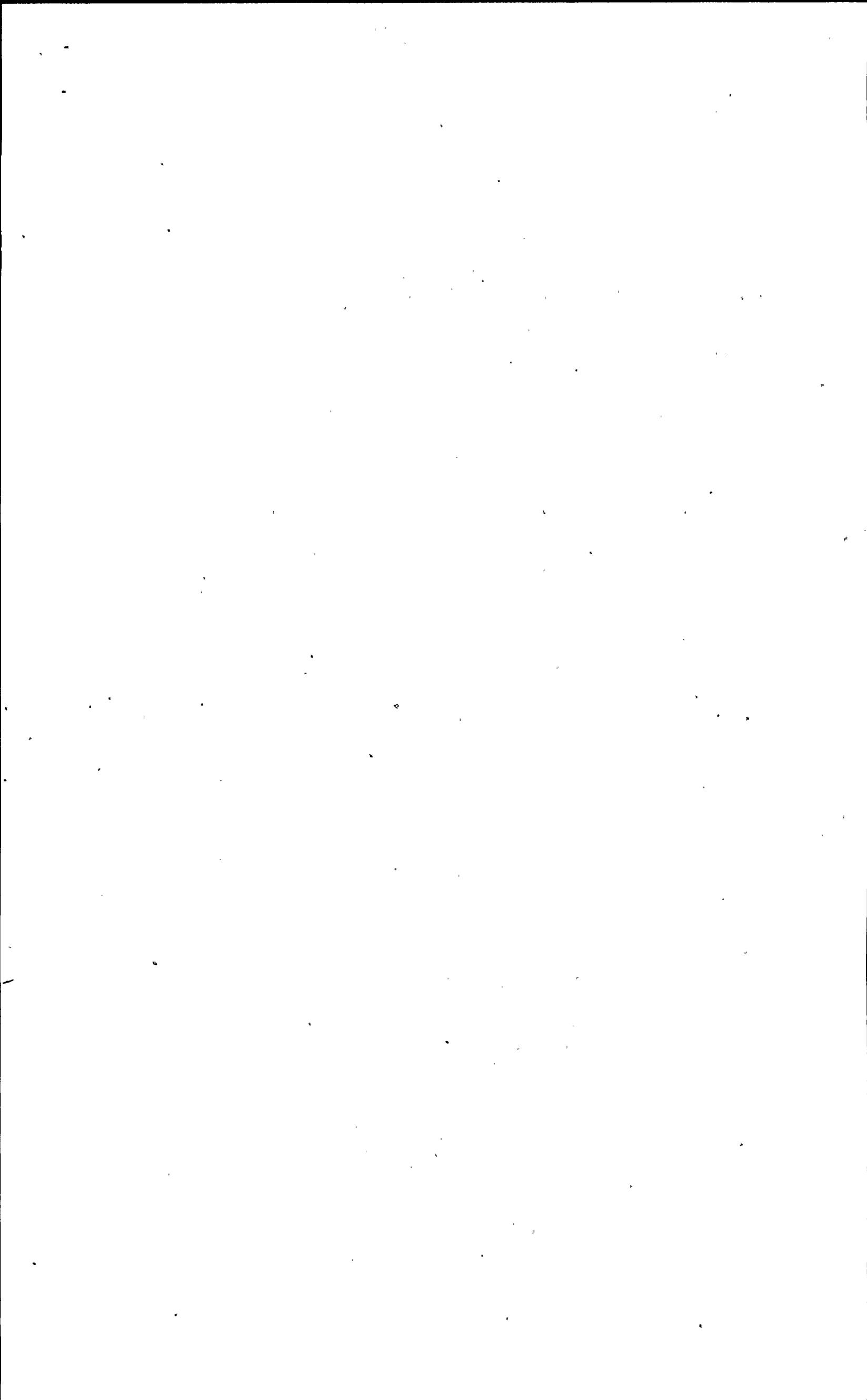
The SPDS function is accomplished by the utilization of dedicated consoles. The SPDS can be fully operated using these consoles.

3 Other Display Devices

If display devices other than those required by NUREG-0696 (EOF, TSC, and SPDS) are connected to the DAS, describe these devices and indicate their degree of impact on DAS performance.

Not specified.

Programmer CRTs will be used to initiate and debug the system and, therefore, will only be used temporarily.



8. DATA COMMUNICATIONS

8.1 Description

1. Provision must be made for adequate and reliable transfer of data among the components of the Data Acquisition System, and between the Data Acquisition System and the:

Technical Support Center

Emergency Operations Facility

Safety Parameter Display System Displays

Nuclear Data Link Communicators Equipment

Meteorological Data Facility

2. Provision must also be made for access to meteorological data in the DAS by the NRC Operations Center, and certain state and local agencies, if this service is not provided by facilities other than the ERF.
3. Block diagrams should be provided to show these data paths and the methods of transmission employed.

P. 6-1 states "Specific data to be transmitted (to NRC) has yet to be defined, but is assumed . . . needed data will come from Reg. Guide 1.97"

Not specified.

