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TRANSMITTAL NUMBER: 531359
TO CONTROL NUMBER: 338
TITLE: OTHER
DEPT: NUCLEAR REGULATORY COMM.
LOCATION: USNRC - WASH DC
TRANSMITTAL DATE: 20040513

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D	OTHR	03-001 RERP		025	C	1			RERP

ACKNOWLEDGED BY: DATE:

A443

CALLAWAY PLANT

Radiological Emergency Response Plan (RERP)

REVISION 026

March 2004

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CHAPTER 1.0

GLOSSARY

1.1 DEFINITIONS

Accountability – The process of identifying personnel remaining in the Protected Area following an assembly or site evacuation.

ALERT - The emergency classification characterized by events in progress or that have occurred which involve an actual or potential substantial degradation of the level of safety of the Plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. This emergency classification corresponds to the ALERT as defined in 10CFR50, Appendix E.4.C, and NUREG-0654/FEMA-REP-1, Appendix 1.

Assembly - The process of reporting to designated buildings outside the Protected Area to evaluate personnel resources and accountability.

Assessment Actions - Steps taken during or after an accident to obtain and process information necessary to make decisions in order to implement specific protective and/or corrective actions.

Automated Calling System – Automated calling service provided by a vendor. This system is a backup to the Sirens and Tone Alert Radios for notifying the general public. In addition, the system can also be used as a backup to the Cellular Paging System for notifying selected ERO personnel.

Backup Emergency Operations Facility (BEOF) - Alternate facility for the EOF, set up in the State's Emergency Operations Center (EOC) at the Ike Skelton Training Site southeast of Jefferson City, Missouri.

Cellular Paging System - A commercially provided cellular paging service capable of delivering alphanumeric messages to pre-designated personal pagers carried by Emergency Response Duty Personnel. Messages are initiated by on-shift personnel from a personal computer connected via telephone modem to the paging service.

Committed Dose Equivalent (CDE) - The dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

Committed Effective Dose Equivalent (CEDE) - The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

Control Room (CR) - The area located on the 2047'-6" elevation of the Control Building from which the reactor and its auxiliary systems are controlled.

Corrective Actions - Emergency measures taken to mitigate or terminate an emergency situation at or near the source of the problem.

Deep Dose Equivalent (DDE) - The dose equivalent at a tissue depth of 1 cm.

Department of Health (DOH) - A department of the State responsible for evaluating the effects of a radiological emergency on the population at risk.

Desired Numbers – As this term appears in Table 5-2, it is the complete or full staffing of the organization (all positions filled with the optimum number of responders) so as not to be confused with minimum staffing or numbers.

Dose Equivalent (DE) - The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The unit of dose equivalent is the rem.

Drill - A supervised instruction period aimed at testing, developing, and improving skills.

Duty - Rotating on-call coverage, scheduled around the clock, to ensure response during off normal working hours.

Emergency Action Levels (EAL)s - Predetermined conditions or values which, when exceeded, require implementation of the Radiological Emergency Response Plan (RERP).

Emergency Classifications - The grouping of emergency situations into four (4) mutually exclusive categories, allowing for proper emergency response. The four categories are utilized industry-wide and in this RERP as follows: (1) UNUSUAL EVENT, (2) ALERT, (3) SITE EMERGENCY, and (4) GENERAL EMERGENCY.

Emergency Communications Center (ECC) - A designated facility designed and equipped to handle incoming and outgoing communications for a County Emergency Operations Center.

Emergency Coordinator - The designated on-site individual having the responsibility and authority to implement the Callaway Plant RERP, and who will coordinate efforts to limit consequences of the emergency, and bring it under control.

Emergency Duty Officer (EDO) - A designated member of the Callaway Plant management staff who is assigned the responsibility of being the initial contact for problems when the Shift Supervisor needs guidance. This includes both normal and emergency situations. EDOs are trained as Emergency Coordinators and are on-call 24 hours per day, 7 days per week.

Emergency Operations Center (EOC) - A State or county facility designed and equipped coordination and control over emergency operations within their jurisdiction.

Emergency Operations Facility (EOF) - An off-site emergency response facility for management of overall Callaway Plant emergency response. This response includes coordination with off-site authorities, coordination of radiological and environmental assessment, and determination of recommended protective actions for the public. The personnel that respond to the EOF are mobilized at the ALERT (or higher) classification.

Emergency Planning Zone (EPZ) - The area around the Plant which is defined to facilitate off-site emergency planning for a finite emergency response base. There are two areas for which EPZs apply. These areas are: (1) Plume Exposure Pathway EPZ, and (2) Ingestion Exposure Pathway EPZ.

Emergency Plan Implementing Procedures (EIP)s - Specific procedures providing actions required to put into effect the provisions of the RERP in order to mitigate and/or terminate the emergency situation. Procedures addressing maintenance of emergency preparedness are also included. Emergency Plan Implementing Procedures are numbered as EIP-ZZ-XXXXX, where X is an alphanumeric character.

Emergency Response Facility (ERF) - A collective name for specifically designated locations which are equipped to facilitate the control and coordination of emergency activities and assessment.

Emergency Response Organization - An organization that has been established to provide technical and logistical direction in the event of a radiological emergency declaration at the Callaway Plant. This organization is structured to provide Plant control and coordination of on-site response, coordination of off-site response and dissemination of information to the public.

Emergency Response Personnel - Pre-designated Personnel, including Rapid Responders, who staff the Emergency Response Facilities to make them capable of fulfilling all intended emergency functions.

ERF Activation – When the ERF is ready to accept respective functions from the Control room (On-shift Emergency Response). These functions include classifications, notifications, dose assessment, protective action recommendations, technical assessment, communications, radiological controls, and emergency repairs.

Essential Personnel - Personnel who are filling an emergency response position or providing support to an emergency response organization.

Event Closeout - The condition declared after Emergency Action Level (EAL) closeout criteria has been met. This condition initiates the transition from emergency operations back to normal operations. Event closeout is typically declared after response to an UNUSUAL EVENT or ALERT has been completed.

Exclusion Area - The area that encompasses the land surrounding the Plant to a radius of 1,200 meters (3,937 feet) from the midpoint of the Unit 1 Reactor Building and the canceled Unit 2 Reactor Building. Control of access to this area is by virtue of ownership and in accordance with 10CFR100.

Exclusion Area Boundary (EAB) - The border of the Exclusion Area.

Exercise - An observed evaluation that tests the integrated capability of the Emergency Response Organization as well as a major portion of the basic elements of the Radiological Emergency Response Plan.

GENERAL EMERGENCY - The emergency classification characterized by events in progress or that have occurred which involve actual or imminent substantial core degradation or melting with the potential for loss of containment integrity and other accidents that have large radioactive release potential. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site for more than the immediate site area. This emergency classification corresponds to the GENERAL EMERGENCY as defined in 10CFR50, Appendix E.4.C, and in NUREG-0654/FEMA-REP-1, Appendix 1.

Ingestion Exposure Pathway EPZ - The area within a 50-mile radius of the Callaway Plant in which people may be indirectly exposed to radiation by eating or drinking contaminated food, milk, and water.

Joint Public Information Center (JPIC) - An off-site Emergency Response Facility from which coordinated news releases can be issued and news media briefings can be held. The JPIC is normally mobilized at the ALERT or higher classification levels.

Low Population Zone (LPZ) - The area immediately surrounding the Exclusion Area which contains residents, the total number and density of which are such that there is a reasonable probability that appropriate protective actions could be taken on their behalf in the event of a serious accident.

Mobilization - The process of staffing the Emergency Response Facilities. This includes announcements over the Plant Gai-tronics system and activation of the Cellular Paging System.

Non-Essential Personnel - All personnel who are not actively filling an emergency response position or providing support to the Emergency Response Organization.

Normal Working Hours – Current standard core hours per Company and Plant policies and procedures. Off hours are the remaining hours in the week, including weekends and holidays.

Off-site - Any area outside of the Protected Area fencing.

On-site - Any area located within the Protected Area fencing.

Owner Controlled Area - The fenced area contiguous to the Protected Area, designated by Callaway Plant to be controlled for security purposes.

Personnel Monitoring Devices - Any device designed to be worn or carried by an individual for the purpose of measuring the radiation exposure received, such as film badges, self-reading dosimeters, thermoluminescent dosimeters, etc.

Physically Operable - Plant systems, equipment, or devices shall be physically operable when they are capable of performing their specific function, regardless of Technical Specifications criteria, and could be available for use during emergency operations.

Plant Operating Procedures - A set of procedures to be used to provide the guidance and control of the Plant operation.

Plume Exposure Pathway EPZ - The area around the Plant where the principal exposure would be from external and inhalation exposure of radioactive materials from a passing plume. This area applies to an area around the Plant out to a radius of about 10 miles.

