Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

January 12, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Station Units 1 and 2
Braidwood Station Units 1 and 2
Advance FSAR Information
NRC Docket Nos. 50-454/455/456/457

Dear Mr. Denton:

This is to provide advance copies of information which will be included in the Byron/Braidwood FSAR in the next amendment. Attachment A to this letter lists the information enclosed.

One (1) signed original and fifty-nine (59) copies of this letter are provided. Fifteen (15) copies of the enclosures are included for your review and approval.

Please address further questions to this office.

Very truly yours,

F. D. Lentine
for T. R. Tramm
Nuclear Licensing Administrator
Pressurized Water Reactors

Attachment

3129N

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1/1

ATTACHMENT A

LIST OF ENCLOSED INFORMATION

I. FSAR Question Responses

New: 010.47
212.155

II. FSAR Text Changes

New Subsection 7.6.10 (Boron Dilution Instrumentation)

pg. 11.3-4 (second O_2 analyzer)

E.1 (revised I.A.1.1)

E.11 (Revised I.C.4)

E.13 (Revised I.C.6)

E.75 (New III.A.1.2, EOF and TSC)

IV. Miscellaneous Items

Fire Protection Open Item 8

FIRE PROTECTION OPEN ITEM #8 (Revised)

FIRE BRIGADE TRAINING

Byron/Braidwood Stations will perform fire brigade drill training per 10 CFR 50 Appendix R such that the fire brigade drills once per quarter so that each fire brigade members participates in at least two fire brigade drills per year.

temperature (below RNDT) coincident with a closed position of the motor operated (MOV) pressurizer relief valve. This MOV is in the same fluid path as the PORV, with a separate MOV used and alarmed associated with the second PORV.

c. A loss-of-offsite power will not defeat the provisions for an electrical power source for the interlocks because these provisions are through onsite power which is described in Section 8.3.

7.6.10 INSTRUMENTATION FOR MITIGATING CONSEQUENCES OF INADVERTENT BORON DILUTION

7.6.10.1 Description

Instrumentation is provided to mitigate the consequences of inadvertent addition of unborated, primary grade water into the Reactor Coolant System. The Boron Dilution Control System is identical to the system reviewed and approved by the NAC for Commanche Peak Units 1 and 2)Docket Nos. 50-445 and 50-446).

Figure 7.6-7 is a simplified system block diagram showing the flux doubling detection system (2 meter) and the protection system output for isolation valve actuation.

In the event of a boron dilution transient, the Nuclear instrumentation Source Range in conjunction with the 2 meter will detect a doubling of the neutron flux. This information is sent to the Solid State Protection System which automatically initiates isolation valve movement to terminate the transient. An alarm is sounded at the time for plant operators to indicate that flux doubling has occurred and isolation valve movement started.

Credit is taken for the instrumentation to provide for operator alert and for automatically initiating isolation valve movement.

7.6.10.2 Analysis

The analysis of effects and consequences of inadvertent boron dilution transient is covered in Subsection 15.4.6.

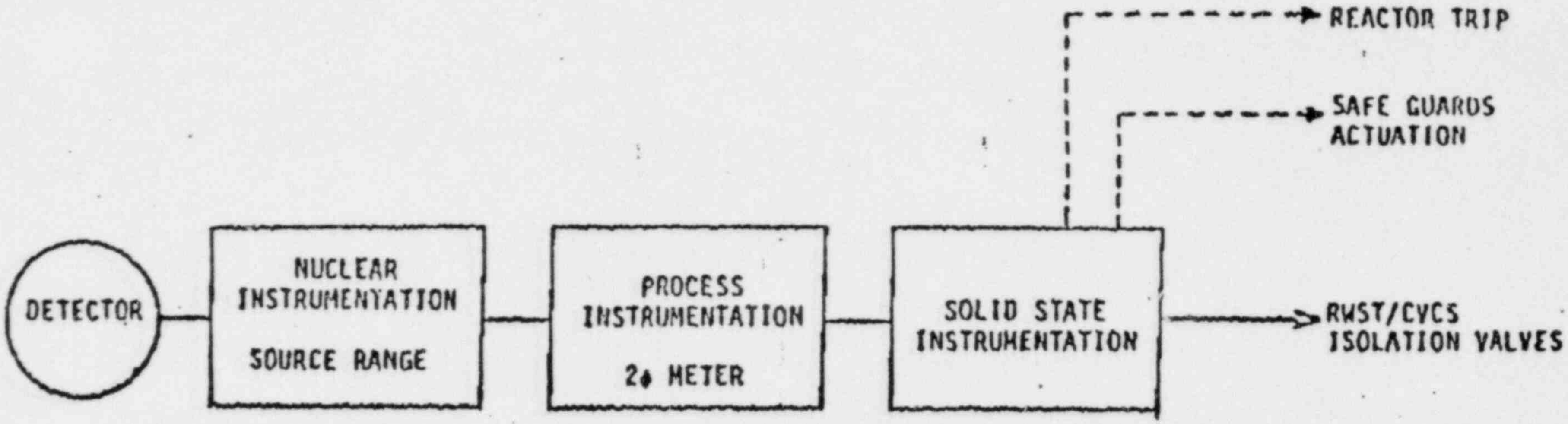
7.6.10.3 Qualification

Qualification of the instrumentation is discussed in Section 3.10 and 3.11.

7.6.11 References

1. The institute of Electrical and Electronic Engineers, Inc., "IEEE Standard: Criteria for Protection Systems for Nuclear Power Generating Stations", IEEE 279-1971.

2. The Institute of Electrical and Electronic Engineers, Inc., "IEEE Trial-Use Criteria for the Periodic Testing of Nuclear Power Generating Station Protection System", IEEE 338-1971.



BYRON/BRAIDWOOD STATIONS
FSAR

FIGURE 7.6-7

INSTRUMENTATION FOR PROTECTION AGAINST INADVERTENT BORON DILUTION

All alarms are shown separately on the WPS panel and further relayed to one common WPS annunciator on the main control board of the plant.

A multipoint automatic gas analyzer is provided to monitor hydrogen and oxygen concentrations in the GWPS. The analyzer records the oxygen and hydrogen concentrations and alarms at high levels. In addition, a separate oxygen analyzer will be added between the compressors and the gas decay tanks. The two analyzers will provide redundant capability for monitoring oxygen concentration in the Gaseous Waste Processing System to assure that explosive levels of oxygen in hydrogen are avoided.

11.3.2.4 Operating Procedure

The equipment installed to reduce radioactive effluents to the minimum practicable level is maintained in good operating order and will be operated in accordance with general power plant practices. In order to ensure that these conditions are met, administrative controls are exercised on overall operation of the system; preventive maintenance will be performed in accordance with general power plant practices to maintain equipment in peak condition; and experience available from similar plants is used in planning for operation.

Administrative controls are exercised through the use of instructions covering such areas as valve alignment for various operations, equipment operating instructions, and other instructions pertinent to the proper operation of the processing equipment. Discharge permit forms assure that proper procedures are followed, proper valve alignments are made, and other operating conditions are satisfied before a release. These forms will be signed and verified by those personnel performing the analysis and approving the release.

Operating procedures and administrative controls incorporate procedures and controls developed at operational PWR plants having similar waste management equipment.

11.3.2.5 Operations

Gaseous wastes consist primarily of hydrogen stripped from the reactor coolant during boron recycle and degassing operations and nitrogen from the Nitrogen Cover Gas. The components connected to the vent header are limited to those which contain no air or aerated liquids to prevent formation of a combustible mixture of hydrogen and oxygen.

Waste gases discharged to the vent header are pumped to a waste gas decay tank by one of the two waste gas compressors.

The standby compressor is started automatically when high pressure occurs in the vent header. The standby compressor can be started manually. The compressors may also be used to transfer gas between gas decay tanks.

APPENDIX E

REQUIREMENTS RESULTING FROM TMI-2 ACCIDENT

E.1 SHIFT TECHNICAL ADVISOR (I.A.1.1)

POSITION:

A technical graduate, licensed at the senior reactor operator (SRO) level, will be provided on each shift at all times when a nuclear unit is in power operation, startup, hot shutdown or cold shutdown (Modes 1-4). A person in this shift position is termed a Station Control Room Engineer (SCRE). The SCRE, functioning as the control room SRO, will also be qualified as a Shift Technical Advisor (STA). The intent is to allow the SCRE to be replaced in the control room by any other SRO on shift as long as the SCRE is within 10 minutes of the control room. This will allow the SCRE the flexibility for in-plant observations from time to time although the SCRE will function, for the most part, in the control room. In this regard the SCRE program is intended to fulfill the long term STA and on shift SRO requirements.

The selection criteria to be used in identifying future SCRE candidates are discussed in Table E.1-1. These criteria are developed in a way that the educational and management qualifications of each prospective candidate are evaluated in light of the guidance, provided by the NRC, for acceptance in the SCRE program. Minor deficiencies identified during this screening process will not disqualify a candidate if it is clear that training provided in the SCRE program will resolve those deficiencies. Other factors not specifically addressed in the NRC criteria such as naval reactors training or other nuclear industry experience, may also contribute to a prospective candidate's qualifications.

The long-term training to be implemented for the SCRE program is discussed in Table E.1-2, which includes a detailed comparison between the Commonwealth Edison SCRE Program and the program outline proposed by the Institute of Nuclear Power Operations (INPO). Also discussed in this table is the SCRE requalification program, which assures the maintenance of technical proficiency of all candidates once they have demonstrated their qualification to go on shift.

The minimum shift manning planned for the two unit, single control room plants is three SROs (a Shift Supervisor, a SCRE [STA], and a Shift Foreman).

The Byron/Braidwood position is to incorporate the following statement into the Station Administrative Procedures which are to be complete by fuel load.

The Shift Engineer and licensed Shift Foreman (SRO) shall maintain awareness of plant status, and changes, thereto, so that during events of an abnormal or accident situation either person can promptly and efficiently relieve the SCRE so that the SCRE can assume the STA function.

To achieve this awareness:

a. The Shift Foreman (SRO) shall participate in the SCRE Shift relief turnover.

b. During the shift, the Shift Engineer and the Shift Foreman (SRO) shall be made aware of any significant changes in plant status in a timely manner by the SCRE.

c. During the shift, the Shift Engineer and Shift Foreman (SRO) shall remain abreast of current plant status. In addition, the Shift Foreman (SRO) shall return to the Control Room two and three times per shift, where practicable, to confer with the SCRE regarding plant status. Where not practical to return to the Control Room, the Shift Foreman (SRO) shall periodically check with SCRE for a plant status update. In no case should the Shift Foreman (SRO) be required to abandon duties critical to reactor operation to return to the Control Room unless specifically ordered to do so by the Shift Engineer.

d. In the event of an abnormal or accident situation, the Shift Engineer can initially relieve the SCRE of his line responsibilities until the Shift Foreman (SRO) arrives in the Control Room. At that time the Shift Engineer would be relieved by the Shift Foreman (SRO) so that he can devote full time to GSEP responsibilities.

E.11 CONTROL ROOM ACCESS (I.C.4)

POSITION:

Administrative Procedures to govern Control Room access during normal and emergency plant conditions will incorporate the position as stated in NUREG-0578 dated July 25, 1979, Section 2.2.2.a. Technical advisors include those personnel required to support normal plant evaluations and, who, in the event of an emergency, will be told to leave the control room.