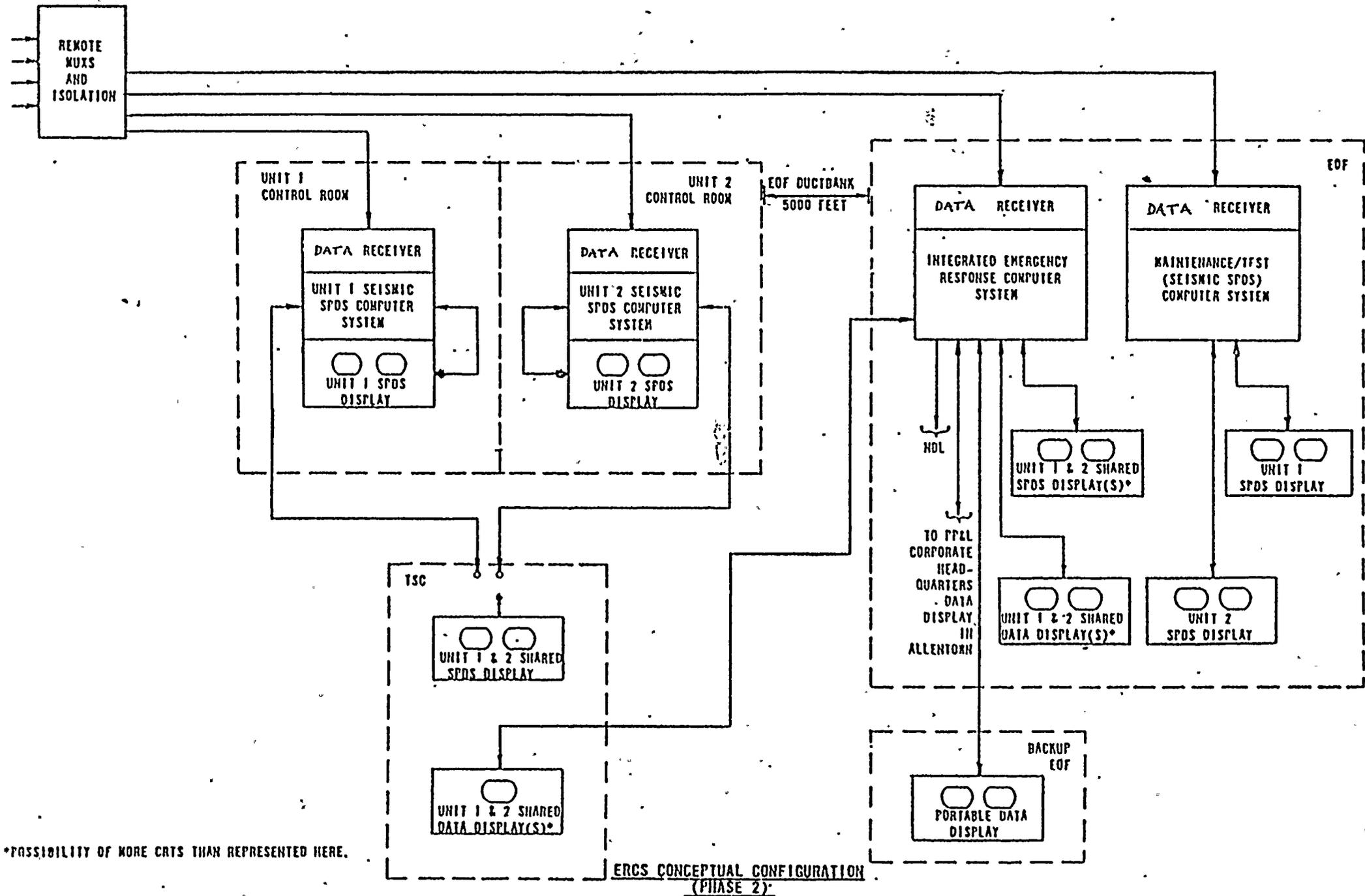
See Figures 8-1 and 8-2 attached.

8.2 General

1. Is the link capacity sufficient for the maximum required rate of transmission?

Not specified.

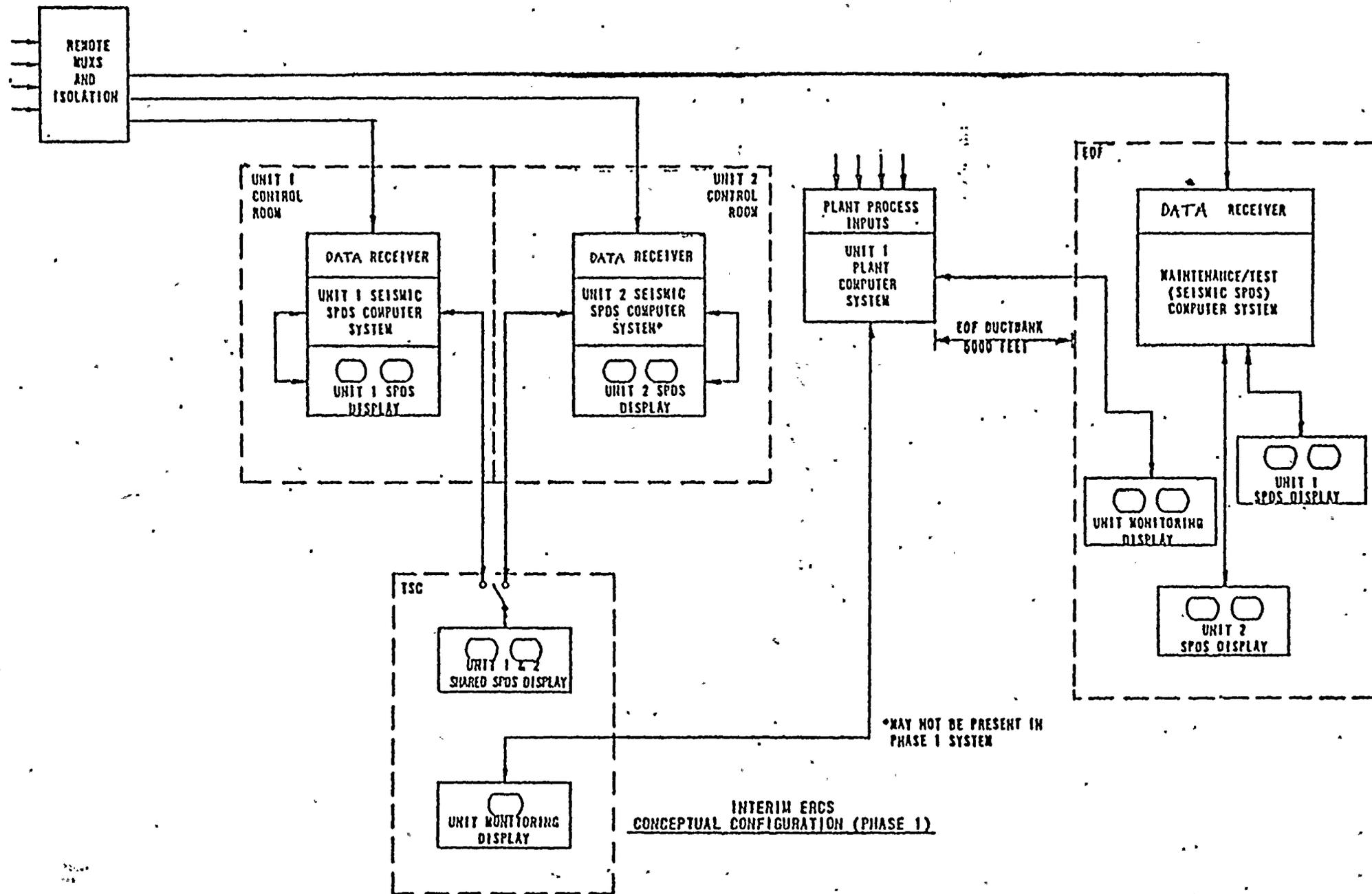
Data transmission rates are compatible with transmitter, receiver and controller hardware used in the transmission.



*POSSIBILITY OF MORE CRTS THAN REPRESENTED HERE.