Projected Dose - A calculated or estimated total effective dose equivalent which affected populations may potentially receive if protective actions are not taken.

Protected Area - The area encompassed by physical barriers and to which access is controlled by Security. The Callaway Plant Protected Area includes all areas within the security fence that immediately surround the major Plant structures (i.e., Reactor Building, Auxiliary Building, Turbine Building, Service Building, and Fuel Building).

Protective Actions - Emergency measures taken to prevent or minimize radiological exposure (i.e., sheltering, evacuation).

Protective Action Guides (PAG)s - Projected TEDE or CDE values to individuals in the general population and to emergency workers that warrant protective action before or after a release of radioactive material.

Radiological Controlled Area (RCA) - The area of the Plant where access is controlled for the purpose of protection of personnel from exposure to radiation and radioactive materials. This area includes the Auxiliary Building, Containment Building, Radwaste Building, Fuel Building, and Laundry and Decon Facility.

Radiological Emergency Response Plan (RERP) - The document which establishes concepts and mechanisms that, when implemented during emergencies, provides safety and dose savings measures for site personnel and the general public.

Rapid Responders – Pre-designated Emergency Response Personnel assigned to activate the Technical Support Center and the Emergency Operations Facility sufficiently to relieve Control Room personnel of emergency functions not directly related to operation of the Plant. Rapid Responders are designated on a rotating basis to be available for mobilization via the Cellular Paging System. When designated on duty, personnel must remain fit for duty and within their designated response time of the Plant.

Recovery - The condition declared after the immediate hazards to life and safety due to the emergency have been removed and efforts are directed to returning affected areas to normal operations.

Recovery Operations - Actions taken after the emergency to restore the Plant as nearly as possible to its pre-emergency condition.

Recovery Manager - The individual who has overall command and control of the entire Callaway Plant emergency response.

Reentry - Return of personnel into areas evacuated due to Plant conditions during a radiological emergency.

Response Time Goal – The expected time that expires from emergency declaration to the responder arriving at the Emergency Response Facility (ERF).

SENTRY - A computerized notification system linked between the Callaway Plant, the State Emergency Management Agency and the four (4) EPZ risk counties. It allows the Communicator to fill out a notification form on screen and transmit the data simultaneously. Notifications on SENTRY can be initiated from the Control Room, the Emergency Operations Facility (EOF), or the Technical Support Center (TSC).

Severe Accident Management Guidelines (SAMG) - Guidelines and aids that incorporate strategies for decision making for responding to and recovering from a severe accident condition beyond normal operating and emergency procedures.

SITE EMERGENCY (or SITE AREA EMERGENCY) - The terms Site Emergency or Site Area Emergency have the same meaning and may be used interchangeably in the RERP, EALs and procedures. The emergency classification characterized by events in progress or that have occurred which involve actual or likely major failures of Plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary. This emergency classification corresponds to the SITE AREA EMERGENCY as defined in 10CFR50, Appendix E.4.C, and NUREG-0654/FEMA-REP-1, Appendix 1.

Site Evacuation - A controlled, pre-planned evacuation, which can be initiated by the Emergency Coordinator, that ensures all non-essential personnel are safely and expeditiously evacuated from the Callaway Plant Exclusion Area.

State - The State of Missouri.

Support Area - Area of the Technical Support Center (TSC) used to assemble manpower for emergency team formation.

Technical Support Center (TSC) - An on-site Emergency Response Facility for centralized control and coordination of on-site emergency response. This response includes the Support Area. The personnel that respond to the TSC are mobilized at the ALERT (or higher) classification.

Total Effective Dose Equivalent (TEDE) - The sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

UNUSUAL EVENT (or NOTIFICATION OF UNUSUAL EVENT – The terms Unusual Event or Notification of Unusual Event have the same meaning and may be used interchangeably in the RERP, EALs, and procedures. The emergency classification characterized by events in progress or that have occurred which indicate a potential degradation of the level of safety of the Plant. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs. This emergency classification corresponds to the NOTIFICATION of UNUSUAL EVENT as defined in 10CFR50, Appendix E.4.C, and NUREG-0654/FEMA-REP-1, Appendix 1.

1.2 ACRONYMS AND ABBREVIATIONS

ANI	-	American Nuclear Insurers
CDE	-	Committed Dose Equivalent
CEDE	-	Committed Effective Dose Equivalent
CFR	-	Code of Federal Regulations
CR	-	Control Room
CTMT	-	Containment
DAC	-	Dose Assessment Coordinator
DDE	-	Deep Dose Equivalent
DE	-	Dose Equivalent
DOE	-	Department of Energy
DOH	-	Department of Health
EAB	-	Exclusion Area Boundary
EAL	-	Emergency Action Level
EAS	-	Emergency Alert System
ECC	-	Emergency Communications Center
EDO	-	Emergency Duty Officer
ENS	-	Emergency Notification System
EOC	-	Emergency Operations Center
EOF	-	Emergency Operations Facility
EPA	-	Environmental Protection Agency
EIP	-	Emergency Plan Implementing Procedure
EPZ	-	Emergency Planning Zone
ETC	-	Emergency Team Coordinator
FCP	-	Forward Command Post
FEMA	-	Federal Emergency Management Agency
FSAR	-	Final Safety Analysis Report
GET	-	General Employee Training
HP	-	Health Physics
HPC	-	Health Physics Coordinator
HPN	-	Health Physics Network
I&C	-	Instrumentation and Control
INPO	-	Institute for Nuclear Power Operations
JPIC	-	Joint Public Information Center
KI	-	Potassium Iodide
LAN	-	Local Area Network
LOCA	-	Loss of Coolant Accident
LPZ	-	Low Population Zone
MCA	-	Multi Channel Analyzer
MCL	-	Management Counterpoint Link
MIDS	-	Moveable Incore Detector System
NCRP	-	National Council on Radiation Protection
NRC	-	Nuclear Regulatory Commission
NSSS	-	Nuclear Steam Supply System
OSC	-	Operations Support Coordinator

PAC	-	Plant Assessment Coordinator
PAG	-	Protective Action Guide
PCS	-	Plant Computer System
PMC	-	Protective Measures Coordinator
PMCL	-	Protective Measures Counterpoint Link
QA	-	Quality Assurance
RCA	-	Radiological Controlled Area
RCP	-	Reactor Coolant Pump
RCS	-	Reactor Coolant System
RERP	-	Radiological Emergency Response Plan
RSCL	-	Reactor Safety Counterpoint Link
RWP	-	Radiation Work Permit
SAMG	-	Severe Accident Management Guidelines
SEMA	-	State Emergency Management Agency (Missouri)
SPDS	-	Safety Parameter Display System
SMD	-	Secondary Monitoring Device
STA	-	Shift Technical Advisor
TAC	-	Technical Assessment Coordinator
TEDE	-	Total Effective Dose Equivalent
TLD	-	Thermoluminescent Dosimeter
TSC	-	Technical Support Center
USCG	-	United States Coast Guard

CHAPTER 2.0

SCOPE AND APPLICABILITY

2.1 PURPOSES AND OBJECTIVES

The purpose of emergency preparedness is to provide direction and control for response to classified emergencies and to ensure that necessary equipment, supplies, and essential services are available.

The primary objective of emergency preparedness is to develop and maintain a Radiological Emergency Response Plan (RERP), Emergency Implementing Procedures (EIP)s, and Severe Accident Management Guidelines (SAMG)s, to ensure a coordinated means for mitigating the consequences of emergencies in order to provide safety and dose-savings for the general public and site personnel, and to prevent damage to property. As such, objectives of the Callaway Plant Radiological Emergency Response Plan (RERP) are as follows:

- Establish a means to identify and classify emergency conditions.
- Establish a means to reclassify emergency conditions should the severity increase.
- Detail the on-shift emergency response and the Emergency Response Organization, including assignment of responsibilities and authorities necessary to direct the response in an emergency situation.
- Provide guidelines and specific details of off-site support organizations' assistance (including governmental organizations) and availability.
- Provide guidance for evaluating protective action recommendations to protect the general public and site personnel.
- Provide guidance for terminating or mitigating the consequences of an emergency, both on-site and off-site.
- Establish and provide specific details on Emergency Response Facilities (ERF)s, assessment equipment, communications equipment and their utilization during normal and emergency conditions.
- Provide for the training of emergency response personnel.
- Outline the most effective course of action in order to protect site personnel and recommend protective actions for the general public in the event of an emergency.

2.2 PLANNING DESCRIPTION

Callaway Plant, in defining the Emergency Planning Zones (EPZ)s, has taken into consideration population densities, political and physical boundaries, and on-site and off-site organizational capabilities, as well as the guidance given in NUREG-0654/FEMA-REP-1, Rev. 1.