E.13 VERIFY CORRECT PERFORMANCE OF OPERATING ACTIVITIES (I.C.6)

POSITION:

Administrative procedures to govern verification of correct performance of operating activities will incorporate the guidelines as stated in NUREG 0737 dated October 31, 1980. Consistent on the item position, persons, not licensed, who complete a training qualification program will be considered "qualified" to implement action to take equipment out-of-service and return ti to service. Upon return to service, correct alignment of equipment, valves, and switches will be accomplished by either use of functional testing, use of the second qualified operator, or use of the automatic system status monitoring system as discussed in Item I.D.3, NUREG-0660.

E.75 UPGRADE EMERGENCY RESPONSE FACILITY (III.A.1.2)

POSITION:

This item is being addressed by NUREG-0696 and Regulatory Guide 1.97. The design of the Byron/Braidwood Emergency Operating Facility and Technical Support Center is following the guidelines of NUREG-0696. The instrumentation is being developed within the guidelines of Regulatory Guide 1.97. The information in this response includes Commonwealth Edison generic Generating Station Emergency Plan information and layout drawings for the Byron Emergency Operating Facility and the Technical Support Center. A description of Communications between the Control Room, TSC and EOF is included.

The Emergency Action levels are defined and a simplified Emergency Notification scheme is presented.

When the site specific annex to the Generating Station Emergency Plan is completed, individuals assigned to the specific positions of the Emergency Plan will be identified. Details of equipment and procedures pertaining to its operation will be submitted for review as it becomes available.

EOF AND TSC LAYOUT

The following facilities and systems are provided at Byron and Braidwood Stations to improve response to emergency situations.

The Technical Support Center (TSC) is located in the turbine building addition above the condensate polisher at elevation 451 feet. This is above the 100-year flood plane. The TSC has sufficient area for 25 people and is approximately a 2-minute walking distance from the main control room. Also provided in the protected area of the TSC facility is an NRC office, records storage room, and equipment rooms for HVAC, electrical, and communications equipment. It is located within the site security boundary. Figure E.75-1 shows the arrangement of the TSC.

The TSC is designed to be habitable to the same degree as the control room for postulated accident conditions, except that the equipment is not Seismic Category I qualified, redundant, instrumented in the control room, or automatically activated. The TSC ventilation system is designed to limit the introduction of potential radioactive contaminants into the supply air by the use of high-efficiency particulate air (HEPA) and charcoal filters.

Radiation monitoring equipment is provided to continuously monitor radiation dose rates and airborne radioactivity concentrations inside the TSC while it is in use during an emergency.

TSC personnel will be protected from radiological hazards, including direct radiation and airborne radioactivity, from in-plant sources under accident conditions.

The TSC dedicated communications with the main control room operational support center (OSC), and emergency operations facility (EOF). Those to the MCR and OSC are wired; those to the EOF are via microwave.

The TSC has displays selected from Regulatory Guide 1.97, Revision 2, including meteorological variables of Regulatory Guide 1.23, Revision 1. The technical data displays assist in the detailed analysis and diagnosis of abnormal plant conditions and any significant release of radioactivity to the environment. The TSC has interactive displays utilizing both CRT's and typerwiters. The accuracy of the data displayed is consistent with that needed to perform TSC functions.

Records that pertain to the as-built conditions and layout of structures, systems, and components are available to TSC personnel.

There is no impact on plant operations when the TSC is activited.

The TSC data is processed by the plant process computer with qualified isolators employed to separate 1E and non-1E circuits as required.

The data system serves the TSC, EOF, and when implemented, the nuclear data link (NDL), using the same data base.

The safety parameter display system (SPDS) parameters will be displayed in the TSC, EOF, and main control room.

Trend displays, time history, and dynamic displays are utilzied to perform the task assigned to the TSC.

The EOF will be located at the Division Headquarters Building in Dixon, Illinois for Byron Station. The Byron Station EOF is more than 20 miles from Byron Station. Figure E.75-2 shows the arrangement of the Byron Station EOF. The Braidwood Station EOF is also more than 20 miles from the station. The Braidwood Station EOF arrangement will be provided later.

The onsite operational support centers have been designed to satisfy the OSC requirements and will be fully described later. The operational support centers are equipped with communications for the main control room.

Power Supply Provisions

TSC

The power supply to the TSC as shown in Figures E.75-3 (Byron) and E.75-4 (Braidwood) is designed with sufficient alternate backup power sources to provide a very high degree of reliability to meet the operational unavailability requirements, while not degrading the safety-related power sources. The TSC power supply provides service to the HVAC and lighting at the TSC.

The power supply to the instrumentation data system equipment (existing process plant computer) is designed with the normal power supply being AC and the power backup being DC. This maintains continuity of TSC functions with a very high degree of reliability.

EOF

The design of the EOF power uspply has not been completed, however, when completed will meet the high degree of reliability required according to NUREG-0696.

HVAC Provisions

The following descriptions apply to the TSC and EOF heating, ventilating, and air conditioning systems.

Emergency Operations Facility (EOF) HVAC System

The Emergency Operations Facility HVAC system serves the Monitor Room, Records Room, NRC Office, Meeting Room, Communications Room, News Media Room, and various offices and toilet rooms located on the second floor of the CECO Division Headquarters Building located in Dixon, Illinois.

Design Bases

The EOF HVAC system is designed to maintain comfort conditions, provide environmental conditions conducive to habitability in the EOF area to meet the requirements of NUREG-0696.

Safety Design Basis

The EOF HVAC system is non-safety-related; therefore there is no safety design basis. However, the system functions in a manner comparable to the Control Room and TSC systems. Since the EOF is located greater than 10 miles from Byron Station, HVAC system isolation with HEPA filtration is not required.

Power Generation Design Basis

a. The EOF HVAC system is available for operation on a year-round basis.

b. The system maintains 75° ± 2° F temperature and 40% ± 5% relative humidity during summer operation.

c. The system maintains 75° ± 2° F temperature and 35% ± 5% relative humidity during winter operation.

d. The system draws approximately 10% of the total supply air from out-of-doors.

e. In the event of loss of electrical power, the system is shut down.

f. The schematic diagram of the EOF HVAC system is shown in Figure E.75-5.

g. Equipment parameters of principal system components are listed in Table E.75-1.

h. One supply equipment train is provided. The train consists of an outside air intake, control dampers, supply air filters, supply fan, heating coil, and cooling coil.

i Humidification is provided by an electric steam boiler providing steam to a duct mounted humidifier system.

j. Heating is provided by a gas fired heat exchanger.

k. Cooling is provided by a direct expansion refrigeration system.

l. Exhaust fans are provided for the toilet rooms, janitor's closet, kitchen and duplicating room for odor dilution.

m. Controls and Instrumentation

   1. The supply fan steam boiler and exhaust fans are controlled by locally mounted switches.

   2. Individual zone thermostats modulate dampers in the heating and cooling sections to maintain temperature settings.

   3. Humidistats modulate humidifier steam valve to maintain humidity setting.

   4. Filter differential pressure is indicated locally.

   5. Ionization detectors are provided in the outside air and return ducts to shut down the system in the event of fire.

   6. All controls are pneumatic and electric.

Safety Evaluation

a. The EOF HVAC system is non-safety-related.

b. A system failure analysis is presented in Table E.75-2.

Testing and Inspection

All equipment will be factory-inspected and tested in accordance with the applicable equipment specifications. System ductwork and erection of equipment will be inspected in accordance with the design drawings and manufacturer's recommendations. Acceptance tests will be performed during which time each system will be balanced for the design airflow, system operating temperatures and pressures. Controls on each system will be checked, adjusted, and tested to ensure the proper sequence of operation. A final, integrated, acceptance test will be conducted with all equipment and controls in operation to verify that system performance and operation meet design requirements.

Each system will be periodically checked and tested to ensure design operation and performance. All maintenance will be performed on a regularly scheduled basis in accordance with normal station maintenance procedures.

TECHNICAL SUPPORT CENTER (TSC) HVAC SYSTEM

The Technical Support Center HVAC system is designed to serve the Monitor Room, Computer Room, Electrical Equipment Room, Battery Room, Kitchen, Toilets, Records Room and other offices in the Technical Support Center. The HVAC Equipment Room is shielded off from TSC Boundary and is provided with separated ventilation system.

Design Bases

The TSC HVAC system is a non-safety-related system and is designed to the habitability requirements in conformance to NUREG-0696.

Safety Design Basis

a. The system is designed for 10,000 cfm capacity with 8,800 recirculation air and 1,200 cfm makeup air.

b. The makeup air of 1,200 cfm is adequate to keep the TSC areas under 1/8 inch w.g. positive pressure with respect to surroundings.

c. On high radiation detection the makeup air 1,200 cmf of recirculation air is routed through a 2,000 cfm filter unit with 4 inch bed tray type charcoal adsorbers. The filter units are designed such that the post-accident integrated dose to personnel and TSC is less than the requirements specified in NRC General Design Criterion 19.

d. The system monitors chlorine concentrations in the outside makeup air intake and automatically isolates makeup air intakes upon chlorine detection. Simultaneously, the HVAC system is placed in the recirculation mode. Miscellaneous kitchen and toilet exhaust fans are shut down.

e. The system monitors products of combustion in makeup air intake. Ionization trips are alarmed in the local HVAC panel and the Control Room. Provision is made to permit the operator to purge all spaces served by the system with 100% outside air unless radioactivity or chlorine in excess of detector setpoints is present in intake.

f. NUREG-0696 does not require system redundancy and hence system is not designed with redundancy. The system components are of comparable quality of those provided in the Control Room HVAC system.

g. TSC is provided with area monitors. Also ventilation system is designed to use portable air monitor.

Power Generation Design Basis

The TSC HVAC system is designed to provide a controlled environment of 75° ± 2° F and a relative humidity of 40% ± 5% except in the Electrical Equipment Room where the maximum design temperature is 104° F.

System Description

The TSC HVAC system is shown in Figure E.75-6. The capacities of principal components are listed in Table E.75-3.

a. The TSC HVAC system is comprised of an air handling unit with a direct expansion cooling system, a makeup filter unit, ductwork, and associated accessories. During normal operation, the minimum outside air quantity is induced through an outside air intake to a mixed air plenum where it is mixed with return air from all spaces.

The air handling unit fan discharges this mixed air through a DX cooling coil into main supply duct. If required, heat is added to supply air in this duct by electric blast coil and humidity is added by a steam humidifier also located in this duct. The supply duct branches off to supply air to three main zones, each zone consisting of areas shown in Figure E.75-7 The branch duct to each zone is provided with electric reheat coils and steam humidifiers to further control the space environment to the design requirements. Air from all spaces except from the kitchen, toilets, and the Battery Room is returned through ductwork to mixed air plenums. The kitchen and toilet exhaust air (600 cfm) is discharged by a separate fan. Battery Room air is exhausted outdoors (300 cfm) by a separate fan. Makeup air conpensates the loss of exhaust air and exfiltered air to keep the TSC under 1/8 inch positive pressure.

b. Chlorine detector, taps for portable radiation monitor, and ionization detector are located in the intake duct.

c. Low leakage pneumatic operated butterfly isolation dampers are provided with fail positions such that the makeup air will be routed through makeup air filter unit on loss of air or high radiation detection. Maximum outdoor air path is normally closed except in the purge mode.

d. The makeup air filter is designed for 2,000 cfm (1,200 cfm makeup air and 800 cfm return air). The unit consists of a centrifugal fan, prefilter, electric heating coil, upstream HEPA filter, two 2 inch bed tray type charcoal adsorbers, downstream HEPA filter in series. All the components and controls are designed to meet ANSI 509-80 requirements.

e. The controls and instrumentation are either pneumatic or electric. A local control panel for various functions to operate the HVAC system is provided and located within the TSC boundary. Important functions such as high radiation detection, ionization detection and chlorine detection are annunciated in the HVAC panel. Common trouble alarm is provided in the Main Control Room.

f. Water deluge valves for charcoal fire protection are provided. These are connected to Station Fire Protection System.