ERCS CONCEPTUAL CONFIGURATION
(PHASE 2)

Figure 8-2

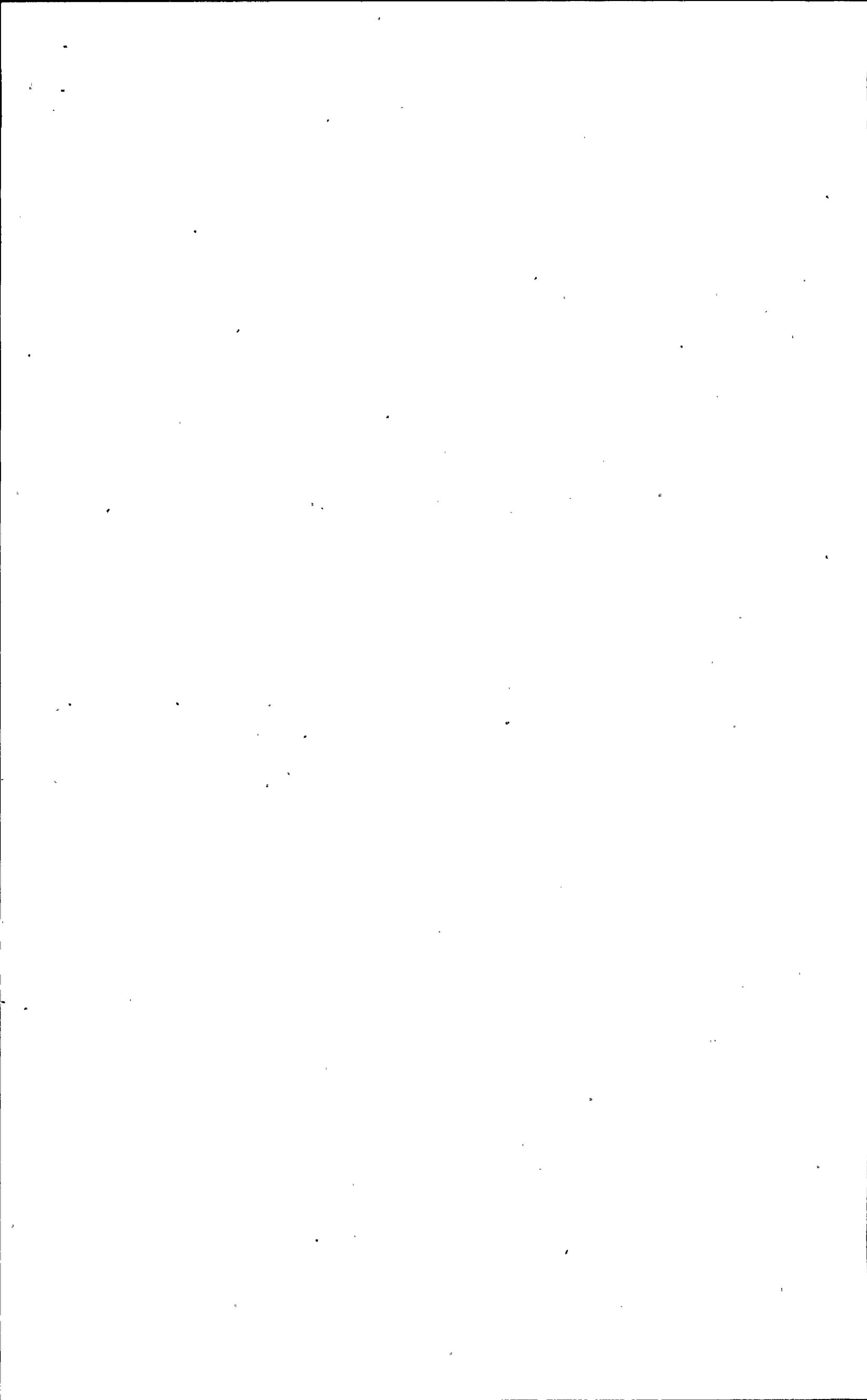


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NRC COMMENTS

PP&L COMMENTS

- | | | |
|---|------------------------|--|
| 2. Can all of the data channels meet the 0.01 unavailability requirement as defined in NUREG 0696, Section 1.5, under all conditions above cold shutdown? | Not specified. | The unavailability requirements will be satisfied. |
| 3. Is all powered data communications equipment on an uninterruptible power supply? | Implied. P. 3-16 | All equipment will be powered from UPS. The seismic SPDS equipment will be powered from a seismic UPS. |
| 4. How are the data channels protected from unauthorized modification? | Not specified. | Data channels are protected from unauthorized modification through the use of administrative procedures limiting access to vital areas of the plant. |
| 5. Are all data channels, plus equipment spares, tested as part of the periodic testing program? | Not specified. | This information can be provided following completion of testing program contents. |
| 3.3 Added Questions for Data Links Using EIA Standard Interfaces | Subject not addressed. | This information can be provided upon completion of vendor's design. |
| 1. Do the voltage levels and impedances conform to the standard? | | |
| 2. Does the data rate adhere to the standard for the distance spanned? | | |
| 3. Are cables and connectors appropriate to the standard? | | |
| 3.4 Added Questions for Voice-Frequency Links | Subject not addressed. | The information requested by this section can be provided in the last quarter of 1982. |



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NRC COMMENTS

PP&L COMMENTS

1. Is error detection and correction provided, if not otherwise supplied by the protocol?
2. What provision is made for testing the voice-frequency segments?
3. Is the data rate within the specification for the modems for the distance spanned?
4. Are spare modems stored on site?
5. Are there redundant data links, physically separate and without common failure mode, in all locations where there is a reasonable probability of service failure?

8.5 Applicable Standards

None referenced.