Two primary zones have been identified for the purpose of development and implementation of the RERP. The first EPZ has a radius of about 10 miles and is referred to as the "Plume Exposure Pathway Emergency Planning Zone". Within this zone, evacuation and/or sheltering may be used as immediate protective actions to protect the general public. The principle concern with the Plume Exposure Pathway is that of external exposure and/or exposure to the thyroid due to inhalation and ingestion from a radioactive plume passing over the area.

The second EPZ has a radius of about 50 miles and is referred to as the "Ingestion Exposure Pathway Emergency Planning Zone". The principle concern with the Ingestion Exposure Pathway is from ingestion of contaminated water or foods such as milk or fresh vegetables.

2.3 PLAN INTERRELATIONSHIPS

The RERP should not be used alone in response to an emergency, but in conjunction and coordination with procedures, other plans, and emergency arrangements.

These interrelationships are summarized as follows:

- Emergency Implementing Procedures (EIP)s provide detailed actions to be taken by individuals in response to on-site emergency situations. These procedures direct the implementation of the RERP.

- The Plant Operating Procedures include: Emergency Operating Procedures utilized to control the Plant during abnormal and accident conditions; Administrative Procedures; Health Physics Procedures; Chemistry Procedures; and Operations Procedures. Pertinent information from this document has been either incorporated into or referenced in the RERP and/or EIPs.

- Severe Accident Management Guidelines which provide strategies for decision making for responding to a severe accident condition.

- Security Plan and Procedures have been coordinated to ensure that appropriate emergency actions can be taken.

- o Coordination and liaison with off-site organizations and agencies having radiological emergency responsibilities ensures compatibility and proper interface with the RERP. Governmental agency interrelationships with the Callaway Plant RERP include:

    - Callaway County/City of Fulton
    - Montgomery County
    - Gasconade County
    - Osage County
    - State of Missouri
    - Federal government

The development of Federal, State, County, and Callaway Plant Radiological Emergency Response Plans has been closely coordinated. In addition, State and local preferences for reporting emergencies, providing information and data, recommending protective actions, etc., have been integrated directly into the RERP and the associated EIPs.

CHAPTER 3.0

SUMMARY OF THE CALLAWAY PLANT EMERGENCY PREPAREDNESS PROGRAM

This chapter of the Radiological Emergency Response Plan provides a summary of the Callaway Plant Emergency Preparedness Program. Information contained in this chapter is detailed in subsequent chapters of this Plan.

3.1 RADIOLOGICAL EMERGENCY RESPONSE PLAN (RERP)

This document establishes the concepts, evaluation and assessment criteria, and protective actions necessary to limit and mitigate the consequences of potential or actual emergencies. The RERP incorporates the necessary pre-arrangements, regulatory guidance and requirements, and organizations necessary to provide dose-savings for the protection of the health and safety of the general public and site personnel. During the developmental stage of this document, components of other planning documents were integrated into the RERP to ensure proper coordination of actions required by all associated planning documents as listed in Appendix I, List of Supporting Radiological Emergency Response Plans.

This RERP satisfies the requirements of 10CFR50.34, 10CFR50.47, and 10CFR50, Appendix E. This document also satisfies the intent of the guidance stated in NUREG-0654/FEMA-REP-1, Rev. 1, as indicated in Appendix A, NUREG-0654/Callaway Plant Radiological Emergency Response Plan Cross Reference.

Supplemental guidance has been provided by additional documents. A sample of these documents is listed below:

- o NUREG-0737
- o NUREG-0696
- o REGULATORY GUIDE-1.97
- o REGULATORY GUIDE-1.101
- o REGULATORY GUIDE-1.145

3.1.1 Summary of RERP

3.1.1.1 Chapter 1 - Glossary

This chapter provides definitions of key words, terms, or phrases that are unique and used throughout the RERP. In addition, a list of commonly used acronyms and abbreviations and their meanings is provided.

3.1.1.2 Chapter 2 - Scope And Applicability

This chapter provides a basic discussion of the purposes and objectives of emergency planning. Included in this chapter is a brief description of planning considerations and the interrelationships of this Plan to other planning documents.

3.1.1.3 Chapter 3 - Summary of the Callaway Plant Emergency Preparedness Program

This chapter provides a brief synopsis of each chapter in the RERP, a summary of the Emergency Plan Implementing Procedures, and a brief discussion of maintaining emergency preparedness.

3.1.1.4 Chapter 4 - Emergency Conditions

This chapter establishes and defines the four classifications of emergencies utilized at the Callaway Plant (UNUSUAL EVENT, ALERT, SITE EMERGENCY, and GENERAL EMERGENCY). Included in this chapter are the trigger mechanisms or Emergency Action Levels (EAL)s used to determine which class of emergency should be declared. In addition, this chapter provides a discussion of postulated accidents in relation to the appropriate classification of that emergency.

3.1.1.5 Chapter 5 - Organizational Control of Emergencies

This chapter provides a discussion of how the normal Callaway Plant operating organization and other Licensee organizations relate to the emergency response organizations and agencies that are utilized to mitigate and/or terminate the circumstances of an emergency. Each position within Callaway Plant Emergency Response Organization is discussed with emphasis on positional authority, responsibilities, and interrelationships with other factions of Callaway Plant's or off-site agencies' organizations. Levels of augmentation including definable points where augmentation would occur are also included in this chapter.

3.1.1.6 Chapter 6 - Emergency Measures

This chapter establishes the methodology of emergency response, and is the basis for the Emergency Plan Implementing Procedures which define emergency actions to be taken. A discussion of the following topics is included:

- o Recognition and evaluation
- o Classification and declaration
- o Notification
- o Assessment actions
- o Corrective actions
- o Protective actions
- o Aid to affected personnel
- o Public Information

3.1.1.7 Chapter 7 - Emergency Response Facilities and Equipment

This chapter provides general descriptions of Emergency Response Facilities, communications equipment, assessment equipment, protective facilities and equipment, decontamination facilities and equipment, medical and first aid facilities, and damage control equipment and supplies that are available during an emergency. Included in this chapter are the functions and anticipated use of the facilities and assessment equipment located in the facilities.

3.1.1.8 Chapter 8 - Maintaining Emergency Preparedness

This chapter summarizes the emergency response training program; describes the requirements for emergency drills and exercises (including joint exercises); details the methods utilized to review and update the RERP, EIPs, and Emergency Preparedness Program; describes the methods utilized to maintain an adequate inventory of emergency equipment and supplies; and describes the Callaway Plant's Emergency Preparedness Organization.

3.1.1.9 Chapter 9 - Recovery

This chapter defines, in general terms, post-emergency reentry, and recovery plans and organization.

3.2 EMERGENCY IMPLEMENTING PROCEDURES (EIP)S

The EIPs provide detailed action steps, in procedure format, necessary to be performed to implement the commitments/requirements as stated in the RERP. Information from other related planning documents has been integrated into the EIPs to ensure a coordinated response between and within organizations responding to an emergency at the Callaway Plant.

In general, the EIPs consist of the following:

- o The criteria or specific emergency action levels utilized to recognize, classify, and declare an emergency;
- o The Callaway Plant initiated notifications and communications equipment utilized;
- o Emergency actions to be taken by appropriate personnel to assess emergency conditions, and the steps taken to correct and/or mitigate the situation;
- o Duties and responsibilities of Emergency Response Organization members, facilities, equipment, etc., necessary to implement the RERP;
- o Actions to be taken for emergency response assistance;
- o Actions to be performed in order to maintain emergency preparedness at the Callaway Plant.

3.3 MAINTENANCE OF THE EMERGENCY PREPAREDNESS PLANNING PROGRAM

Planning program maintenance consists of mechanisms designed to ensure a state of emergency preparedness.

Various departments at the Callaway Plant are involved in the maintenance of the Emergency Preparedness Planning Program. The Senior Vice President and Chief Nuclear Officer has the ultimate responsibility for management and direction of the Emergency Preparedness Program for Callaway Plant.

The maintenance of the Emergency Preparedness Program is described in detail in Chapter 8.

CHAPTER 4.0

EMERGENCY CONDITIONS

Emergencies are classified into four classes: (1) UNUSUAL EVENT, (2) ALERT, (3) SITE EMERGENCY, and (4) GENERAL EMERGENCY. SITE AREA EMERGENCY as defined in 10 CFR 50 Appendix E, IV, C, is referred to as SITE EMERGENCY, in this RERP and its implementing procedures. Section 4.1 describes the purpose of each emergency classification level.