<u>Safety Evaluation</u>

a. The TSC HVAC system is non-safety-related.

b. A failure analysis is provided in Table E.75-4.

<u>Inspection and Testing</u>

All equipment is factory inspected and tested in accordance with the applicable equipment specification and codes. System ductwork and erection of equipment air inspected during various construction stages. Component demonstration tests are performed on all mechanical components and the system is balanced for the design airflows and system operating pressures. Controls, interlocks, and safety devices on each system are checked, adjusted and tested to ensure the proper sequence of operation. The equipment manufacturer's recommendations and station practices are considered in determining required maintenance.

EMERGENCY FACILITIES AND EQUIPMENT

Emergency Control Centers

Station Control Room

The nuclear station control room shall be the initial onsite center of emergency control. Control Room personnel must evaluate and effect control over the initial aspects of an emergency and initiate activities necessary for coping with the initial phases of an emergency until such time that support centers can be activited. These activities shall include:

a. Continuous evaluation of the magnitude and potential consequences of an incident;

b. Initial corrective actions; and

c. Notification of appropriate individuals.

Support centers provided are an Onsite Technical Support Center, and Onsite Operational Support Center, a Corporate Command Center, and Nearsite Emergency Operations Facility.

Onsite Technical Support Center (TSC)

Each nuclear generating station has established an Onsite Technical Support Center (TSC) for use during emergency situations by plant management, technical, and engineering support personnel. When activated during an emergency, the Onsite TSC shall be manned by sufficient personnel to:

a. Support the Control Room command and control function;

b. Assess the plant status and potential offsite impact; and

c. Coordinate emergency response actions.

Staffing of the Onsite TSC shall be as directed by the Station Director. Reporting initially to the Onsite TSC for the Site and General Emergency shall be all directors of the Station Group, i.e., the Station Director, Operations Director, Technical Director, Maintenance Director, Stores Director, Administrative Director, Security Director, and Rad/Chem Director. (The Shift Engineer when acting is initial Station Director would not report to the Onsite TSC.) Other personnel may augment the Onsite TSC staff upon approval of the Station Director. The organization of the TSC staff is shown in Figure E.75-8.

Each Onsite TSC is in close proximity to the Control Room and is sized for at least 25 persons and supporting equipment. Of the 25 persons, five will be considered to represent the NRC and one person will be considered to represent the State of Illinois. At Quad-Cities and Zion Stations, an additional slot per station will be held for a contiguous state representative.

Personnel in the Onsite TSC shall be protected from radiological hazards, including direct radiation and airborne contaminants under accident conditions to the same degree as Control Room personnel. To ensure adequate radiological protection, permanent radiation monitoring systems have been installed in the Onsite TSC. These systems continuously indicate radiation dose rates and airborne radioactivity inside the Onsite TSC while in use. In addition, protective breathing apparatus (full face air purifying respirators) and thyroid blocking agents are available for use as required.

The Onsite TSC has access to a complete set of as-built drawings and other records, including general arrangement diagrams, P&IDs, piping system isometrics, and the electrical schematics. The Onsite TSC (will have) the capability to record and display vital plant data, in real time to be ued by knowledgeable individuals responsible for engineering and management support of reactor operation, and for implementation procedures.

Onsite Operational Support Center (OSC)

Each nuclear generating station has established an Onsite Operational Support Center (OSC). The Onsite OSC is the location to which operations support personnel will report during an emergency and from which they will be dispatched for assignments or duties in support of emergency operations. Personnel who may report to the Onsite OSC include:

a. Operating personnel not assigned to the Control Room,

b. Radwaste personnel, and

c. Rad/Chem Technicians.

The Operation Director shall designate an individual from the Station Operations staff to manage and supervise the activities of the Onsite OSC.

A limited inventory of supplies will be kept in the Onsite OSC. This inventory will include respirators, protective clothing, portable lighting, and portable survey instruments.

Corporate Command Center (OSC)

The Corporate Command Center located in the Commonwealth Edison Building, downtown Chicago, is the location from which the Corporate Command Center Director will normally direct a staff in evaluating, coordinating, and directing the overall company activities involved in coping with an emergency. If the Recovery Group is activated at the Nearsite EOF, then the CCC will be the location for a support staff reporting to the Recovery Group.

In addition to the above functions, the CCC will serve as the corporate environmental center where environmental monitoring will be directed and offsite dose projections performed under the direction of the CCC Environmental Director.

Nearsite Emergency Operations Facility (EOF)

The Nearsite Emergency Operations Facility (EOF) is the location near the generating station that provides for the management of overall emergency response, the coordination of radiological assessments, and for mangement of recovery operations. The Nearsite EOF and associated Recovery Group function under a Recovery Manager and are activated for all Site and General Emergency situations. Activation for other emergency conditions is optional. The Byron EOF is located in Dixon, Illinois which is greater than 20 miles from Byron Station.

There will be three major emergency control functions at each Nearsite EOF. They are: (1) the Recovery Center; (2) the Emergnecy Control Center; and (3) the Emergency News Center. Refer to Figure E.75-9.

The Recovery Center functions under the direction of the Recovery Manager and is the command post for direction of all recovery operations.

The Emergency Control Center is under the direction of the Environmental/Emergency Coordinator and functions as a location from which to evaluate emergency situations that affect the public.

The Emergency News Center is under the direction of the Emegency News Center Director and functions as the single-point contact for disseminating information to the public. A technical spokesperson will be chosen by Commnowealth's top management. This spokesperson will be knowledgeable about the affected station and its operation and will have the authority and responsibility to discuss technical problems associated with the emergency. The spokesperson will be available to brief the press at the Emergency News Center.

COMMUNICATION SYSTEMS

Commonwealth has extensive and reliable communication systems installed at its generating stations, system power supply office, corporate headquarters, and Division load dispatching offices. These systems include the use of normal and special telephone lines, radio, microwave voice channels, mobile radio units, and handi-talkies.

For the purposes of GSEP communications, the system is addressed in terms of functional areas as described in the following sections.

Nuclear Accident Reporting System (NARS)

The Nuclear Accident Reporting System is a dedicated telephone voice communication system that has been installed for the purpose of notifying State and local authorities of declared nuclear emergencies. This system links together the station Control Rooms, the Corporate Command Center, Onsite Technical Support Centers, System Power Supply Office, Nearsite Emergency Operations Facilities, and State and local authorities as appropriate. (See Figure E.75-9.)

The State of Illinois Emergency Services and Disaster Agency, in cooperation with Commonwealth Edison, is responsible for the development and execution of all steps necessary to ensure continuous operation of the NARS.

Communication for Command and Control

Commonwealth has established four separate dedicated communication systems that ensure reliable and timely exchange of information necessary to provide effective command and control over any emergency response. These systems include:

a. A microwave voice channel betweeen the Corporate Command Center and the Shift Engineer's Office, the Onsite TSC, and the Nearsite EOF at each nuclear station.

b. A telephone link that enables communication between the Corporate Command Center, the Onsite TSC, and the Nearsite EOF.

c. A telephone link that enables communication between the Control Room and the Onsite TSC.

d. A telephone link that enables communication between the Control Room and the Onsite OSC.

Refer to Figure E.75-10 for a more descriptive representation of the above systems.

Environmental Assessment Communications

Two separate communication systems have been installed to allow coordinated environmental monitoring and assessment during an emergency.

The first system consists of the necessary hardware to allow communication between the Corporate Command Center, the Control Room, the Onsite TSC, the Nearsite EOF mobile units in Commonwealth Edison vehicles, and handi-talkies held by environmental monitoring teams in the field. The radio system has scramble capability to prevent monitoring by non-company equipment.

The second system consists of a dedicated telephone which allows continuous communication between the Corporate Command Center and the Illinois Department of Nuclear Safety REAC in Springfield. Refer to Figure E.75-11.

NRC Communications

There exists a dedicated telephone, Emergency Notificaiton System (ENS), between each nuclear station's Control Room and the NRC, with an extension of that line in the Onsite Technical Support Center. There also exists a separate dedicated telephone, Health Physics Network (HPN), between the NRC and the Radiation Protection Office at each nuclear station (see Figure E.75-12). The actual configuration of these systems may vary from station to station. Installation and use of the NRC phones is under the direction of the NRC.

Assessment Facilities

Onsite Systems, Instrumentation, and Equipment

Each nuclear station is equipped with instrumentation for seismic monitoring, radiation monitoring, fire protection, and meteorological monitoring. The actual instrumentation varies somewhat from site to site and thus will not be described in this generic plan. Descriptions of the above equipment will appear in each site specific annex.

With regard to Commonwealth Edison's meteorological monitoring program, there has been a quality assurance program since 1976. The program was adopted from 10 CFR 50, Appendix B. However, since the meteorological facilities are not composed of structures, systems, and components that prevent or mitigate the consequences of postulated accidents and are thus not "safety-related", not all aspects of 10 CFR 50, Appendix B apply. Those aspects of quality assurance germane to supplying good meteorological information for a nuclear power station were adopted into the meteorological quality assurance program.

Safety Parameter Display System (SPDS)

The Safety Parameter Display System (SPDS) (will) provide a display of plant parameters from which the safety status of operation may be assessed in the Control Room, Onsite TSC, the CCC, and Nearsite EOF for each nuclear station. The primary function of the SPDS is to help operating personnel in the Control Room make quick assessments of plant safety status. Duplication of the SPDS displays in the Onsite TSC, the CCC, and Nearsite EOF will promote the exchange of information between these facilities and the Control Room and assist management in the decision making process.

Offsite Dose Calculation System (ODCS)*

The Offsite Dose Calculation System (ODCS) is a computer based method for estimating the environmental impact of unplanned airborne releases of radioactive material from nuclear stations.

The objectives of the Commonwealth ODCS are:

a. Meet the meteorological criteria of NUREG-0654.

b. Provide, where possible, redundant independent pathways of data transmission and redundant data processing computers for use in an emergency situation.

c. Provide quick and reasonably accurate estimates of radiation dose to persons living offsite, including preparation of procedures and training of users required to accomplish the assessment.

d. Provide a method for the meteorological contractor to secure meteorological data for assessment of routine releases and to detect equipment failure quickly.

Each nuclear station meteorological tower will be interrogated many times daily by the meteorological contractor to secure the information necessary for preparation of meteorological operating reports and to detect system failures.

*This system will not be fully operable, as described, until April 1982.

Every hour, and more frequently during an accident, a corporate (in Chicago) SYFA computer will poll each meteorological facility to prepare the corporate data file and to check the system in order to maintain the ODCS in a readiness posture. Corporate IBM computers will then store the data for an extended period of time and process the data when refined estimates of dose are needed.

At each nuclear station, two computers with different functional requirements will process the meteorological information. The plant process computer will produce initial transport and diffusion estimates within 15 minutes following classification of an incident. The plant SYFA computer will produce refined estimates of dose in two ways: (1) as a terminal entry system to the corporate IBM or (2) by itself when the data link between the plant's Onsite Technical Support Center (TSC) and the corporate IBM is lost.