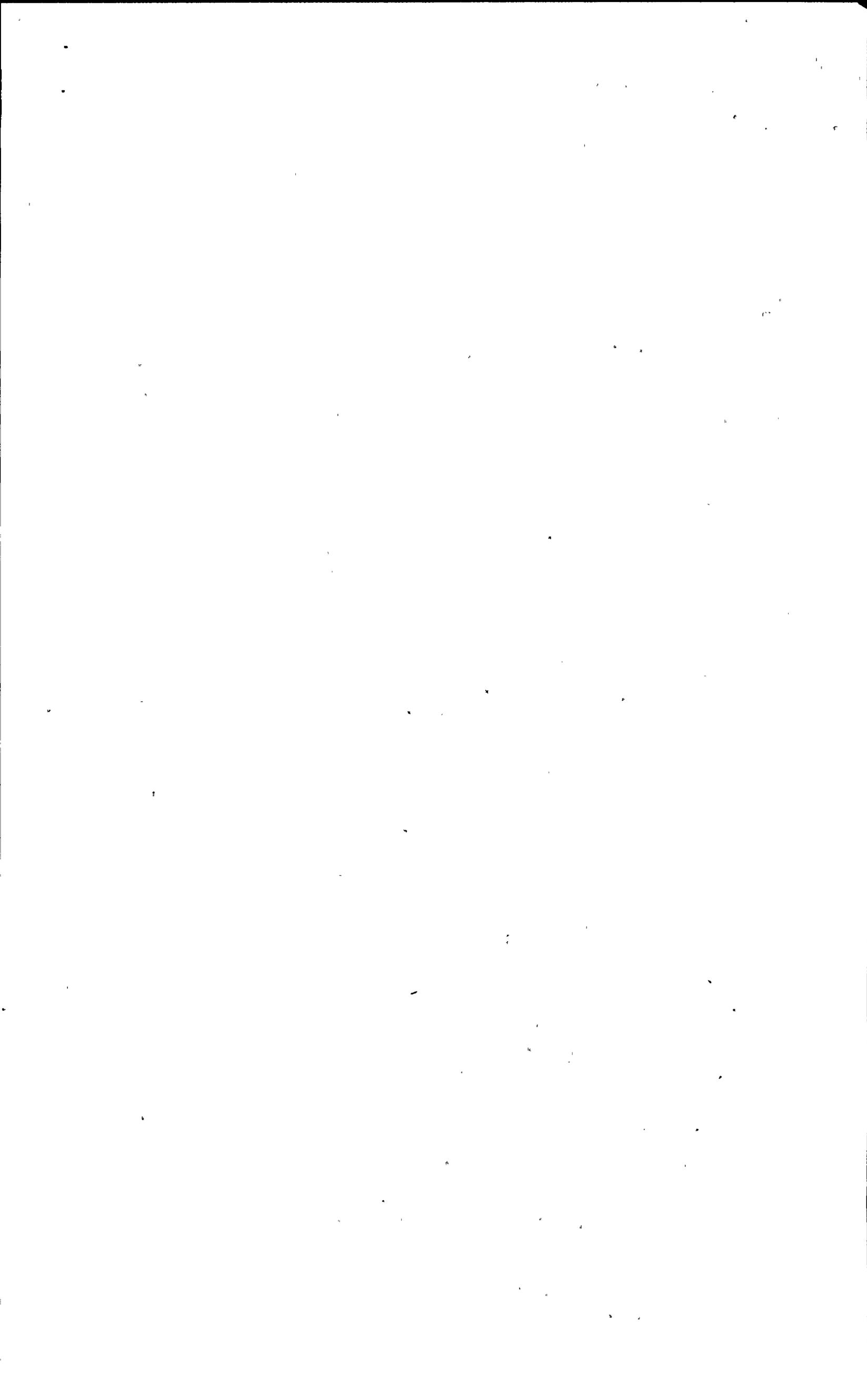
Typical standards used can be provided following the completion of vendor's design.

Typical standards that may be specified for serial data and control signal transmission are:

EIA Standard RS-232-C. "Interface between data terminal equipment and data communication equipment employing serial binary data interchange." August 1969.

FED-STD 1020. "Electrical characteristics of balanced voltage digital interface circuits." September 1975.

FED-STD 1030. "Electrical characteristics of unbalanced voltage digital interface circuits." September 1975.



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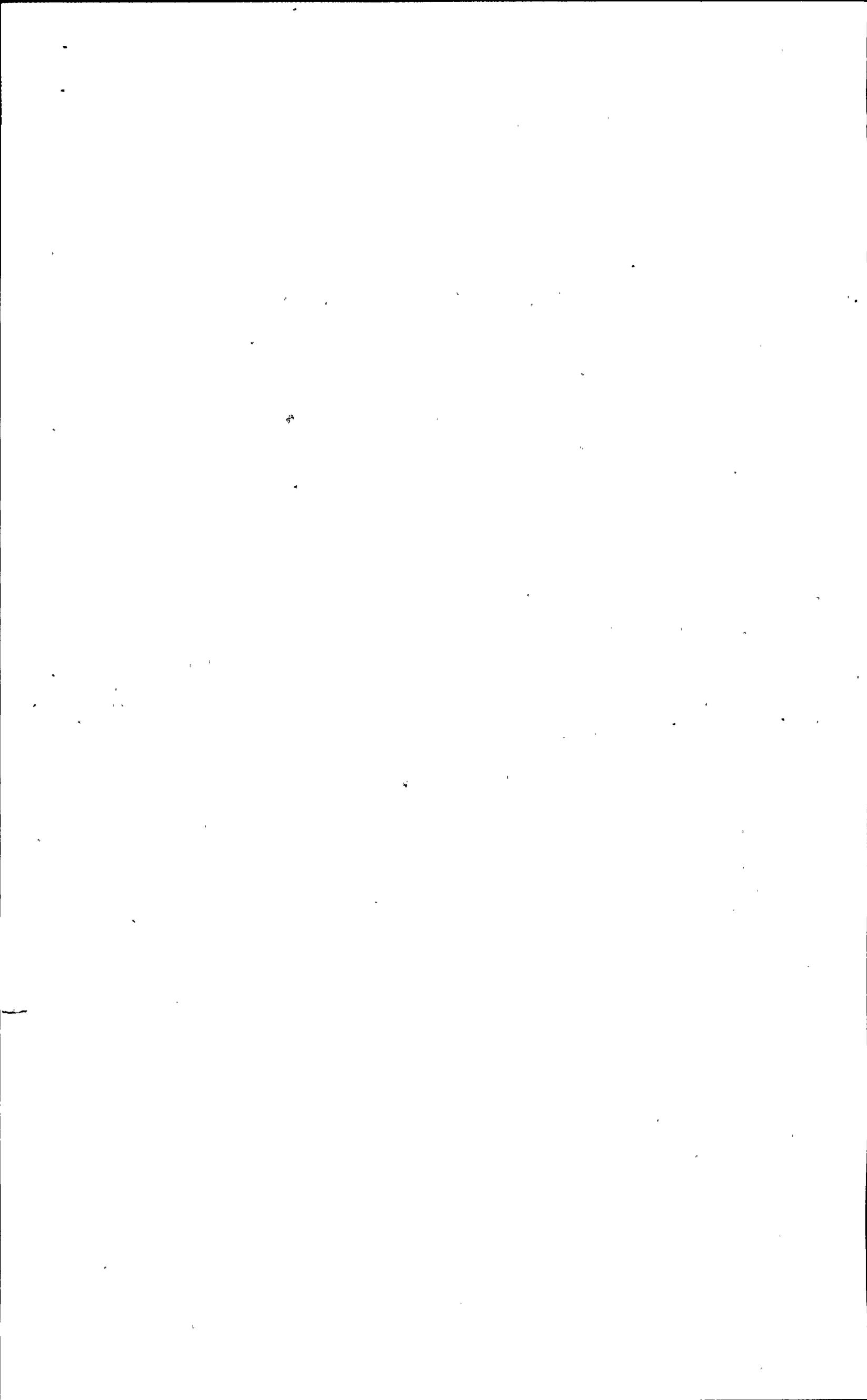
NRC COMMENTS

PP&L COMMENTS

EIA Standard RS-422-A. "Electrical characteristics of balanced voltage digital interface circuits." December 1978.

EIA Standard RS-423-A. "Electrical characteristics of unbalanced voltage digital interface circuits." September 1978.

EIA Standard RS-449. "General purpose 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange." November 1977.



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NRC COMMENTS

PP&L COMMENTS

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.