The possibility exists that particular situations may have characteristics in two or more classes. In such an event, the emergency will be categorized in the more severe class to ensure a conservative approach is taken. **(COMN 3383)**

A system of EALs that can be implemented in a timely and accurate manner was developed per NUMARC/NESP-007. There are four major categories of INITIATING CONDITIONS.

- Group One - Abnormal Radiation Events
- Group Two - Fission Product Barriers
- Group Three - Hazards Affecting Plant Safety
- Group Four - System Malfunctions

These initiating conditions and their indicators are depicted in Table 4-1. These initiating conditions are used for classifying events and are provided in the Emergency Plan Implementing Procedures.

The initial assessment of plant conditions and classification of an emergency using the guidance of the Emergency Implementing Procedures is performed by operating shift personnel under the direction of the Shift Supervisor. **(COMN 3384)** This assessment is performed as quickly as possible. The goal is to have the emergency classified within 15 minutes after recognition of the initiating condition.

4.1 EMERGENCY CLASSIFICATIONS

Each of the four emergency classes represent distinct classes of events and have a genuine purpose as described in the following sections.

4.1.1 UNUSUAL EVENT

This classification is characterized by events in progress or which have occurred indicating a potential degradation of the level of safety of the Plant. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs. This event status places the Plant in a readiness position for possible cessation of routine activities and/or augmentation of on-shift resources.

The purposes of this class are to:

1) assure that the first step in any response has been carried out;

2) inform the operating staff; and

3) provide systematic handling of UNUSUAL EVENT information and decision making.

Events in this class are selected based upon a potential to degrade to a more severe situation rather than an actual public hazard.

Initiating Conditions that require an UNUSUAL EVENT declaration are given in Table 4-1.

4.1.2 ALERT

This classification is characterized by events in progress or that have occurred which involve an actual or potential substantial degradation of the level of safety of the Plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. As in the case of an UNUSUAL EVENT, the ALERT class includes emergency situations that are expected to be minor in nature. The entire Emergency Response Organization is mobilized. In addition, because of the nature of the ALERT class, broader assessment actions will begin.

The purposes of the ALERT class are to:

1) assure that emergency response personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required; and

2) provide off-site authorities current status information;

3) provide updates for the public through off-site authorities.

Initiating Conditions that require an ALERT declaration are given in Table 4-1.

4.1.3 SITE EMERGENCY

The SITE EMERGENCY class includes accidents in which major failures of Plant functions needed for protection of the public have occurred or are likely to occur. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

The purposes of this class are to:

1) assure that response centers are manned;

2) assure that monitoring teams are dispatched;

3) assure that personnel required for evacuation of near-site areas are at their duty stations;

4) provide current information to off-site authorities;

5) provide updates for the public through off-site authorities.

Initiating Conditions that require a SITE EMERGENCY declaration are given in Table 4-1.

4.1.4 GENERAL EMERGENCY

The GENERAL EMERGENCY class includes accidents which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity, and other accidents that have large radioactive release potential. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site for more than the immediate site area.

The purposes of this class are to:

1) initiate predetermined protective actions for the public;

2) provide continuous assessment of information from the Callaway Plant and off-site organization measurements;

3) initiate additional measures as indicated by actual or potential releases;

4) provide consultation with off-site authorities; and

5) provide updates for the public through off-site authorities.

Initiating Conditions that require a GENERAL EMERGENCY declaration are given in Table 4-1.

4.2 SPECTRUM OF POSTULATED ACCIDENTS

This section of the RERP shows that each of the accidents that have been hypothesized for the Plant can be properly evaluated using the preceding emergency characterization classes. A summary analysis of their implications for emergency planning is included.

4.2.1 Classification of Hypothetical Accidents

All of the events hypothesized in Chapter 15 of the Standardized Nuclear Unit Power Plant Systems Final Safety Analysis Report (SNUPPS FSAR) fall into one of the four emergency classes outlined in section 4.1. Listed below is a spectrum of these events and the emergency class into which each would likely fall. A complete discussion of any of these hypothetical events may be found in Chapter 15 of the Standard Plant FSAR. Conservative assumptions with respect to the accidents described in Chapter 15 have been made. Therefore, occurrence of some of these accidents (for example, with no failed fuel) may not result in as high a class as noted. Also, equipment assumed to work in the Chapter 15 analysis was assumed to successfully operate for the evaluation. Failures of required equipment in any of the accident scenarios may result in higher classes of emergencies.

4.2.11 Leaks of Radioactive Materials Outside the Containment Building

Loss of radioactive materials (liquids) from the support systems or subsystems for the reactor and the waste processing systems may occur. The components (piping, valves, pumps, tanks, etc.) are located within the buildings in the Radiological Controlled Area (RCA). The floor drain system in the RCA is designed to collect any such leakage. The ventilation systems for the RCA are filtered and effluent monitors sample the effluent discharge. The ventilation systems are designed for the collection and removal of particulates and Iodine gas from the RCA that might be released as a result of this leakage.

If leakage should occur, the initial assessment would be performed by the operating crew based on system indication, observation by personnel, area radiation monitors, process monitors, or the building effluent monitors. If the effluent monitors indicate a release level that would cause the declaration of an ALERT or higher emergency classification, further assessment could be provided by radiological surveys and field monitoring.

4.2.1.2 Loss of Coolant Accident

A loss of coolant accident results from the failure of the primary system pressure boundary to contain the coolant. As the coolant is released to the containment, the Reactor Coolant System (RCS) is depressurized and the containment pressure increases. The classification of this type of accident would be based on Group 2, Fission Product Barriers and Group 1, Abnormal Radiation Events, Off-site Events and could include classifications of Unusual Event, Alert, Site, or General Emergency based on severity.

Initial assessment would be performed by the operating crew based on data from RCS instrumentation (pressure, level, flow, etc.), containment monitoring system, subcooling indications, and containment pressure indications. Further assessment would be provided by radiological surveys.

4.2.1.3 Main Steam Line Break

A main steam line break outside containment could result in the loss of secondary coolant from an entire steam generator. If there were any radioactivity in the secondary coolant, it could be released to the atmosphere. The classification of this type of accident would be based on Group 2, Fission Product Barriers and Group 1, Abnormal Radiation Events, Off-site Events and could include classifications of Unusual Event, Alert, Site, or General Emergency based on severity.

Assessment of a steam line break would be made by the operating crew based on steam generator and reactor coolant parameters. Radiation levels would be determined by radiological surveys and field monitoring.

4.2.1.4 Steam Generator Tube Rupture

In the event of a steam generator tube rupture, primary coolant is released to the secondary system. Radioactive gases entering the condenser air removal system discharge to the unit vent. Should the steam generator's Power Operated Relief Valves (PORV)s or safeties lift, radioactive gases would be released directly to the environment. This incident may be classified as an ALERT, SITE EMERGENCY, or GENERAL EMERGENCY depending on the concentration of radioactive materials in the primary coolant and the severity of steam generator tube leakage. This classification would be based on Group 2, Fission Product Barriers, and Group 1, Abnormal Radiation Events, Off-site Events.

Initial assessment would be based on readouts in the Control Room from the Condenser Air Discharge Monitoring System, Steam Generator Blowdown Processing System Monitors, the Unit Vent Monitoring System, and the PORV monitors.

4.2.1.5 Reactor Coolant Pump Locked Rotor

The instantaneous seizure of a reactor coolant pump rotor results in a reactor trip on low coolant flow signal. With the coincident loss of off-site power, the Plant condenser is not available so the excess heat is removed from the secondary system by releasing steam through the main steam safety relief valves. Steam generator tube leakage is assumed to occur and continue until the pressures in the reactor coolant and secondary systems are equalized. This incident may be classified as an ALERT, or SITE EMERGENCY depending on the concentration of radioactive materials in the primary coolant and the severity of steam generator tube leakage. This classification would be based on Group 2, Fission Product Barriers, and Group 1, Abnormal Radiation Events, Off-site Events.

Initial assessment would be performed by the operating crew based on data from RCS instrumentation and radiation monitoring instrumentation. Further assessment would be provided by radiological surveys and field monitoring.

4.2.1.6 Fuel Handling Accident

A fuel handling accident could occur if an irradiated fuel assembly is dropped, if an object is dropped onto an irradiated fuel assembly, if a cask containing an assembly is dropped, or if an assembly is deformed during any of the manipulations of loading, unloading, or storage. An UNUSUAL EVENT or ALERT based on Group 1, Abnormal Radiation Events, On-site Events, would be declared in the event of a fuel handling accident in which the fuel clad was damaged and radioactivity was released.

Area radiation monitors in the containment building, cask handling area, fuel pool bridge crane and spent fuel pool area are available to determine radiological conditions. Radiation monitoring would be required during the initial re-entry into the affected area. If a release of radioactive materials occurred or was suspected, field monitoring would be activated.