During an accident these four computer systems (plant process, plant SYFA, corporate SYFA, corporate IBM) will provide the various users with timely information required to make decisions. Emergency actions will be performed in the following sequence:

a. Time frame: initial one-half hour or so post-accident - the control room operator will rely on wind speed and direction and effluent release rate information provided by the plant process computer and these data converted into requisite Emergency Action Levels (EALs) by the Class A computer model.

b. One-half hour to few hours - the plant will rely on the station-designated ODCS user to analyze the offsite consequences using the corporate IBM computer (Class B model) or plant SYFA (Class B model).

c. Few hours to duration of accident - a corporate environmental group will perform refined estimates of the offsite consequences for the duration of the emergency period using effluent information provided by plant personnel and the corporate IBM Class B model. This corporate group has been formed to support all nuclear stations and will perform its work in Chicago in lieu of having to relocate to each Nearsite Emergency Operations Facility (EOF). A data link between the corporate facility and each Nearsite EOF will be provided.

The Class A model will provide warning to the Control Room operator when the following EALs have been exceeded: for Site Emergency: 2-minutes average noble gas release rate having projected offsite dose rate of 500 mR/hr and 30-minute average noble gas release rate having projected offsite dose rate of 50 mR/hr, using worst case meteorology; and for General Emergency: 2-minute average noble gas release rate having projected offsite dose rate of 1000 mR/hr using 15-minute average meteorology.

Nuclear Data Link

The Nuclear Data Link (NDL) (will be) a data transmission system designed to send a specified set of variables from the nuclear station to the NRC Operations Center. The purpose fo the system is to provide management personnel at NRC with timely, reliable, and accurate plant system, meteorological, and radiological information. The system will also be available to State and utility personnel.

Protective Facilities and Equipment

Each nuclear station has chosen locations to serve as both onsite assembly areas and offsite evacuation assembly areas. The specific locations of these areas are shown in each site specific annex.

First Aid and Medical Facilities

Each nuclear station maintains onsite first aid supplies and equipment necessary for the treatment of contaminated or injured persons. No resident physicians, nurses, or industrial hygienists are on the staff of Commonwealth's generating stations, and as such, medical treatment given to injured persons is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local clinic or hospital.

Damage Control Equipment and Supplies

The onsite storeroom of each nuclear station maintains a supply of parts and equipment for normal plant maintenance. These parts, supplies, and equipment are available for damage control use as necessary. When an emergency condition exists at one station, additional supplies can be obtained from other stations and from Division resources upon request.

Facilities and Equipment for Offsite Monitoring

Commonwealth Edison has contracted with a company (currently Hazleton Environmental Sciences Corporation) to conduct an extensive offsite enviromnetal monitoring program to provide data on measurable levels of radiation and radioactive materials in the environs. The program includes: fixed continuous air samplers; routine sampling of river water; routine sampling of milk; routine sampling of fish; and a fixed TLD monitoring network. The TLD program consists of the following elements at each nuclear station:

a. A nearsite ring of dosimeters covering the 16 meteorological sectors.

b. A 16 sector ring of dosimeters placed in a zone about 5 miles from the plant.

c. TLDs placed at each of the normal fixed air sampler locations (typically about 8-15 air samplers per nuclear station).

Each nuclear station maintains a supply of emergency equipment and supplies which may be used for offsite monitoring. The actual equipment may vary somewhat from site to site and thus the specific listing of equipment appears in Station Emergency Plan Implementing Procedures.

EOF AND TSC MONITORED PARAMETERS

The paramters monitored at the emergency offsite facility and technical support center are indicated in Table E.75-5.

EMERGENCY ACTION LEVELS

Table E.75-6 describes emergency action levels. Table E.75-7 shows guidance for augmentation of the onsite emergency organization.

Figure E.75-13 shows a simplified emergency notification scheme.

TABLE E.75-1

(LATER)

TABLE E.75-2

(LATER)

TABLE E.75-3

TECHNICAL SUPPORT CENTER HVAC SYSTEM EQUIPMENT PARAMETERS

NAME OF EQUIPMENT	NUMBER, TYPE, QUANTITY, AND NOMINAL CAPACITY
A. TSC HVAC Supply Air System	
Type	Blow-through packaged
Following are the components:	
1. Supply Air Fan	0VV23C
Type	Centrifugal
Quantity	1
Drive	Belt
Capacity (cfm)	10,000
External Static Pressure (in. of water)	4.0
2. Supply Air Filters	0VV18F
Type	High Efficiency
Quantity	1
Capacity (cfm)	10,000
Pressure Drop:	
Clean (in. of water)	0.3
Dirty (in. of water)	1.2
Efficiency (% by ASHRAE 52-68 Test Std.)	80
Media	
3. Cooling Coil	0VV18A
Type	Direct Expansion
Quantity	1
Cooling Capacity (Btu/hr)	294,900
Air Quantity (cfm)	10,000

B. Heating Coils	0VV20A	0VV21A	0VV22A	0VV23A
Type	Elec	Elec	Elec	Elec
Quantity	1	1	1	1
Capacity (kW)	15	10	25	10

TABLE E.75-3 (Cont'd)

NAME OF EQUIPMENT	NUMBER, TYPE, QUANTITY, AND NOMINAL CAPACITY			
Air Quantity (cfm)	2600	1500	4850	1050
C. Humidifiers	0VV17M	0VV18M	0VV19M	0VV20M
Type	Steam	Steam	Steam	Steam
Quantity	1	1	1	1
Capacity (lb/hr)	4	8	5	15
Air Quantity (cfm)	1050	2600	1500	4850
D. Humidifier Steam Generator	0VV18B			
Type	Electric			
Quantity	1			
Capacity (lb/hr)	45			
Operating Pressure (psig)	10			
E. Toilet Room Exhaust Fan	0VV27C			
Type	Wall Exhaust Fan			
Quantity	1			
Drive	Direct			
Capacity (cfm)	600			
External Static Pressure (in. of water)	0.5			
F. Battery Room Exhaust Fan	0VV29C			
Type	Vaneaxial			
Quantity	1			
Drive	Direct			
Capacity (cfm)	300			
External Static Pressure (in. of water)	0.625			
G. HVAC Equipment Room Exhaust Fan	0VV28C			
Type	Wall Wxhaust Fan			
Drive	Direct			
Quantity	1			
Capacity (cfm)	1000			

TABLE E.75-3 (Cont'd)

NAME OF EQUIPMENT	NUMBER, TYPE, QUANTITY AND NOMINAL CAPACITY
External Static Pressure (in. of water)	0.25
H. TSC Emergency Makup Air Filter Unit	0VV19S
Type	Packaged
Following are the components:	
1. Makeup Air Supply Fan	0VV25C
Type	Centrifugal
Quantity	1
Drive	Direct
Capacity (cfm)	2000
External Static Pressure (in. of water)	2.5
2. Pre-Filters	0VV19F
Type	High Efficiency
Quantity	1
Capacity (cfm)	2000
Pressure Drop:	
Clean (in. of water)	0.3
Dirty (in. of water)	1.2
Efficiency (% by ASHRAE 52-68 Test Std.)	80
Media	Glass Fiber
3. Heating Coil	0VV19A
Type	Electric
Quantity	1
Capacity (kW)	
Air Quantity (cfm)	2000
4. HEPA Filters	0VV20F, 0VV23F
Type	Nuclear Grade

TABLE E.75-3 (Cont'd)

NAME OF EQUIPMENT	NUMBER, TYPE, QUANTITY AND NOMINAL CAPACITY
Quantity	2
Capacity (cfm)	2000
Pressure Drop:	
Clean (in. of water)	1.0
Dirty (in. of water)	2.2
Efficiency (% minimum 0.3 micorn and larger)	99.97
Media	Glass Fiber water proof and fire retardant
5. Charcoal Adsorbers	0VV21F 0VV22F
Type	Tray
Quantity	2
Capacity (cfm)	2000
Pressure Drop (in. of water)	1.1
I. Purge Fan	0VV24C
Type	Vertical
Quantity	1
Drive	Direct
Capacity (cfm)	8800
Total Static Pressure (in. of water)	2.0
J. Condensing Unit	0VV30C
Type	Reciprocating
Quantity	1
Type of Refrigerant	R-22
Type of Compress Drive	Direct
Type of Condensers	Air-Cooled
Maximum Net Total Cooling (Tons)	25

TABLE E.75-4

(LATER)

TABLE E.75-5

EOF AND TSC MONITORED PARAMETERS

A. PLANT SYSTEM PARAMETERS

Core Exit Temperature

Reactor Coolant System

1) RCS hot leg temperature
2) RCS cold leg temperature
3) RCS pressure
4) Pressurizer level

Secondary System

1) Steam line pressure
2) Steam generator level - narrow range
3) Steam generator level - wide range
4) Auxiliary feedwater flow

ECCS

1) High ehad safety injection pump flow
2) Medium head safety injection pump flow
3) Low head safety injection pump flow

Containment Parameters

1) Containment pressure
2) Containment sump water level
3) Containment water level
4) Hydrogen concentration

B. RADIATION PARAMETERS

Steam Generator Blowdown

Condenser Air Ejector

Containment Radiation - High Range Area Monitor

Effluent Radioactivity

1) Noble gases
2) Halogens and particulates

TSC Data

1) TSC radiation level
2) TSC airborne radioactivity concentration

TABLE E.75-5 (Cont'd)

C. Meteorological Data

Temperature, differential temperature, dew point, wind speed, and wind direction parameters available from the meteorological tower.

TABLE E.75-6

EMERGENCY ACTION LEVELS

CONDITION	DESCRIPTION
Unusual Event	Events in progress or have occurred which indicate a potential degradation of the level of safety of the plant.
Alert	Events in progress or have occurred which involve an actual or portential substantial degradation of the level of safety of the plant.
Site Emergency	Events in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public.
General Emergency	Events in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.

TABLE E.75-7

GUIDANCE FOR AUGMENTATION OF THE ONSITE EMERGENCY ORGANIZATION WITHIN 60 MINUTES

Augmentation Within 60 Minutes

FUNCTIONAL AREA	UNUSUAL EVENT	ALERT.	SITE AND GENERAL EMERGENCY
1. Command and Control	Notification Only		
Station Director	1	1	1
Oper. Director	1	1	1
Maint. Director	*1	1	1
Tech Director	*1	1	1
Admin. Director	*1	*1	1
Stores Director	*1	*1	1
Rad/Chem Director	*1	1	1
Security Director	*1	*1	1
Environs Director	*1	1	1
2. Notifications and Communications		1	1
Accident Assessment			
Offsite		*2	4
Onsite		*1	1
In-Plant		*1	1
Rad/Chem (Lab)		*1	1
4. Technical Support			
Nuclear (Core)		*1	1
Electrical		*1	1
Mechanical		*1	1
5. Repair and Correction			
Mechanical		*1	1
Electrical		*1	1
Radwaste		*1	1
Inst. and Control		*1	1