Not specified.

The actual documentation storage location has not been determined to date. The minimum documentation indicated will be provided.

2. User Documentation

Not specified.

PP&L's procurement specification delineates documentation which will satisfy the requirements indicated in Section 9.1.2 through 9.1.5 of this document.

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)?

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NRC COMMENTS

PP&L COMMENTS

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?

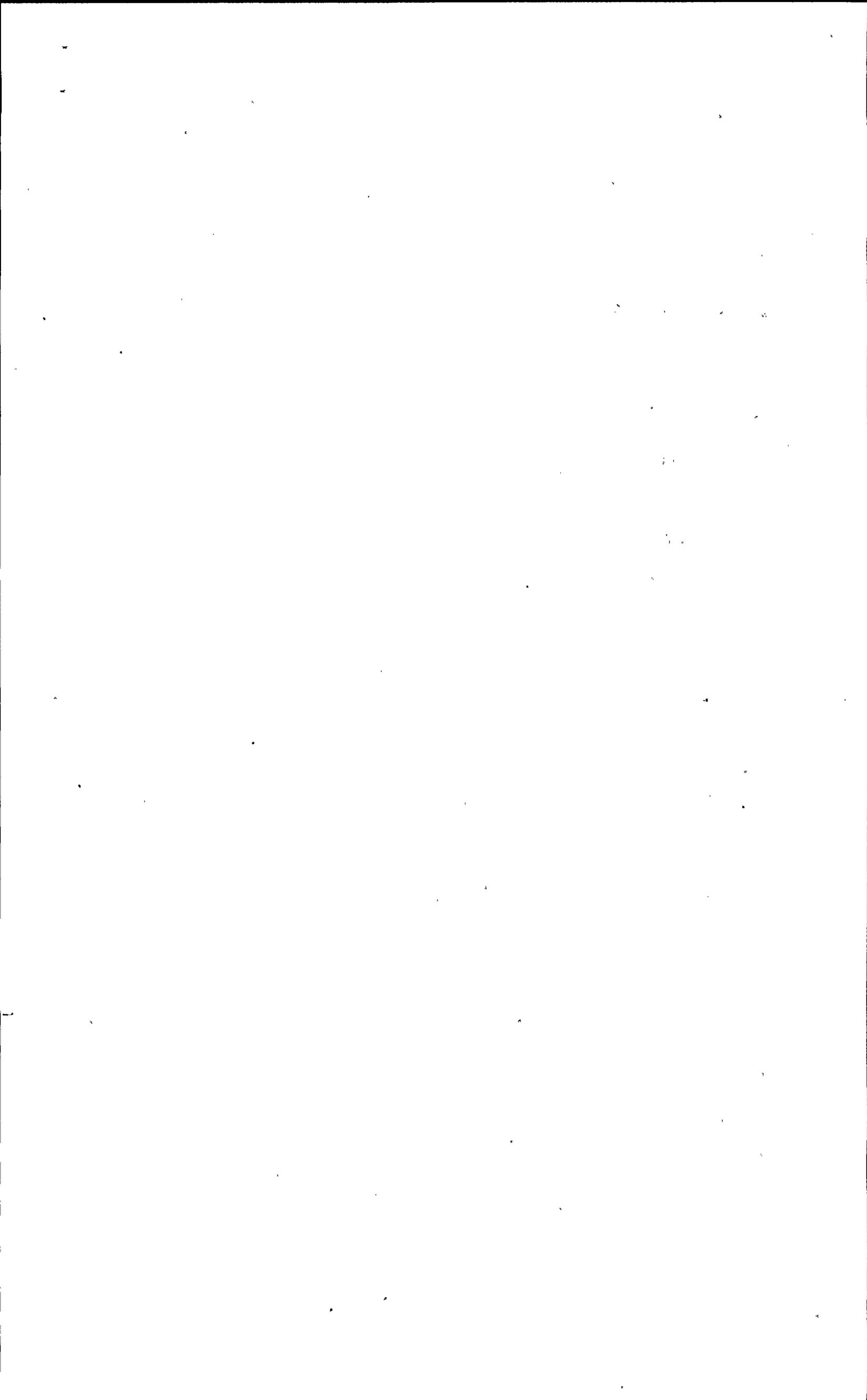
- c. Is the user documentation self supporting such that no other documentation is necessary to operate the system?
- d. Does the user documentation contain guidance on the limitation of instrument readings and their reliability following serious accidents?

3. Functional System Documentation

Not specified.

See PP&L comment for 9.1.2.

- a. What documentation describes in detail the DAS, the communications systems and the display systems from a functional perspective, as well as the means of implementation?
- b. Does this documentation have reference to all documentation for subsystems which interface to the DAS, communications equipment, and display systems?



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NRC COMMENTS

PP&L COMMENTS

4. Hardware Documentation

Not specified.

See PP&L comment to 9.1.2.

- a. What hardware documentation provides information for the engineers or technicians other than the system designer to maintain the system?

- d. Does this hardware documentation include:

Theory of Operation?

Mechanical Prints?

Electrical Prints?

5. Software Documentation

Not specified.

See PP&L comment to 9.1.2

- a. What documentation is available to maintain and evaluate the software?

- b. What procedures are to be followed to insure that the code contains sufficient comments for efficient maintenance and verification of the software?