4.2.1.7 Rod Cluster Control Assembly Ejection

Following a postulated rod-ejection accident, 10% of the activity from the fuel-pellet-clad gap is assumed to be instantaneously released to the reactor coolant. The activity released to the containment from the reactor coolant through the ruptured control rod drive mechanism pressure housing is assumed to be mixed throughout the containment and could result in leakage to the atmosphere. In the case of primary to secondary leakage coincident with loss of off-site power, activity is also released to the atmosphere by releasing steam through the steam generator PORVs and safeties. Depending on the leak rate and fuel damage, the situation could result in a declaration of an UNUSUAL EVENT, ALERT, SITE EMERGENCY, or GENERAL EMERGENCY based on Group 1, Abnormal Radiation Events, Off-site Events, or Group 2, Fission Product Barriers.

Initial assessment would be performed by the operating crew based on indications in the Control Room. Further assessment would be provided by radiological surveys and field monitoring.

4.3 DETECTION OF POSTULATED ACCIDENTS

The detection of abnormal conditions or accidents by station personnel may be a result of alarms, instrument readings, off-site information, personnel observations, or a combination thereof. The first person to detect such conditions has been trained to immediately notify the Shift Supervisor who will then evaluate and classify the situation.

Instrumentation that can be utilized to detect anomalies for hypothetical accidents is listed and/or discussed in the FSAR or Technical Specification or Emergency Operating Procedures. Emergency Operating Procedures are procedures that govern the plant operation during emergency operations.

Tab

EMERGENCY ACTION LEVELS

Group 1 ABNORMAL RADIATION EVENTS
Offsite Events

UNUSUAL EVENT	ALERT	SITE EMERGENCY	GENERAL EMERGENCY
A. Any Unplanned Release of Radioactivity to the Environment That Exceeds 2 Times the Radiological Effluent Control Limits in the ODCM, (APA-ZZ-01003) for ≥60 minutes. MODES: At All Times	B. Any Unplanned Release of Radioactivity to the Environment That Exceeds 200 Times the Radiological Effluent Control Limits in the ODCM, (APA-ZZ-01003) for ≥15 minutes. MODES: At All Times	C. EAB Dose Resulting From an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mrem TEDE or 500 mrem CDE Thyroid for the Actual or Projected Duration of the Release. MODES: At All Times	D. EAB Dose Resulting From an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mrem TEDE or 5000 mrem CDE Thyroid for the Actual or Projected Duration of the Release. MODES: At All Times
Indicators 1. All of the following: a. A valid alarm and reading on any of the following effluent monitors: HB-RE-18 GT-RE-21B GH-RE-10B b. The valid reading is 2 times the Hi Hi alarm setpoint value. c. The release cannot be terminated within 60 minutes of the alarm actuation. OR 2. Both of the following: a. Confirmed sample analysis indicates that a release exceeding 2 times the applicable values of the ODCM (APA-ZZ-01003), has occurred. b. The release cannot be terminated within 60 minutes.	**Indicators** 1. All of the following: a. A valid alarm and reading on any of the following effluent monitors: HB-RE-18 GT-RE-21B GH-RE-10B b. The valid reading is 200 times the Hi Hi alarm setpoint value. c. The release cannot be terminated within 15 minutes of the alarm actuation. OR @2. Both of the following: a. A Valid reading on any of the following monitors: AB-RE-0111 >27 mrem/hr AB-RE-0112 >27 mrem/hr AB-RE-0113 >27 mrem/hr AB-RE-0114 >27 mrem/hr FC-RE-0385 >150 mrem/hr b. The release cannot be terminated within 15 minutes. OR 3. Both of the following: a. Confirmed sample analysis indicates that a release exceeding 200 times the applicable values of the ODCM (APA-ZZ-01003), has occurred. b. The release cannot be terminated within 15 minutes. @ Release values based on average meteorological data and a 1 hour release duration.	**Indicators** Any of the following: *1. A valid reading on the Unit Vent monitor, GT-RE-21B, > 2.42E+8 µCi/sec for 15 minutes or longer. *@2. Both of the following: a. A Valid reading on any of the following monitors: AB-RE-0111 >146 mrem/hr AB-RE-0112 >146 mrem/hr AB-RE-0113 >146 mrem/hr AB-RE-0114 >146 mrem/hr FC-RE-0385 >850 mrem/hr b. The reading has been, or is expected to be, exceeded for 15 minutes or longer. 3. A valid dose projection indicates >100 mrem TEDE or >500 mrem CDE thyroid dose at, or beyond, the EXCLUSION AREA BOUNDARY using in plant rad data or field monitoring team survey results. 4. Field survey results at, or beyond, the EAB corresponding to >100 mrem/hr TEDE for 1 hour (or expected to continue for 1 hour) or >500 mrem/hr CDE thyroid for 1 hour of inhalation. *Declare the event using this indicator only if actual dose projections per Indicator 3 cannot be performed within 15 minutes of the monitors exceeding the reading. @ Release values based on average meteorological data and a 1 hour release duration.	**Indicators** Any of the following: *1. A valid reading on the Unit Vent monitor, GT-RE-21B, > 2.42 E+9 µCi/sec for 15 minutes or longer. *@2. Both of the following: a. A Valid reading on any of the following monitors: AB-RE-0111 >1460 mrem/hr AB-RE-0112 >1460 mrem/hr AB-RE-0113 >1460 mrem/hr AB-RE-0114 >1460 mrem/hr FC-RE-0385 >8500 mrem/hr b. The reading has been, or is expected to be, exceeded for 15 minutes or longer. 3. A valid dose projection indicates >1000 mrem TEDE or >5000 mrem CDE thyroid dose at, or beyond, the EXCLUSION AREA BOUNDARY using in plant rad data or field monitoring team survey results. 4. Field survey results at, or beyond, the EAB corresponding to >1,000 mrem/hr TEDE for 1 hour (or expected to continue for 1 hour) or >5,000 mrem/hr CDE thyroid for 1 hour of inhalation. *Declare the event using this indicator only if actual dose projections per Indicator 3 cannot be performed within 15 minutes of the monitors exceeding the reading. @ Release values based on average meteorological data and a 1 hour release duration.

Group 1 ABNORMAL RADIATION EVENTS
Onsite Events

UNUSUAL EVENT	ALERT	ALERT
E.* An Unexpected Increase in Plant Radiation. MODES: At All Times	F.* Major Damage to Irradiated Fuel or Loss of Water Level That Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel. MODES: At All Times Unless Noted	G.* Release of Rad Material, or an Increase in Rad Level that Either Impedes Safe Operations or the Ability to Establish or Maintain Cold Shutdown. MODES: At All Times
Indicators Any of the following: 1. Spent Fuel Pool level is decreasing on EC-LI-0039A with Normal makeup being added, and all irradiated fuel assemblies remain covered. 2. Refueling Pool level is decreasing on BB-LI-0053A or B with Normal makeup being added, and all irradiated fuel assemblies remain covered. 3. Any valid (Confirmed by HP survey) ARM (other than a Group 1,G. Safe Shutdown ARM) >1000 times normal. (Normal levels can be considered as the monitor reading prior to the noticed increase.) * This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)	**Indicators** Any of the following: 1. A **VALID** Hi-Hi Alarm on Fuel Building exhaust monitors GG-RE-27 or 28 (Channel 273 or 283). 2. Containment refueling bridge area radiation monitor (SD-41) > 100 mR/hr. (Mode 6 only.) 3. Fuel building area radiation monitor (SD-37 or 38) > 30 mR/hr. 4. Report of visual observation of loss of water level resulting in irradiated fuel being uncovered. * This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)	**Indicators** Any of the following: 1. Valid (confirmed by HP) reading on SD-33 (Control Room) >15 mR/hr. 2. Valid (confirmed by HP) reading on the following Safe Shutdown ARMs: SDRE-26 AB 2026 RHR Hx Area Wall SDRE-23 AB 2000 RHR Hx Area Corridor SDRE-15 AB 1974 West Corridor-Central SDRE-16 AB 1974 West Corridor-South > 1000 times normal (normal levels can be considered as the monitor reading prior to the noticed increase). * This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)

Group 2 FISSION PRODUCT BARRIERS

A. UNUSUAL EVENT	B. ALERT	C. SITE EMERGENCY	D. SITE EMERGENCY	E. GENERAL EMERGENCY
Any CONTAINMENT BARRIER Indicator	Any RCS BARRIER Indicator or Any FUEL CLAD BARRIER Indicator	Any RCS BARRIER Indicator and Any FUEL CLAD BARRIER Indicator	A CTMT BARRIER Loss Indicator and Any RCS or FUEL CLAD BARRIER Indicator	A Loss Indicator from any two barriers and Any Indicator from the third

CONTAINMENT BARRIER
MODES: 1-4

Loss Indicators:

1. Containment Pressure
   a) A rapid unexplained loss of CTMT pressure following an initial increase in pressure.
   or
   b) CTMT pressure or sump level not increasing with a LOCA.
2. Containment Isolation Valve Status
   Incomplete CTMT isolation allowing a release to the environment, following a valid CTMT isolation signal (CISA, CISB, CPIS).
3. SG Release with Primary-Secondary Leakage
   a) Pri-to-sec leakage verified greater than 150 gpd per SG, or 600 gpd total through all SGs. T. S. 3.4.13
   and
   b) Any of the following:
      1) The leaking SG pressure is decreasing in an uncontrolled manner or completely depressurized.
      2) Use of the ruptured SG PORV for cool down or temperature control.
      3) The leaking SG is supplying the TDAFW turbine.