*As needed depending upon the nature of the emergency

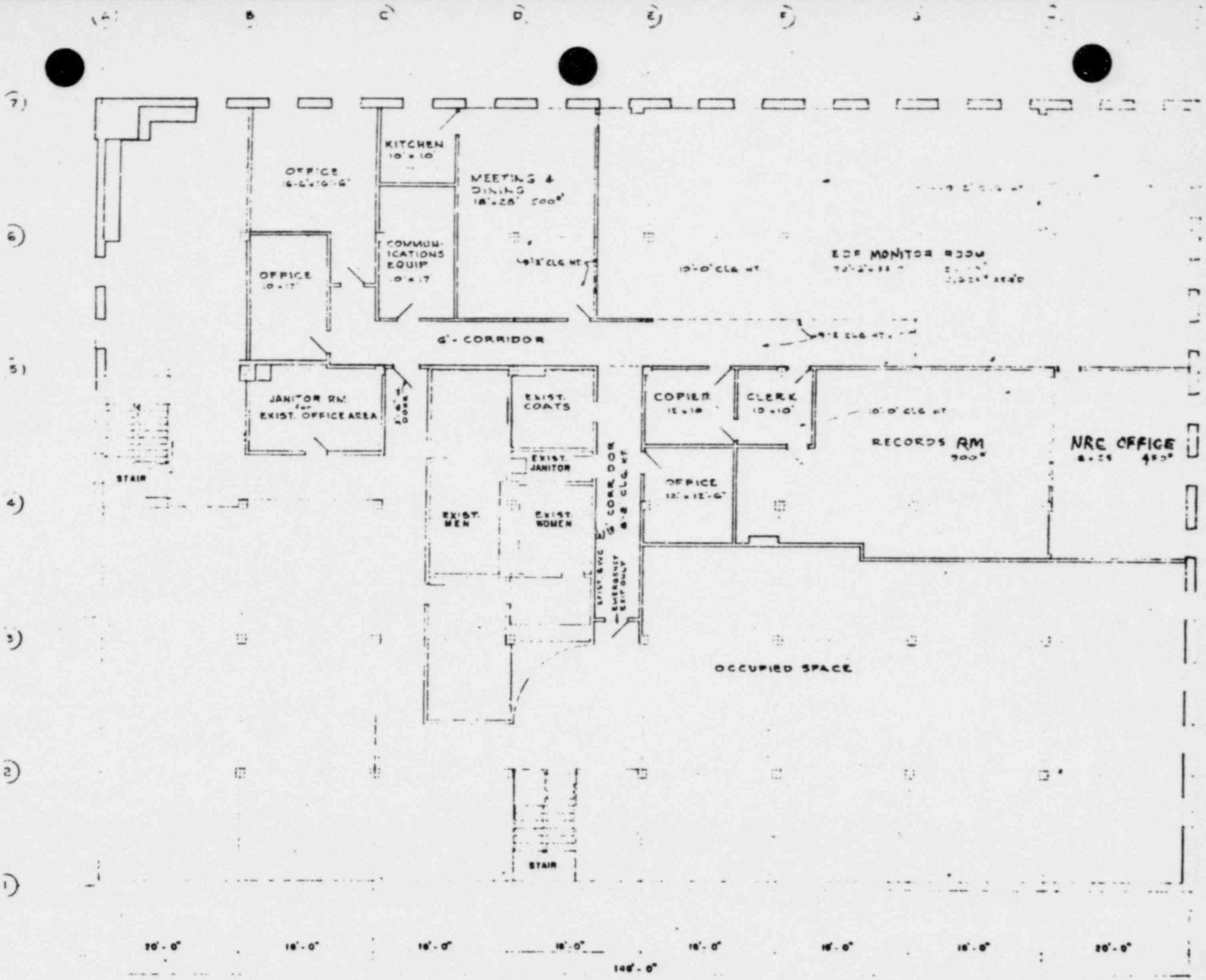
NOTE: Additional support in the areas of Command and Control; Communications; and Accident Assessment will be available from the offsite GSEP organization. It is reasonable to expect partial manning of the OCC or Nearsite EOF within 60 minutes for the Site and General Emergencies.

TABLE E.75-7 (Cont'd)

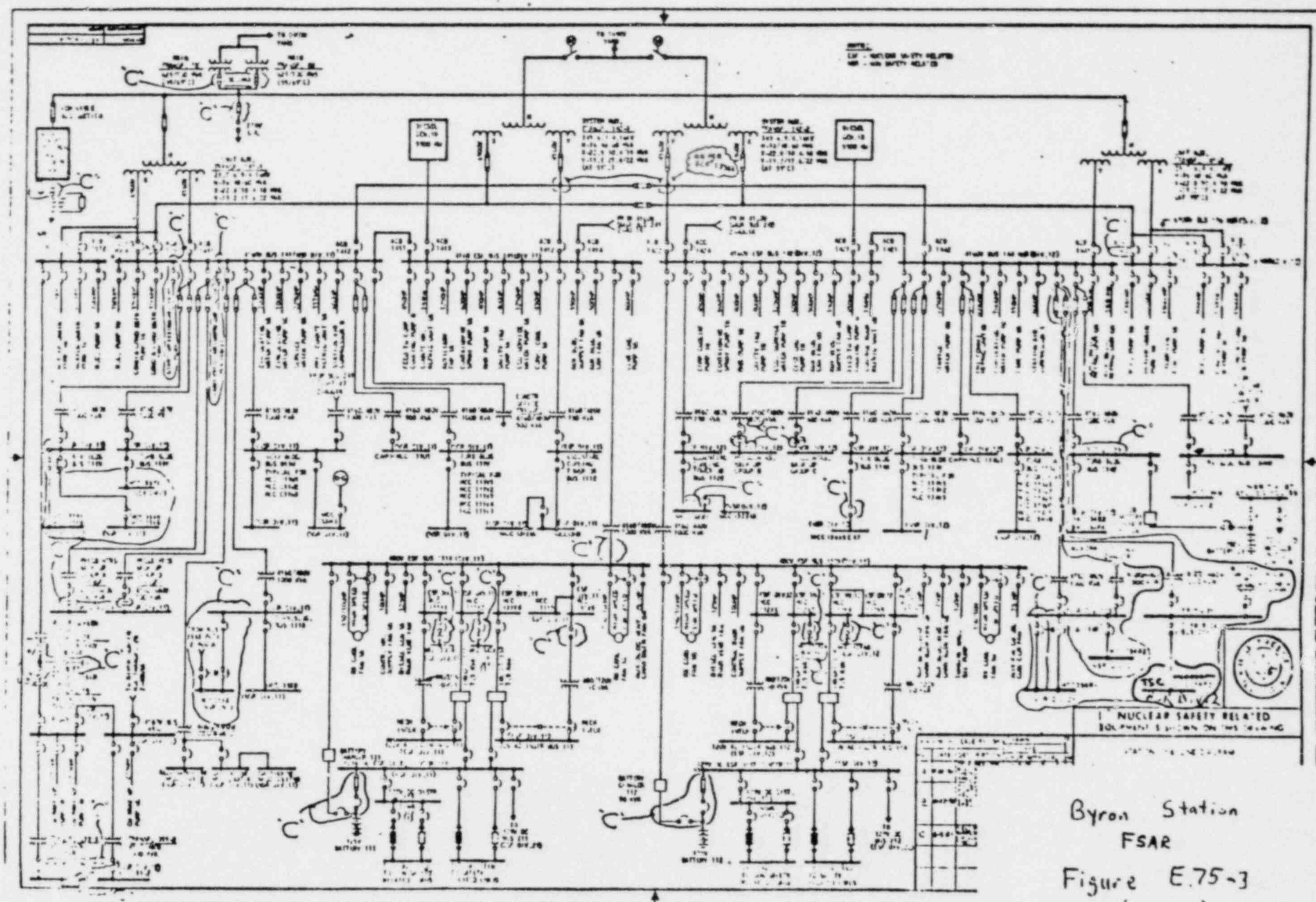
FUNCATIONAL AREA	UNUSUAL EVENT	ALERT	SITE AND GENERAL EMERGENCY
6. Protective Actions Radiation Protection		*2	4
	*2-9	*7-24	28

*As needed depending upon the nature of the emergency

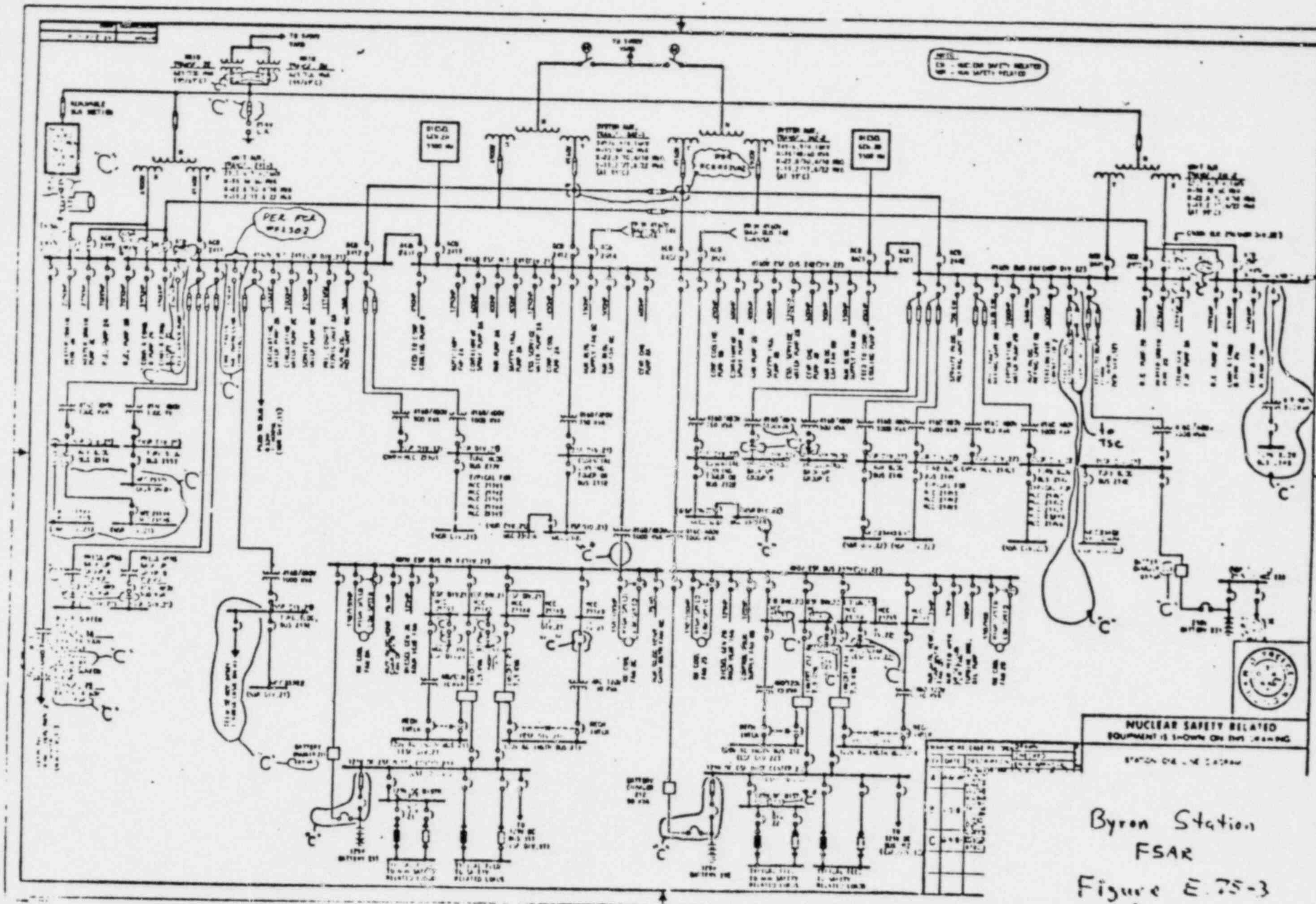
NOTE: Additional support in the areas of Command and Control; Communications; and Accident Assessment will be available from the offsite GSEP organization. It is reasonable to expect partial manning of the OCC or Nearsite EOF within 60 minutes for the Site and General Emergencies.