6. Documentation Update Procedure

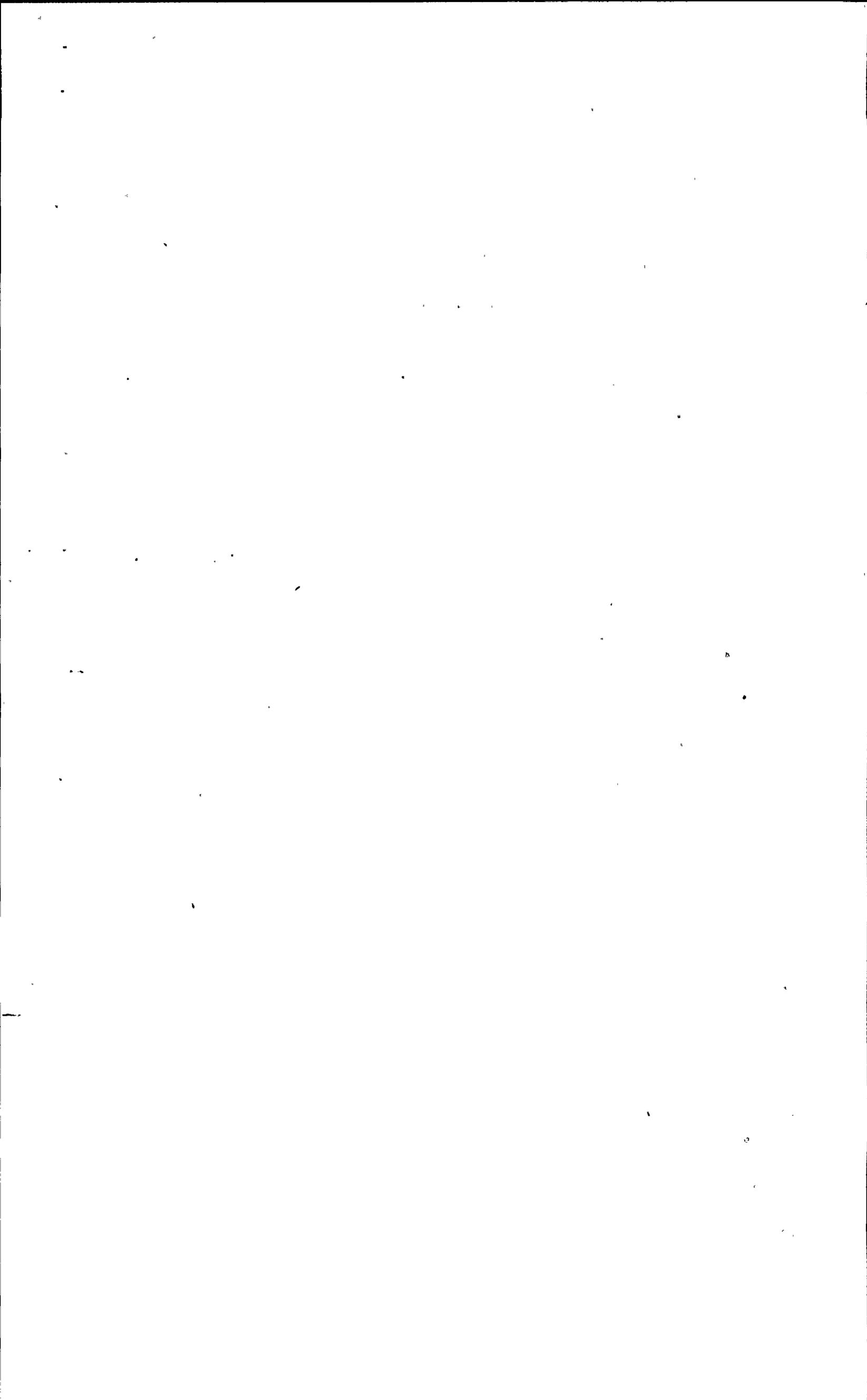
Not specified.

Administrative procedures will be developed to provide for this function.

- a. What procedure which has been established for maintaining the manuals and other necessary documentation to assure that any changes in the DAS, communications system or display systems are reflected in this documentation.

- b. Who will be responsible for the updates?

This function will be assigned through administrative procedures to be developed.



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NRC COMMENTS

PP&L COMMENTS

9.2 Training

Not specified

Training for operators and maintenance personnel must be provided.

This training will be defined and documented when the computer system is installed. Other training is described in the Emergency Plan training lesson plans.

PP&L will be acquiring this training. However, a detailed course outline is not yet available.

1. User Training

- a. How will operators of display systems be trained?
- b. Who will perform this training?
- c. What review of the training procedure will be followed to respond to changes in the systems?

2. Maintenance Training

- a. How will the maintenance personnel responsible for the DAS, communications equipment and display devices be trained?
- b. How will the training of personnel be verified?

9.3 Quality Assurance

1. Software Verification/Validation

- a. What verification or validation plan has been developed for the software for the DAS and display systems?

Section 9.0 Pg 9.1 may be meant to show intent to verify software but lacks sufficient detail to confirm that.

The ERCS quality plan referenced in Section 9.3 of Appendix I to the Emergency Plan provides for independent verification/validation of the software, hardware, and the integrated system.

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NRC COMMENTS

PP&L COMMENTS

- b. Does the test plan outline procedures for testing the following error types?

Not specified.

A test plan will be developed as part of the detailed system design effort.

Logic Errors

Documentation Errors (especially in the User documentation)

Overload Errors

Timing Errors

Throughput and Capacity Errors

Fallback and Recovery Errors

- c. Does the test plan specify the overall test and integration philosophy, strategies, and methodologies to be employed?

Subject not addressed.

See PP&L previous comment.

- d. Who will perform the independent quality assurance function?

Subject not addressed.

The independent organizations performing the verification/validation activities are PP&L's Vendors, PP&L, and Bechtel-PP&L A/E as described within the ERCS quality plan referenced in Subsection 9.3 of Appendix I to the Emergency Plan. The specific verification/validation plan is contingent upon the vendors capabilities but will be modeled along the guidelines provided by P742/ANS 4.3.2/Draft 10. The verification/validation plan will be prepared and approved at the time of final system design.

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NRC COMMENTS

PP&L COMMENTS

- e. Is there an adequate method to verify that there is a correlation between output data from the DAS and readings observed by the operators in the control room? Describe this method.

Subject not addressed.

A comparison of hardwired instrument readings and plant computer system outputs could be correlated with SPDS data outputs.

A string test from the individual sensor through the necessary processors and cables to the data output device shall be a part of this method.

2. Hardware Verification/Validation

- a. What is the verification or validation plan for the hardware necessary for the hardware necessary for the DAS, communications equipment and display systems?

Insufficient information. Sec. 9.0
Pg 9-1.

PP&L's responses to Sections 9.3.1a & d of this document discuss the verification/validation plan for the DAS and Display System ERCS hardware. The quality plans for the TSC and EOF referenced in Sections 9.1 and 9.2, respectively, of Appendix I to the Emergency Plan, provides for the independent verification/validation of the habitability systems in addition to the communication systems. The verification/validation activities are performed by the appropriate independent groups within PP&L and/or Bechtel (PP&L's A/E) as described within the TSC, EOF, and ERCS quality plans. Specific procedures from PP&L's/Bechtel's 10CFR50 Appendix B quality assurance programs, modified as necessary, are being used to implement some of the verification/validation activities within the quality plans. Other specific verification/validation procedures are in use or are being prepared.

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NRC COMMENTS

PP&L COMMENTS

b. Who will perform the independent quality assurance function on this hardware?

Not specified.

See PP&L's previous comment.

3. System Log

a. Will a system log be maintained?

Not specified.

Yes

b. Minimum information in this log should be:

Not specified.

The format for the log will be developed prior to system installation.

All system modifications

All system failures including time, reason and resolution

All planned outages

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 communications equipment meet this criterion, the following information must be reviewed:

Inadequate response. Pg 7-7 Sec 7.2.3 "... should be able to achieve very high availability in the 99% area above cold shutdown."

See Table 9-1.