Potential Loss Indicators:

4. Critical Safety Function Status
   Meet the entry requirements for FRZ.1, Red Path Summary for CTMT.
5. Containment Pressure
   a) H2 concentration in containment >4%.
   or
   b) Less than 1 full train of Ctmt spray and Ctmt cooling fans, with Ctmt pressure greater than 27 psig.
6. Significant Radioactive Inventory in Ctmt
   GT-RE-59 or 60 (Channels 591 or 601) reading >1.5 E+4 R/hr
7. Core Exit Thermocouples
   a) Core exit TCs >1200°F and restoration procedures not effective in 15 minutes.
   or
   b) Core exit TCs >700°F and RVLIS (pumps off) <40% and restoration procedures not effective in 15 minutes.
8. Radiation Increase Outside Containment
   Unexplained increase in radiation levels in areas adjacent to the Containment.

RCS BARRIER
MODES: 1-4

Loss Indicators:

1. RCS Leak Rate
   Safety Injection initiated with a loss of subcooling (less than instrument error) using Attachment 2 or 3 of Emerg. Procedure E-0.
2. SG Tube Rupture
   a) Any of the following:
      1) GE-RE-92 (Channel 925) >2.0E-5 µCi/cc
      2) BM-RE-25 (Channel 256) >1.0E-4 µCi/cc
      3) SJ-RE-02 (Channel 026) >1.0E-4 µCi/cc
      4) Level in any SG continues to increase in an uncontrolled manner
   and
   b) Any of the following:
      1) The ruptured SG pressure is decreasing in an uncontrolled manner or completely depressurized.
      2) Use of the ruptured SG PORV for cool down or temperature control.
      3) The leaking SG is supplying the TDAFW turbine.
3. Containment Radiation Monitoring
   GT-RE-59 or 60 (Channels 591 or 601) reading > 6.4 E+0 R/hr.

Potential Loss Indicators:

4. Critical Safety Function Status
   Meet the entry requirement for FRH.1, Red Path Heat Sink or FRP.1, Red Path for Integrity.
5. RCS Leak Rate
   RCS leakage >50 gpm.
6. SG Tube Rupture
   a) Any of the following:
      1) GE-RE-92 (Channel 925) >2.0 E-5 µCi/cc
      2) BM-RE-25 (Channel 256) >1.0 E-4 µCi/cc
      3) SJ-RE-02 (Channel 026) >1.0 E-4 µCi/cc
      4) Level in any SG continues to increase in an uncontrolled manner.
   and
   b) the primary-to-secondary leak rate exceeds 50 gpm.

FUEL CLAD BARRIER
MODES: 1-4

Loss Indicators:

1. Critical Safety Function Status
   Meet the entry requirements for FRC.1, Red Path for Core cooling.
*2. Primary Coolant Activity Level
   RCS coolant activity >300µCi/cc dose equivalent I-131.
3. Containment Radiation Monitoring
   GT-RE-59 or 60 (Channels 591 or 601) reading >2.8E+3 R/hr.

Potential Loss Indicator:

4. Critical Safety Function Status
   Meet the entry requirements for FRC.2, Orange Path for Core Cooling or FRH.1, Red Path for Heat Sink.
5. Core Exit Thermocouples
   Core exit TCs >700°F.
6. Reactor Vessel Water Level
   a) RVLIS (Pumps Off) less than 40%
   or
   b) RVLIS (Pumps On) less than minimum

RCP's on	Minimum
4	44
3	30
2	20
1	13

* Refer to CTP-ZZ-08100.

Group 3 HAZARDS AFFECTING PLANT SAFETY
Security Events

UNUSUAL EVENT	ALERT	SITE EMERGENCY	GENERAL EMERGENCY
A. Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant. MODES: At All Times	B. Security Event in the Plant Protected Area. MODES: At All Times	C. Security Event in a Safe Shutdown Area. MODES: At All Times	D. Security Event Resulting in a Loss of the Ability to Reach and Maintain Cold Shutdown. MODES: At All Times
Indicators Any of the following: 1. Bomb device discovered within the plant Protected Area and outside the following Safe Shutdown Areas: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building 2. Confirmed report of an attempted entry or sabotage. 3. A site specific credible security threat.	**Indicators** Confirmed report of an intrusion by a hostile force into the plant Protected Area.	**Indicators** Any of the following 1. Bomb device discovered within any of the following areas: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building 2. Confirmed report of an intrusion by a hostile force into any of the following areas: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building	**Indicators** Any of the following: 1. Occupation of the Control Room by a hostile force. 2. Occupation of the Aux Shutdown Panel by a hostile force.

Group 3 HAZARDS AFFECTING PLANT SAFETY

Fires

UNUSUAL EVENT	ALERT
E. Fire Within Protected Area Boundary Not Extinguished Within 15 Minutes of Verification. MODES: At All Times	F. Fire Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown. MODES: At All Times
Indicators 1. Fire in or adjacent to any of the following: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building and 2. Not extinguished within 15 minutes of control room verification of a fire.	**Indicators** 1. Fire in any of the following areas: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building and 2. There is visible damage to permanent structures or equipment, affecting the operability of safety related equipment.

Natural and Destructive Events

UNUSUAL EVENT	ALERT
G. Natural and Destructive Phenomena Affecting the Protected Area. MODES: At All Times	H. Natural and Destructive Phenomena Affecting a Safe Shutdown Area. MODES: At All Times
Indicators Any of the following: 1. a. Response spectrum recorder operating annunciator 98E alarms in the Control Room and b. Verified to be a real event per OTO-SG-00001. 2. Report of a main turbine rotating component failure resulting in casing penetration or major damage to seals causing a rapid loss of lubricating oil or hydrogen. 3. Explosion, vehicle crash or tornado in or adjacent to any of the following: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building	**Indicators** Any of the following: 1. a. Operating basis earthquake annunciator 98D alarms in the Control Room and b. Earthquake greater than OBE levels (0.12g) in the horizontal and vertical directions as indicated by LIGHT "OSG-AE-1" or LIGHT "OSG-AE-2" 2. a. Report of a tornado, high wind, vehicle crash, explosion, or other natural or destructive phenomena to any of the following Safe Shutdown areas: • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building and b. There is visible damage to permanent structures or equipment, affecting plant operations.

Group 3 HAZARDS AFFECTING PLANT SAFETY

Toxic Gas

UNUSUAL EVENT	ALERT
I. Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant. MODES: At All Times	J. Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Establish or Maintain Cold Shutdown. MODES: At All Times
Indicators Any of the following: 1. Report or detection of toxic or flammable gases that enter within the Exclusion Area Boundary, that have created a HAZARDOUS ATMOSPHERE per CTP-ZZ-01300, deemed detrimental to safe operation. 2. Confirmed report by local, County or State Officials of potential evacuation of site personnel as determined from the DOT evacuation tables for selected hazardous materials in the DOT Emergency Response Guide for Hazardous Materials.	**Indicators** Any of the following: 1. Report or detection of toxic or flammable gases, not properly contained, within or adjacent to any of the following Safe Shutdown Areas, that have created a HAZARDOUS ATMOSPHERE per CTP-ZZ-01300,jeopardizing operation of systems required to establish or maintain Cold Shutdown • Area 5 • Containment • Aux Feed Pump Rooms • Aux Building • Diesel Generator Building • UHS Cooling Tower • ESW Pumphouse • Control Building • RWST • Fuel Building

Control Room Evacuation Events

ALERT	SITE EMERGENCY
K. Control Room Evacuation Has Been Initiated. MODES: At All Times	L. Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established. MODES: At All Times
Indicators Entry into OTO-ZZ-00001, Control Room Inaccessibility, is required.	**Indicators** 1. Entry into OTO-ZZ-00001, Control Room Inaccessibility, is required. and 2. Control of the Aux Feed System and a SG PORV for cooldown cannot be established within 15 minutes.