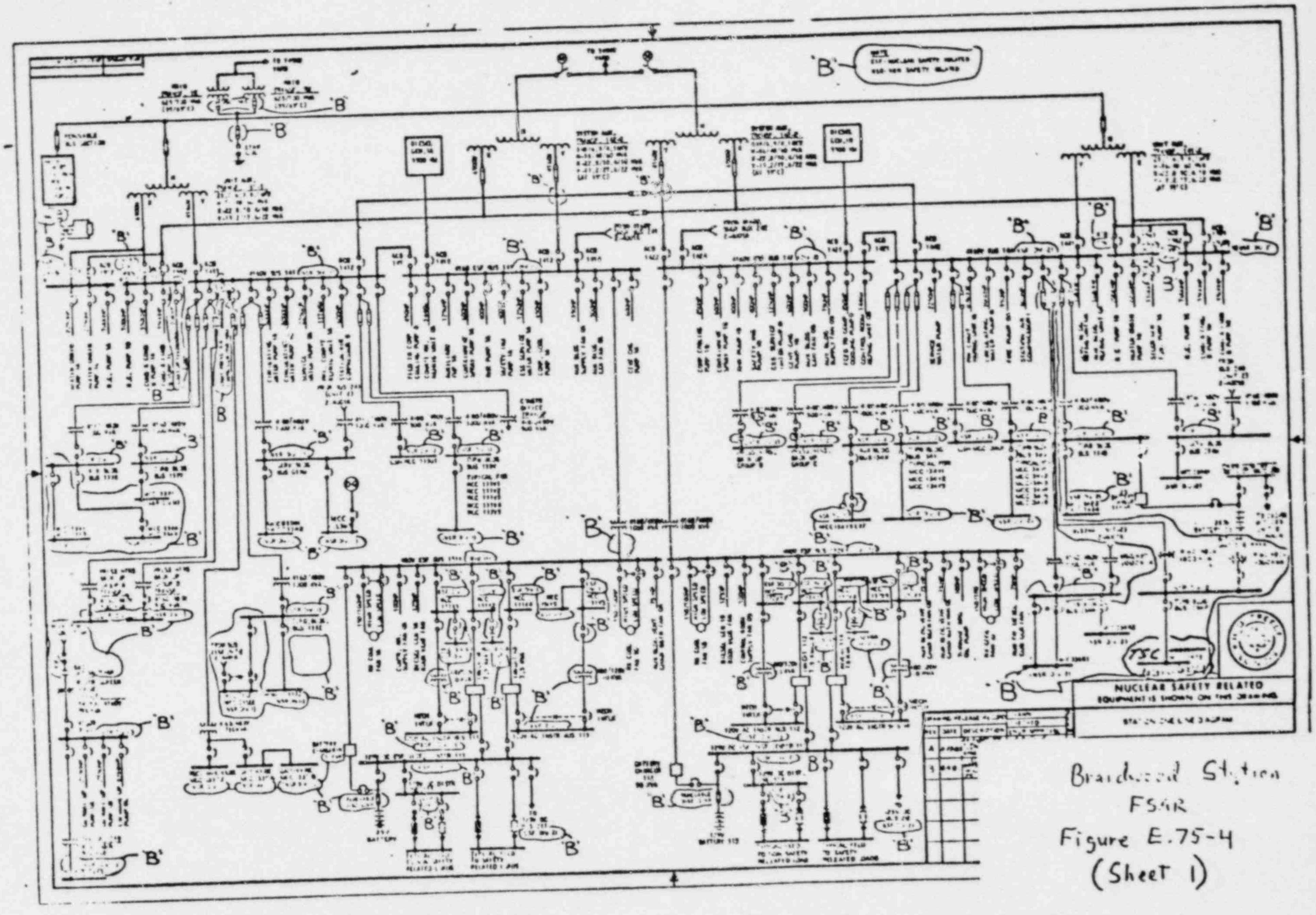
Byron - FSAR EOF SECOND FLOOR PLAN Figure E.75-2



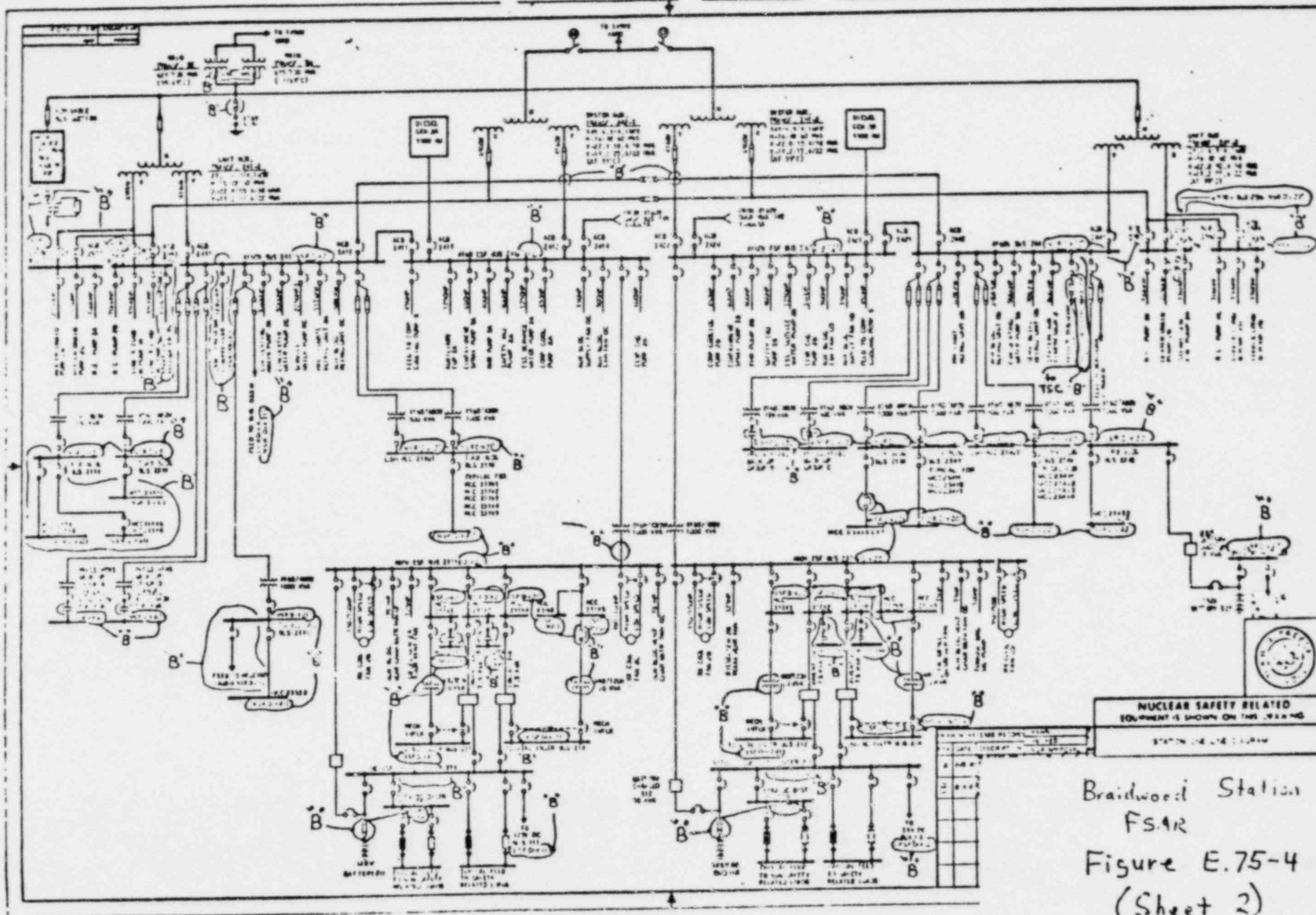
Byron Station
FSAR
Figure E.75-3
(Sheet 1)



Byron Station
FSAR
Figure E.75-3
(Sheet 2)



Braidwood Station
FSAR
Figure E.75-4
(Sheet 1)



Braidwood Station
FSAR
Figure E.75-4
(Sheet 2)

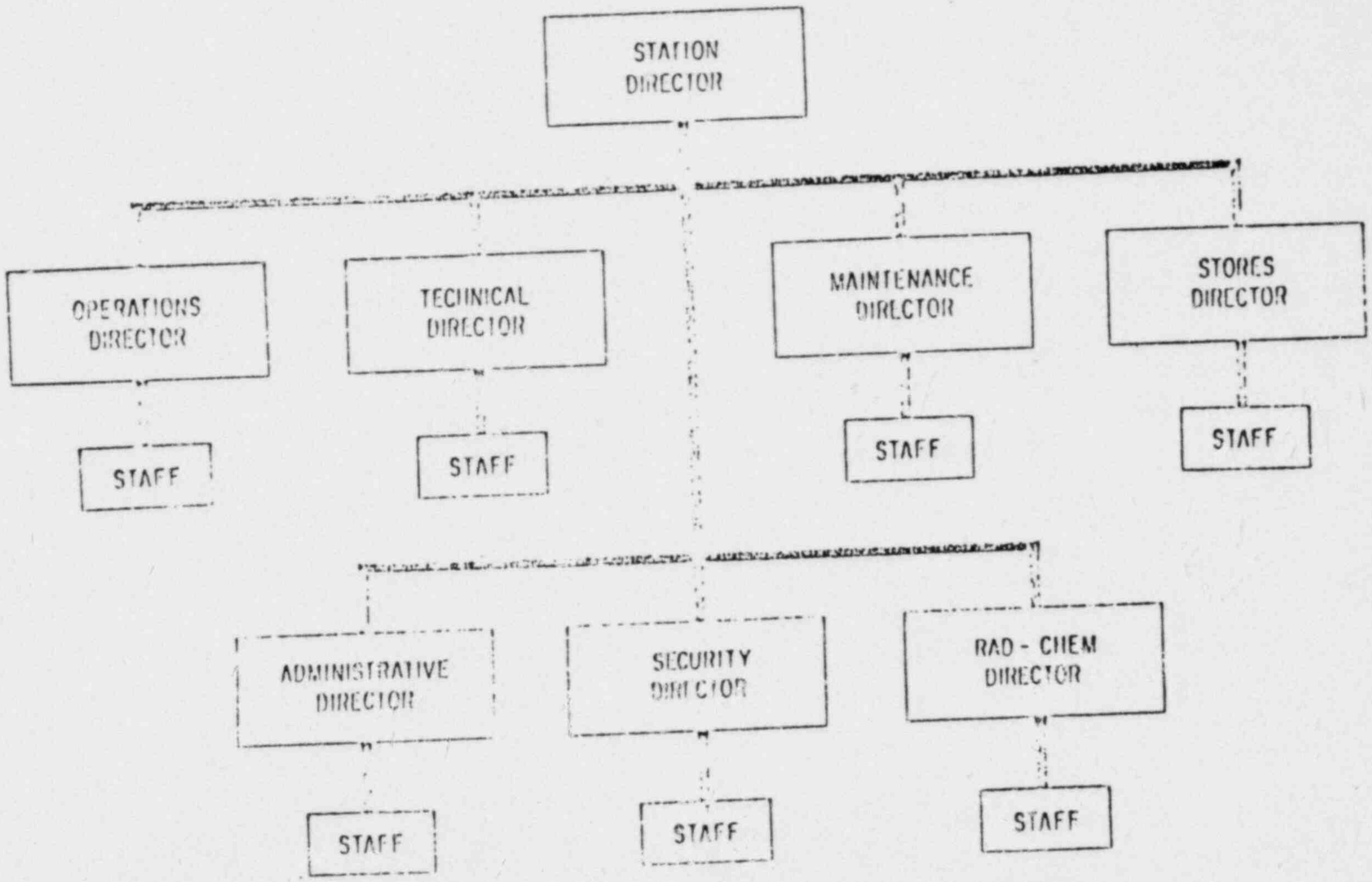
FIGURE E.75-5

(LATER)