TABLE 9-1
SPDS RELIABILITY DATA

<u>ASSEMBLY</u>	<u>MTBF</u>	<u>SOURCE</u>
1 Div. 1 DAS Mux	7,150 hrs	MIL-H-217C Calc.
2 Div. 2 DAS Mux	7,150 hrs	MIL-H-217C Calc.
3 LOP DAS Mux	5,120 hrs	MIL-H-217C Calc.
4 Remote Data Conn	18,060 hrs	MIL-H-217C Calc.
5 Fiber Optic Link	100,000 hrs	Estimate
6 Solid-State Mem ML11	5,000 hrs	Vendor estimate
7 DEC PDP 11/24	2,500 hrs	Based on similarity to DEC 11/23 and 11/34 using field experience.
8 Aydin 5215 Gen	26,000 hrs	MIL-H-217A
9 Aydin 5115 Keyboard	25,000 hrs	MIL-H-217A
10 15 in CRT	10,000 hrs	Vendor estimate
11 Sensor & Wiring (2) failure of related input signals	50,000 hrs	Estimate

Failure rate = 3 +4 +5 +6 +7 +8 +11.

(9) and (10) are redundant; also (1) and (2) have redundant inputs.

$$\text{MTBF} = \frac{L}{FR} = 1088 \text{ hours}$$

Based on this projection, it is anticipated that 8 failures will occur per year.

$$\text{System Availability} = \frac{\text{MTBF}}{\text{MTBF} + \text{MTTR}}$$

$$\text{MTTR} = \frac{\text{MTBF} (1 - \text{SA})}{\text{SA}}$$

$$\text{MTTR} = \frac{1088 (1 - .99)}{.99} = 11 \text{ hours}$$

In order to meet the 99% availability with a projected MTBF of 1088 hours, the mean time for each repair cannot exceed 11 hours.

The Data Acquisition System will have a built-in diagnostic control panel for identifying failures to the card level. The repair will then be made by simply replacing the card. Diagnostics in the DEC 11/24 will also isolate a failure to the card level in the computer and also the ML11 memory. Similarly, the Aydin display generator and keyboard also have diagnostics to identify a failure.

Based on the proposed diagnostics, extensive operator/maintenance training, comprehensive manuals, and spares proposed, the mean time of 11 hours allowed to meet the system availability far exceeds that which is required. On most DEC equipment, field experience shows an MTTR of between 1 and 3 hours. The longer period is generally required for electro-mechanical devices, which are non-existent in the Control Room SPDS.

Using a realistic figure of 2 hours for repair, the Availability is projected to be 99.8%.

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NRC COMMENTS

PP&L COMMENTS

The list below contains SPDS parameters only. Other ERF parameters which will be monitored by the plant computer can be provided following completion of final design.

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?



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NRC COMMENTS

PP&L COMMENTS

What is the system's deadlock avoidance mechanism?

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.

P. 8-2, 8-3

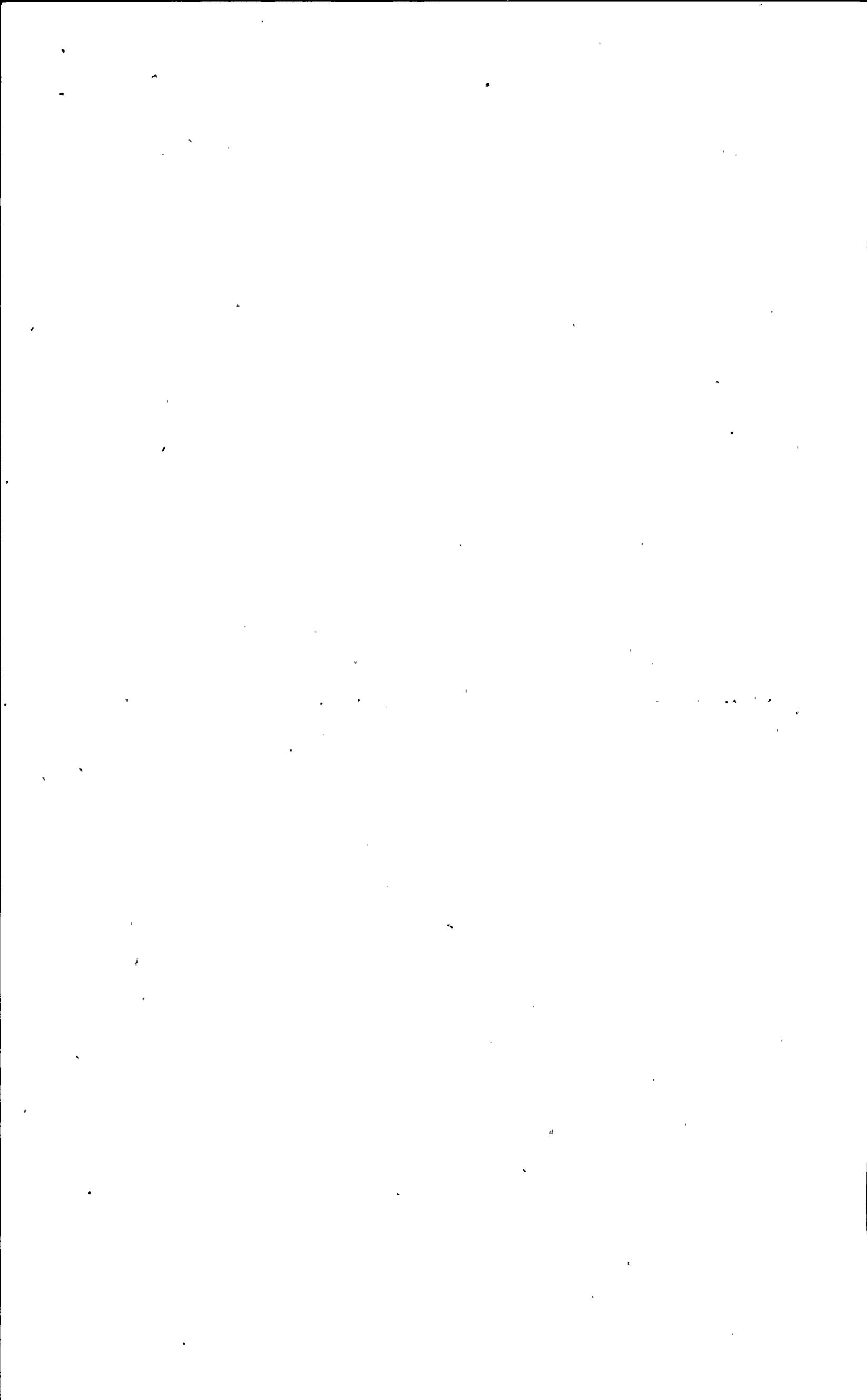
Insufficient information. Reference is made to "Section 8.1.1.3 for exceptions," this section states that exceptions "will be dealt with when then PP&L formally responds to the NRC on Reg. Guide 1.97, 1.23, and NUREG-0654."