Group 4 SYSTEM MALFUNCTIONS
Annunciator Events

UNUSUAL EVENT	ALERT	SITE EMERGENCY
A. Unplanned Loss of Most or All Alarms (Annunciators) for Greater Than 15 Minutes. MODES: 1-4	B. Unplanned Loss of Most or All Annunciators With Either a Transient In Progress, or the Plant Computer is Unavailable. MODES: 1-4	C. Inability to Monitor a Significant Transient in Progress. MODES: 1-4
Indicators 1. Any of the following: a. 3 of 4 field power supplies indicate < 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. b. Field Power Supply Bus voltage is less than 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. c. Ten or more logic power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action. d. Five or more Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes and not a result of planned action. or 2. All of the following: a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes. b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained. c. The loss does not result from planned action.	Indicators 1. Any of the following: a. 3 of 4 field power supplies indicate < 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. b. Field Power Supply Bus voltage is less than 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. c. Ten or more logic power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action. d. Five or more Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes and not a result of planned action. or 2. All of the following: a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes. b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained. c. The loss does not result from planned action. and 3. Any of the following: a. A change in reactor power greater than ±10%. b. Safety injection initiation. c. Compensatory plant parameters monitored via the plant computer, per OTO-RK-00001, are not valid or cannot be obtained.	Indicators 1. Any of the following: a. 3 of 4 field power supplies indicate < 105 volts (loss of all annunciators). b. Field Power Supply Bus voltage is less than 105 volts (loss of all annunciators). c. Ten or more logic power supplies have failed (loss of all annunciators). d. Five or more Multiplexer Adapter Rack Fuses have failed (loss of all annunciators). or 2. All of the following: a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed. b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained. and 3. Any of the following: a. A change in reactor power greater than ±10%. b. Safety injection initiation. and 4. Compensatory plant parameters monitored via the plant computer, per OTO-RK-00001, are not valid or cannot be obtained.

Group 4 SYSTEM MALFUNCTIONS

Electrical Events (Operating)					Electrical Events (Shutdown)		
UNUSUAL EVENT	**ALERT**	**SITE EMERGENCY**	**SITE EMERGENCY**	**GENERAL EMERGENCY**	**UNUSUAL EVENT**	**UNUSUAL EVENT**	**ALERT**
D. Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes. MODES: 1-4	E. Only One AC Source to Essential Busses for >15 Minutes Such That Any Additional Single Failure Would Result in Station Blackout. MODES: 1-4	F. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses. MODES: 1-4	G. Loss of All Vital DC Power MODES: 1-4	H. Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power. MODES: 1-4	I. Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater Than 15 Minutes. MODES: 5, 6	J. Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes. MODES: 5,6	K. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Cold Shutdown or Refueling. MODES: 5, 6, Defueled
Indicators All of the following: 1. Loss of offsite power to NB01 and NB02. * 2. The loss of offsite power has occurred for >15 minutes.	**Indicators** 1. Loss of any 3 of the following power sources: a. Offsite power to NB01 * b. Offsite power to NB02 * c. Emergency Diesel NE01 d. Emergency Diesel NE02 and 2. The loss of all 3 has occurred for >15 minutes.	**Indicators** 1. Loss of all 4 of the following power sources: a. Offsite power to NB01 * b. Offsite power to NB02 * c. Emergency Diesel NE01 d. Emergency Diesel NE02 and 2. The loss of all 4 has occurred for >15 minutes.	**Indicators** 1. Loss (Bus Voltage < 106.9 VDC) of all 4 of the following busses: a. NK01 b. NK02 c. NK03 d. NK04 and 2. Failure to restore power to at least one DC bus within 15 minutes.	**Indicators** All of the following: 1. Loss of offsite power to NB01 and NB02. * 2. Loss of both Emergency Diesel Generators NE01 and NE02. 3. a. Restoration of at least one emergency bus within 4 hours is not likely. or b. Meet the entry requirements for FRC.1, Red Path for Core Cooling.	**Indicators** 1. Loss of Division 1 Vital DC power as indicated by <106.9 VDC on NK01 or NK03. and Loss of Division 2 Vital DC power as indicated by <106.9 VDC NK02 or NK04. and 2. The loss of both Divisions has occurred for >15 minutes.	**Indicators** 1. Loss of offsite power to NB01 and NB02. * and 2. The loss of offsite power has occurred for >15 minutes.	**Indicators** 1. Loss of all 4 of the following power sources: a. Offsite power to NB01 * b. Offsite power to NB02 * c Emergency Diesel NE01 d. Emergency Diesel NE02 and 2. The loss of all 4 has occurred for >15 minutes.

* Note: Supply Breakers opening due to degraded switchyard voltage is considered a Loss of Offsite Power.

Group 4 SYSTEM MALFUNCTIONS

Shutdown Capability

UNUSUAL EVENT	ALERT	SITE EMERGENCY	SITE EMERGENCY
L.* Inability to Perform a Required Shutdown Within Technical Specification Limits. MODES: 1-4	M. Inability to Maintain Plant in Cold Shutdown. MODES: 5, 6	N. Loss of Water Level That Has or Will Uncover Fuel in the Reactor Vessel. MODES: 5, 6	O. Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown. MODES: 1-4
Indicators 1. The plant is not brought to a required operating mode within a Technical Specification LCO action completion time.	**Indicators** 1. Any of the following: a. Complete loss of both trains of RHR. b. Complete loss of both trains of CCW. c. Complete loss of both trains of ESW. and 2. Either of the following: a. Greater than 200°F on any valid incore thermocouple.* b. Uncontrolled temperature rise, with no actions available that will likely prevent approaching 200°F on any valid incore thermocouple.*	**Indicators** 1. Any of the following: a. Complete loss of both trains of RHR. b. Complete loss of both trains of CCW. c. Complete loss of both trains of ESW. and 2. Either of the following: a. Greater than 200°F on any valid incore thermocouple.* b. Uncontrolled temperature rise, with no actions available that will likely prevent approaching 200°F on any valid incore thermocouple.* and 3. a. Water level in the reactor vessel is less than 2.0 inches on BB-LI-0053A or B. or b. RVLIS (pumps off) <55%	**Indicators** 1. All of the following: a. Failure to bring the reactor subcritical with the control rods fully inserted. b. Complete loss of all Boron Injection Flowpaths. or 2. All of the following: a. All steam generator levels <10% wide range. b. All steam dump valves to condenser (AB UV-34, 35 and 36) are NOT responding to steam header pressure controller (AB PK-507 or AB UK-33). c. All steam generator steam dump valves to atmosphere are NOT operating properly (AB-PIC-1A, 2A, 3A and 4A). d. Complete loss of both RHR trains. (A complete loss of ESW or CCW constitutes a complete loss of RHR.) or 3. All of the following: a. The Ultimate Heat Sink (UHS) is inoperable as a result of level or temperature. b. Complete loss of both UHS Cooling Tower trains.
* It is not intended to declare an Unusual Event due to an unknown condition or failure resulting in exceeding the allowable action statement time. The allowable action statement time is always available from the time of the discovery.	* If a thermocouple is not available, use Wide Range Hot Leg temperature indications: • BBTI413A - Loop 1 • BBTI423A - Loop 2 • RECORDERS BBTR413 - Loop 1 BBTR423 - Loop 2 BBTR433 - Loop 3 BBTR443 - Loop 4	* If a thermocouple is not available, use Wide Range Hot Leg temperature indications: • BBTI413A - Loop 1 • BBTI423A - Loop 2 • RECORDERS BBTR413 - Loop 1 BBTR423 - Loop 2 BBTR433 - Loop 3 BBTR443 - Loop 4	

Group 4 SYSTEM MALFUNCTIONS

Communication Events

UNUSUAL EVENT
P. Unplanned Loss of All Onsite or Offsite Communication Capabilities MODES: 1-6
Indicators 1. All of the following on-site systems: a. Complete failure of Plant telephone systems b. Complete failure of Gai-tronics systems c. Complete failure of Plant radios d. Complete failure of Plant Emergency Dedicated Phones. or 2. All of the following offsite systems: a. Complete failure of ENS (Red Phone) line. b. Complete failure of Back Up Radio System (BURS). c. Complete failure of Plant telephone system. d. Complete failure of the Sheriff's radio system. e. Complete failure of the SENTRY notification system.