FIGURE E.75-7

(LATER)

GSEP STATION GROUP ORGANIZATION

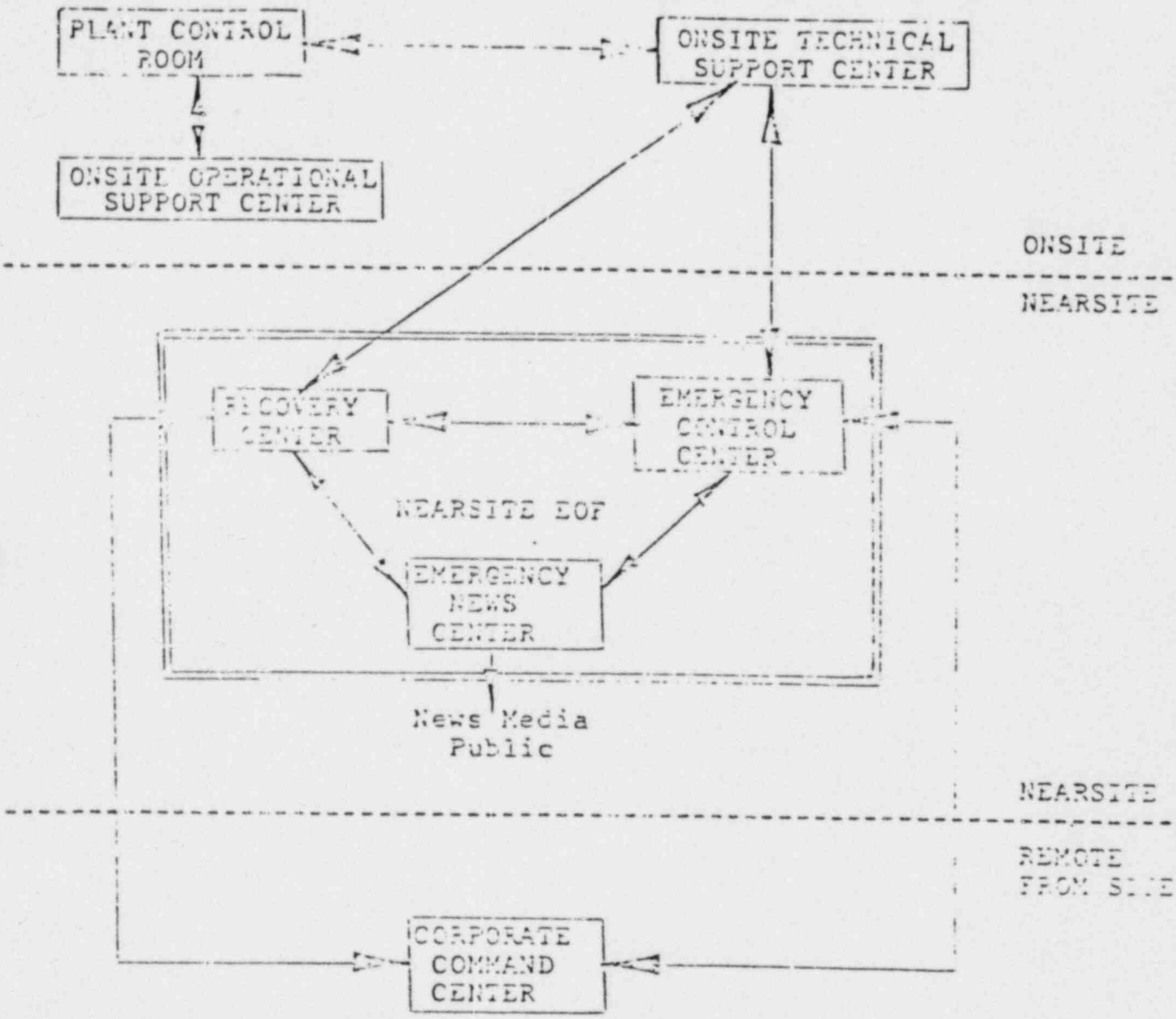


B/B-FSAR
Figure E.[illegible]

FIGURE E.75-9

COMMONWEALTH EMERGENCY CONTROL CENTERS
& COMMUNICATIONS FLOW

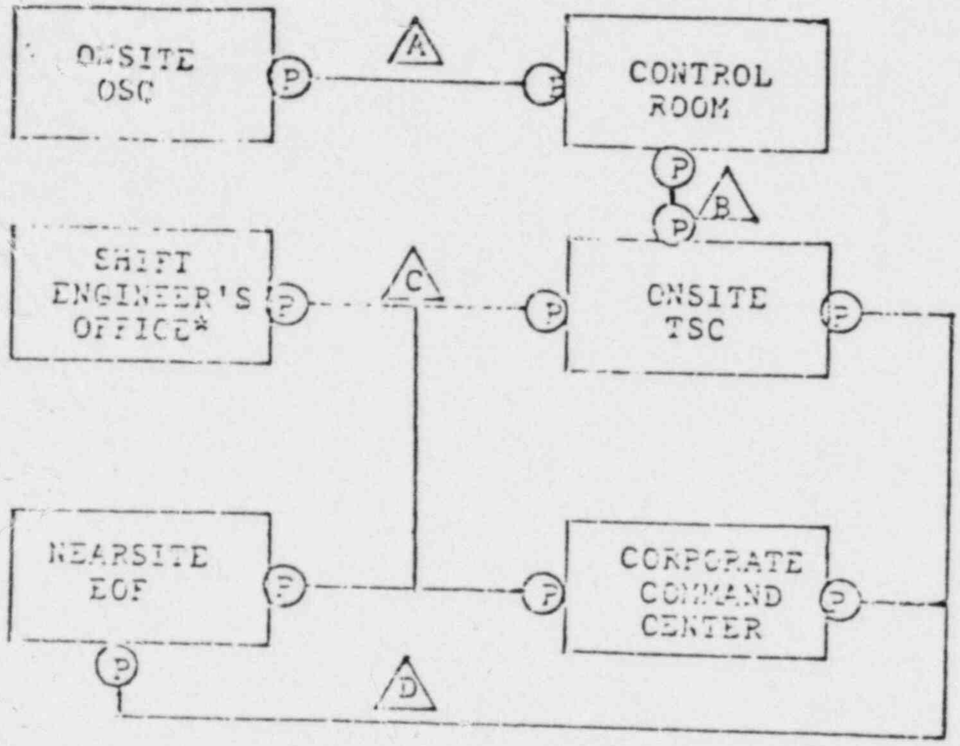
(for a full response situation)



Note: The Nearsite EOF has three defined functional centers. Space limitations of individual Nearsite EOFs may not allow separate physical rooms for each "center".

FIGURE E.75-10

COMMUNICATIONS FOR COMMAND AND CONTROL



(A) Telephone line between the Onsite OSC and Control Room. Color coding of this system is at the discretion of each nuclear station.

(B) Telephone line between the Control Room and Onsite TSC. Color coding of this system is at the discretion of each nuclear station.

(C) Microwave voice channel between the Corporate Command Center and the Nearsite EOF, Shift Engineer's Office, and the Onsite TSC. Phone receivers are color-coded gray. (This system is still under development.)

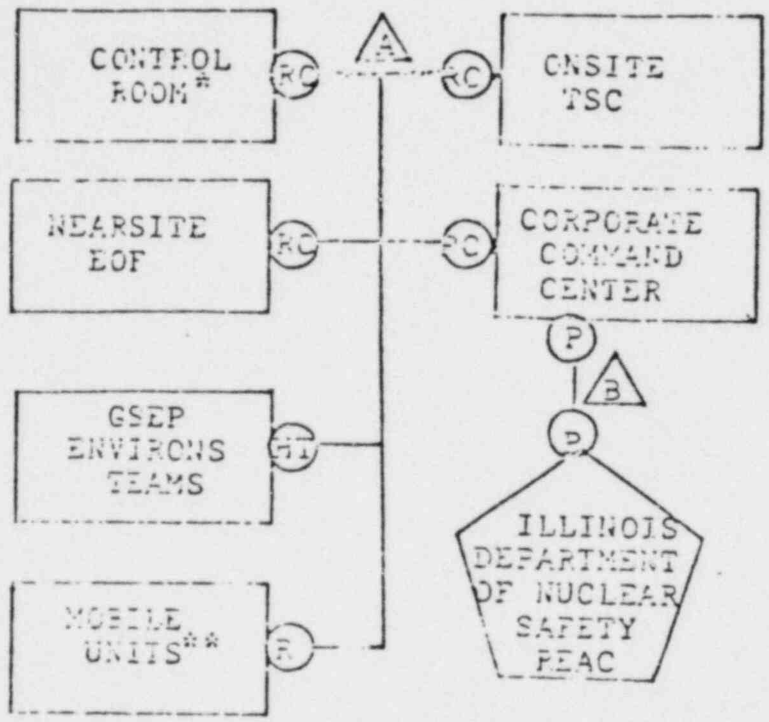
(D) Telephone line between the Nearsite EOF, Corporate Command Center, and Onsite TSC. Phone receivers are color-coded yellow.

(P) Phone receiver

* At the discretion of each nuclear station, the gray phone for the Shift Engineer's Office may be placed in the Control Room.

FIGURE E.75-11

ENVIRONMENTAL ASSESSMENT COMMUNICATIONS



(A) Microwave radio link between the Corporate Command Center, Onsite TSC, Control Room, Nearsite EOF, GSEP environs teams, and mobile units.

(B) Telephone line between the Corporate Command Center and the Illinois Department of Nuclear Safety. Phone receivers are color-coded <u>black</u>.