UNIT PARAMETERS

Analog

- Primary coolant system water level (reactor water level)
- Primary coolant system pressure (reactor pressure)
- Average power range monitor
- Source range monitor
- Core flow grid plate differential pressure (core flow)

- Total jet pump flow (core flow)
- Core spray flow
- Core spray pressure
- Drywell temperature
- Drywell pressure
- Drywell floor sump level differential
- Drywell equipment drain tank differential
- Drywell radiation
- Containment hydrogen concentration
- Containment oxygen concentration
- Suppression pool water temperature
- Suppression pool water level
- Off-gas pretreatment monitor
- RHR service water radiation



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NRC COMMENTS

PP&L COMMENTS

Digital

Scram demand
Source range monitor positions
Mode switch position

Safety relief valve position
Primary containment isolation valve
positions
Reactor pressure vessel isolation
valve positions

COMMON PARAMETERS

Analog

Exhaust vent monitor
Radwaste radiation monitor

All meteorological data listed in
Regulatory Guide 1.23 Rev. 1 will be
telemetered via the plant computer
system and will be available in the
control room, TSC and EOF.

Remote multiplexers will be located in
the upper and lower relay rooms of each
unit.

The DAS is cabled to the sensor signal
condition circuits and not directly
to the sensor.

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.

3. For each automatically monitored sensor:

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

Insufficient information. P. 7-3

Is isolation provided? If so, describe.

Adequate response. P. 8-2

Describe the cabling between the sensor and
the DAS.

Not specified.

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?

How much time is required to bring a backup system on-line?

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

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NRC COMMENTS

PP&L COMMENTS

9.5 Maintenance

Not specified.

Hardware and software maintenance plans will be developed during system implementation. PP&L's staff, augmented by the vendor's field service personnel will implement maintenance plans. Detailed information pertaining to the system's maintenance can be provided at the time of unit delivery.

In order to insure that the data systems, instrumentation, and facilities of ERF's meet the unavailability requirement the following minimum hardware and software maintenance requirements should be reviewed.

1. Hardware Maintenance

- a. What is the hardware maintenance plan?
- b. How does the plan work to assure minimum unavailability?
- c. Concerning maintenance personnel:

What personnel are identified for the DAS, communications equipment and display systems?

Where are these personnel located?

How are the personnel qualified for the hardware they will be working with?

- d. Concerning spare parts:

Where are spare parts located for minimum practical replacement time?

Where are critical items located on-site?

If spare parts are to be supplied by outside sources, what is the maximum availability delay that can be assured?

Is the quality of the spare parts equivalent to the original equipment?

- e. Is maintenance support equipment available on demand?
- f. What is the schedule and procedure for calibration and verification of test equipment?

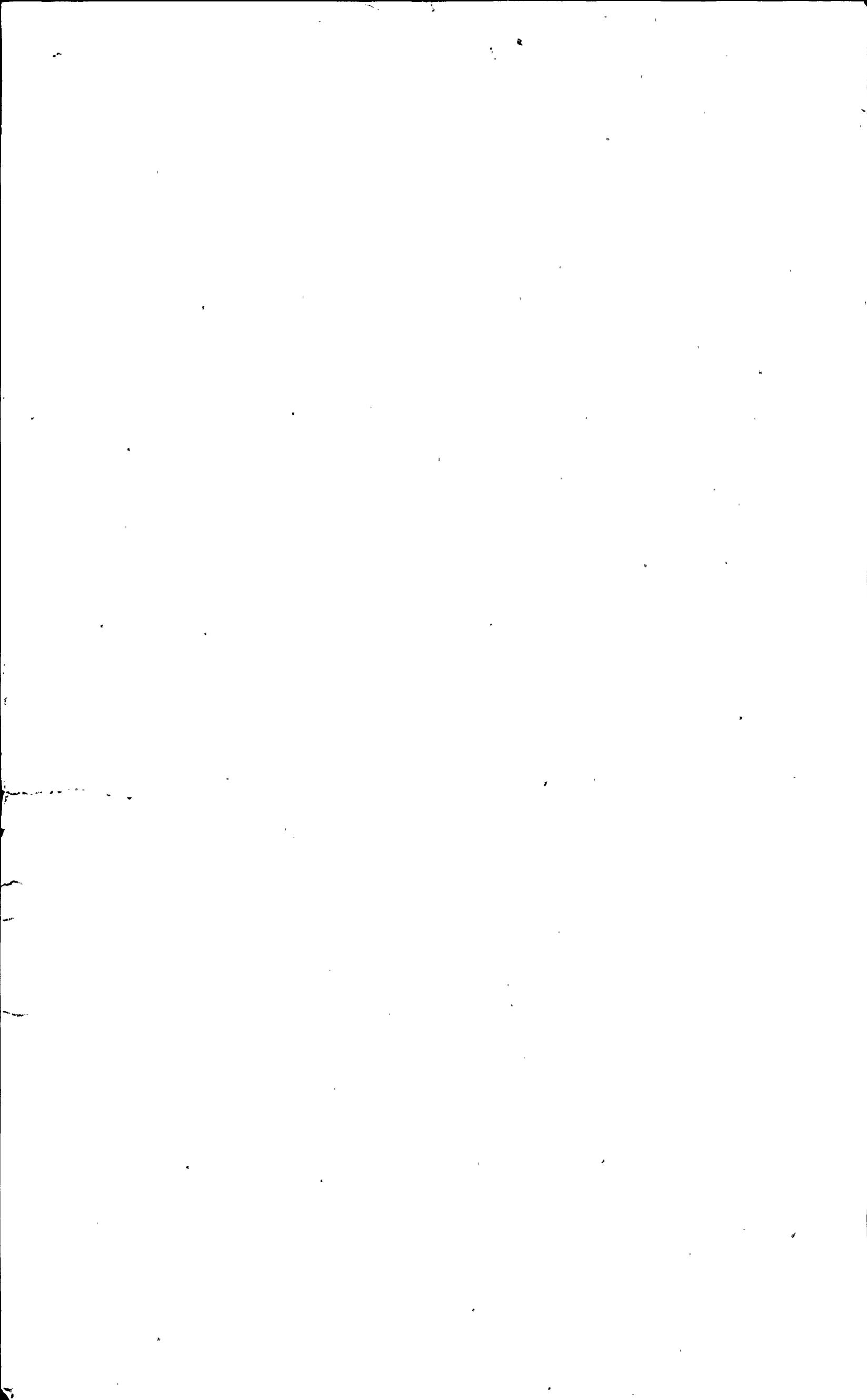
d. Software Maintenance

- a. What is the software maintenance and re-verification plan?
- b. Who will maintain the software for the DAS and display systems?
- c. What is the procedure for providing adequate qualified backup software maintenance personnel?
- d. What is the DAS update procedure?

Does this procedure insure that:

Changes to the software are authorized?

Any changes to the software are adequately tested and validated before they are implemented?



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NRC COMMENTS

PP&L COMMENTS

A description and date of the change
have been recorded in a manner which
can be easily reviewed?

(NG/41-A)