(RC) Radio/console unit

(HT) Handi-talkie (153.590 MHz)

(R) Radio (153.590 MHz)

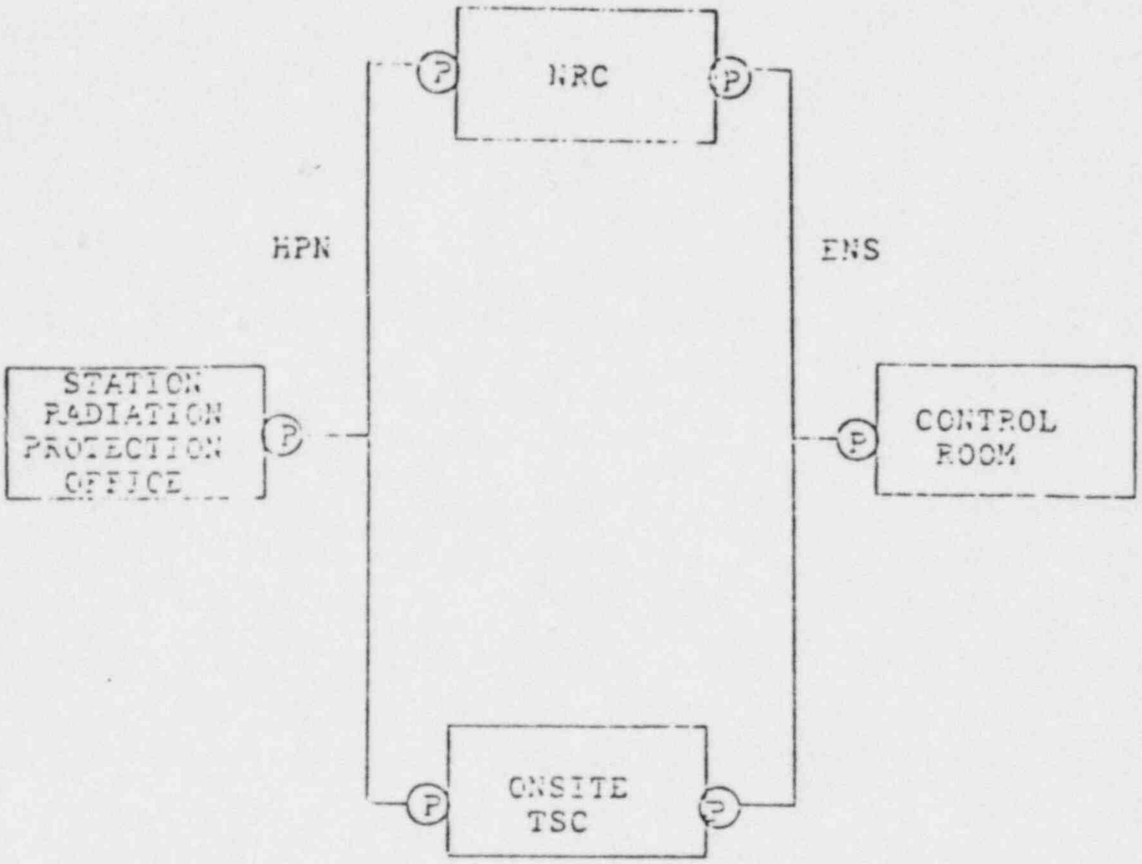
(P) Phone receiver

* At the discretion of each nuclear station, the radio console for the Control Room may be placed in the Shift Engineer's Office.

** Most mobile units do not have scramble capability.

FIGURE E.75-12

NRC COMMUNICATIONS



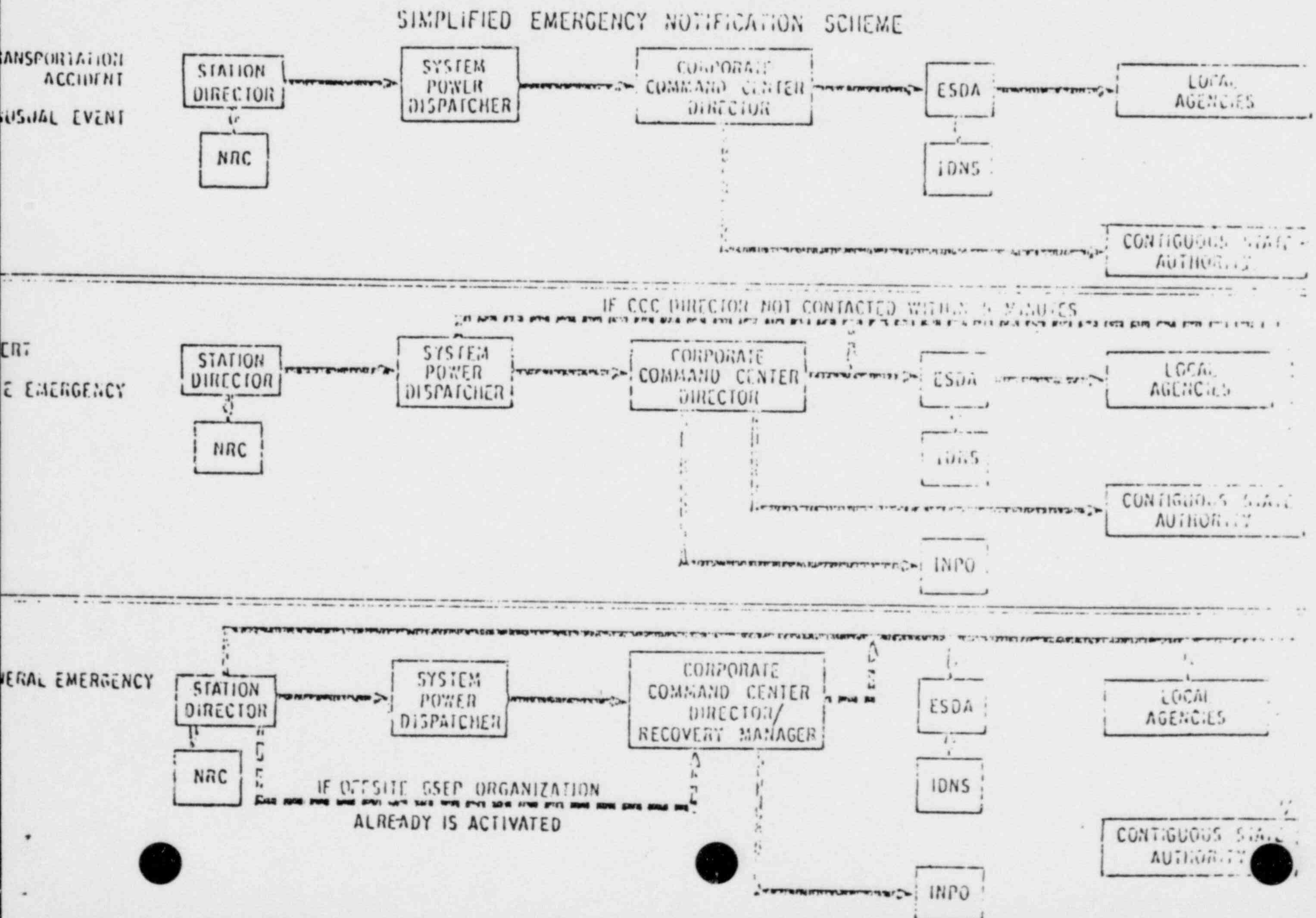
ENS: Emergency Notification System; phone receivers are color-coded red.

HPN: Health Physics Network; phone receiver colors vary from station to station.

(P) Phone receiver

The exact configuration of the above systems may vary from one nuclear station to another. Installation and use of the NRC phones are under the direction of the NRC.

Figure E.75-13



QUESTION 010.47

"Your response to Q010.30 has not provided an adequate analysis to demonstrate that drainage of leakage water away from safety-related components or systems is adequate for worst case flooding resulting from postulated pipe breaks or cracks in high or moderate energy piping near these safety-related components or systems. The analysis must show that drainage by natural routes such as stairwells or equipment or hatches by the non-seismic Category I drainage system under failed conditions is adequate to prevent the loss of function of safety-related components and systems. As an example, show that a crack in one essential service water line inside the essential service water pump room will not flood out the other redundant pump before operator action can be taken to isolate the leak assuming a failed non-safety grade sump alarm system. Worst case locations should be assumed for this example and for other safety-related systems listed in FSAR Table 3.6-1.

It is our position that unless drainage capability by natural or by failed non-seismic Category I drainage systems can be demonstrated, you should provide the following for all areas housing redundant safety-related equipment.

1. Leak detection sumps shall be equipped with redundant safety grade alarms which annunciate in the control room. Verify that if operator action is required on receipt of alarm that flooding or redundant safety grade quipment will not occur within 30 minutes; or

2. Provide separate watertight rooms and independent drainage paths with leak detection sumps for each redundant safety-related component."

RESPONSE

The following report outlines a confirmatory study of the flooding which would result in the auxiliary building following postulated high or moderate energy line breaks.

AUXILIARY BUILDING FLOODING ANALYSIS

I. INTRODUCTION

One potential problem which could result from a break of a high or moderate energy line is flooding of safety-related equipment. This report will address flooding of safety related equipment in the auxiliary building. The containment flooding concerns have been addressed previously. Turbine building flooding is not a safety concern because safety-related equipment is not located in the turbine building (see response to NRC Question 010.50).

II. PLANT FLOODING DESIGN BASIS

The auxiliary building design prevents flooding from affecting safety-related equipment required to safely shut the plant down. The auxiliary building floor drain system, although designated Category II Safety Class D, is supported to withstand seismic loads. In many areas, the pipe is actually imbedded in the concrete floors and walls of the auxiliary building. If the floor drains are not available or adequate, water will leave rooms through doorways and flow down stiarways until it reaches the auxiliary building basement.

To insure against flood damage, certain areas such as the essential service water pump area have been designed with watertight penetrations to prevent leakage from adjacent flooded areas. The auxiliary building has high capacity Category I sumps to prevent floods from causing high water levels in the basement.

III. SCOPE

This flooding study investigates potential breaks in the auxiliary building to show that the postulated high and moderate energy line breaks will not result in flood levels high enough to adversely impact the ability to safely shut the plant down.

The most limiting potential breaks will be investigated. It will be assumed that isolable breaks will be isolated within 30 minutes. This is reasonable because the auxiliary building sumps are equipped with Category I level indicators which will quickly signal unusual water leakage.

IV. PROCEDURE

The following steps are being followed in the flooding analysis:

1. Each floor of the auxiliary building will be zoned based on the location of walls, flow areas, and potential line break loactions.

2. The limiting line break will be defined for each area.

3. The potential flow paths will be investigated to insure that drainage to the auxiliary building sumps is available.

4. The transient break flow will be determined.

5. The maximum flood level in all areas involved will be determined.

6. The location of safety related equipment will be compared with the maximum flooding heights.

V. CONCLUSION

The procedure described herein will verify that high and moderate energy line breaks will not cause flooding which impairs the ability to safely shut down the plant.

QUESTION 212.155

"Provide more detailed information on the RWST heating system than is given in your response to Q212.50. Specifically address:

a) Seismic Design
b) Single Failure Criteria
c) Power Supplies
d) Piping and Control System Diagrams"

RESPONSE

The RWST heating system consists of an Electric-to-Water heat exchanger with a water circulating pump, piping and valves, as shown in Figure 6.3-1. The entire heating system is Category II (non-safety-related).

a. Seismic Design

None of the electrical power, control or instrumentation circuits as designed to meet Seismic Category I requirements.

The heating system is connected ot the RWST with two inch Category II piping. Protection against inadvertant draining of the tank in the event of a pipe rupture is provided by a Category I stand pipe on the return side of the system, and a Category I manual shut off valve at the Category I/II interface on the supply side. If a break occurs in the Category II portion of the system, alarms will result from drainage into the Auxiliary Building sumps and also from the RWST level when the tank is drained to the low level alarm point. Drainage from the low level alarm point to the actual minimum tank level through a fully severed two inch line would require in excess of 45 minutes. This would afford sufficient time to take action to close the isolation valve.

b. Single Failure Criteria

None of the electrical power, control of instrumentation circuits as designed to meet Single Failure Criteria requirements.

c. Power Supplies

Electric power for this system is derived from the following non-safety-related (non-Class 1E) buses:

Pump Motor (power and control) - 480 VMCC #134V5 (1AP48E)

Heater (power) - 480 V Switchgear 134Y (1AP17EN).

Heater ACB Control - 125 Vdc Distribution Panel 114 (1DC06EB).

Instrumentation - Miscellaneous Control System Panel #1PA20JC and 480 V MCC 134V5 (1AP48E).

d. Piping and Control System Diagrams

Refer to Figure 6.3-1.

To prevent the RWST vent from freezing during cold weather, heat tracing will be added to the portion of the vent pipe which is external.