RCS/Fuel Events

UNUSUAL EVENT	UNUSUAL EVENT
Q. Fuel Clad Degradation MODES: 1-6	R. RCS Leakage MODES: 1-4
Indicators 1. Any of the following: a. >1.0 µCi/gram Dose Equivalent I-131 for greater than a 48 hour continuous period. b. Dose Equivalent I-131 activity exceeding the limits of Tech Spec Fig. 3.4-1. (ITS Fig. 3.4.16-1) c. >100/E bar µ Ci/gram of gross radioactivity.	**Indicators** 1. Any of the following: a. Unidentified leakage greater than 10 gpm. b. Pressure boundary leakage greater than 10 gpm. c. Identified leakage greater than 25 gpm.

Reactor Protection System

ALERT	SITE EMERGENCY	GENERAL EMERGENCY
S. Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip Was Successful. MODES: 1, 2	T. Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip Was NOT Successful. MODES: 1, 2	U. Failure of the Reactor Protection System to Complete an Automatic Trip and Manual Trip Was NOT Successful and There Is Indication of an Extreme Challenge to the Ability to Cool the Core. MODES: 1, 2
Indicators 1. All of the following: a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0. b. An automatic reactor trip is NOT successful. c. A manual reactor trip IS successful using manual trip switches SB-HS-1 on RL003 OR SB-HS-42 on RL006.	**Indicators** 1. All of the following: a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0. b. An automatic reactor trip is NOT successful. c. A manual reactor trip is NOT successful using manual trip switches SB-HS-1 on RL003 AND SB-HS-42 on RL006.	**Indicators** 1. All of the following: a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0. b. An automatic reactor trip is NOT successful. c. A manual reactor trip is NOT successful using manual trip switches SB-HS-1 on RL003 AND SB-HS-42 on RL006. d. Meet the entry requirements for FRC.1 OR FRH.1, red path summaries for core cooling and heat sink.

CHAPTER 5.0

ORGANIZATIONAL CONTROL OF EMERGENCIES

This chapter describes the organizational structure of the Callaway Plant Emergency Response Organization and transition from the normal operating organization in the event of a radiological emergency declaration. The Callaway Plant Recovery Organization and post-accident planning are discussed in Chapter 9.

The Callaway Plant Emergency Response Organization (ERO) has been established to provide technical and logistical direction in the event of a radiological emergency declaration at the Callaway Plant. This organization is structured to provide for Plant control, coordination of on-site response, coordination of off-site response and dissemination of information to the public.

The Callaway Plant On-shift Operating Organization provides the initial emergency response to any emergency situation. Minimum staffing of the normal On-shift Operating Organization is noted in Figure 5-1 which also illustrates the initial On-shift Emergency Response. **(COMN 42586)**

The Shift Supervisor is the senior Callaway Plant management representative on-site during the absence of normal Plant management (i.e., back-shifts, weekends, holidays). The Shift Supervisor is responsible for directing safe, legal, and efficient Plant operations in accordance with established normal and emergency operating procedures. The Shift Supervisor is provided technical assistance by an Operating Supervisor or Engineer who meets the qualifications for Shift Technical Advisor (STA) as required by the NRC.

The Emergency Duty Officer (EDO) is a predesignated senior Plant management representative "on-call" (not required to be on-site) and available to provide the Shift Supervisor with management guidance and directives during normal and emergency operations.

Immediate actions in response to an emergency are the responsibility of the On-shift (Figure 5-1) Emergency Response. On-site emergency management responsibilities are assumed by the Shift Supervisor who becomes the Emergency Coordinator until the Emergency Duty Officer (EDO) arrives and assumes responsibilities.

At ALERT (or higher) emergency classification levels, the Emergency Response Organization (Figure 5-2) is mobilized to provide additional support to the on-shift personnel. **(COMN 3391)** The EDO assumes Emergency Coordinator responsibilities from the Shift Supervisor and directs emergency response after being briefed on the emergency situation. The on-coming personnel are briefed on the emergency situation prior to accepting responsibilities.

After being briefed by the Emergency Coordinator, the Recovery Manager becomes the senior management representative for Callaway Plant emergency response. However, the Emergency Coordinator continues to direct and control on-site personnel and make all emergency declarations.

5.1 ON-SHIFT EMERGENCY RESPONSE (FIGURE 5-1, TABLE 5-1)

The On-shift Emergency Response is directed from the Control Room. The On-shift Emergency Response is capable of responding unassisted to emergencies classified as UNUSUAL EVENTS as outlined in Section 4.1.1.

The primary responsibilities of the On-shift Emergency Response are: **(COMN 3312)**

- o Initial classification and declaration of emergencies;
- o Requesting technical and operational support;
- o Initial coordination of on-site emergency actions/response;
- o Notification and communications with off-site organizations;
- o Making Protective Action Recommendations to off-site authorities;
- o Mobilizing the rest of the Callaway Plant Emergency Response Organization; and
- o Requesting local off-site support (i.e., fire fighting, ambulance, law enforcement).

As the Emergency Coordinator, the Shift Supervisor assigns members of the On-shift Emergency Response to emergency duties, as necessary, to effectively control the situation.

Minimum staffing levels for the On-shift Emergency Response are specified in Table 5-1.

Responsibilities of the members of the On-shift Emergency Response are as follows:

5.1.1 Shift Supervisor **(COMN 3314)**

Upon classification of an emergency, the Shift Supervisor assumes the position of Emergency Coordinator and initiates emergency actions including making Protective Action Recommendations to authorities responsible for implementing off-site emergency measures. The Shift Supervisor assigns on-shift personnel to emergency duties as deemed necessary, and notifies the EDO of the emergency. The Shift Supervisor continues as acting Emergency Coordinator until relieved by the EDO. When relieved, the Shift Supervisor will resume normal duties in directing Plant Operations activities from the Control Room.

5.1.2 Operating Supervisor

The on-shift Operating Supervisors are assigned the positions of Control Room Supervisor in charge of the Control Room and Field Supervisor in charge of actions outside the Control Room.

The Control Room Supervisor is responsible for directing Reactor Operators, Equipment Operators, and Assistant Equipment Operators in the appropriate actions necessary to maintain safe Plant conditions in accordance with established normal and emergency operating procedures and Severe Accident Management Guidelines.

The Field Supervisor reports to the Control Room and performs actions as assigned by the Shift Supervisor.

At least one (1) Supervisor assumes the additional duties of a Shift Technical Advisor (STA), which includes monitoring Plant instrumentation and the Safety Parameter Display System (SPDS) throughout the course of the emergency and providing technical recommendations to the Shift Supervisor concerning reactor safety. These duties may be assumed by an STA qualified Engineer if one is available on shift.

In the event of a fire, one Operating Supervisor is designated as Fire Brigade Leader. This cannot be the Operating Supervisor designated as the Shift Technical Advisor (STA).

If the Shift Supervisor is incapacitated or unavailable to assume Emergency Coordinator responsibilities, the Operating Supervisors have the authority to assume that position.

5.1.3 Operations Personnel

Upon declaration of an emergency, Reactor Operators, Equipment Operators, and Assistant Equipment Operators report to, or makes contact with, the Control Room and are under the direction of an Operating Supervisor and/or Shift Supervisor. Operations personnel perform Plant operations in accordance with established normal and emergency operating procedures and Severe Accident Management Guidelines. They may be assigned other emergency duties as necessary.

5.1.4 Instrumentation and Controls (I&C)Technicians

Upon the declaration of an emergency, the I&C Technicians reports to the Shift Supervisor in the Control Room. The I&C Technicians are responsible for I&C and emergency electrical activities including preventative and corrective actions, Control Room Communicator duties, and other emergency duties assigned by the Shift Supervisor. If an ALERT (or higher) emergency is declared, the I&C Technicians will report to the Emergency Team Coordinator in the TSC when released by the Shift Supervisor.

5.1.5 Rad/Chem Technician, Chemistry

Upon declaration of an emergency, the Chemistry Technician reports to, or makes contact with, the Shift Supervisor. The Chemistry Technician is responsible for sampling and analysis as needed to identify the source and magnitude of the emergency. If an ALERT (or higher) emergency is declared, the Chemistry Technician will report to the Chemistry Coordinator in the TSC when released by the Shift Supervisor. Rad/Chem Technicians, Chemistry are qualified as Support Area Personnel in the Health Physics group (Section 5.2.5).

5.1.6 Rad/Chem Technician, Health Physics Operations (HPOPS)

Upon declaration of an emergency, the HPOPS Technician reports to, or makes contact with, the Shift Supervisor. The HPOPS Technician is responsible for providing radiation protection support to Operators and Emergency Teams. If an ALERT (or higher) emergency is declared, the HPOPS Technician will report to or make contact with the Health Physics Coordinator located in the TSC when released by the Shift Supervisor.

5.1.7 Rad/Chem Technician, Health Physics Technical Support (HPTS) (COMN 3412)

Upon declaration of an emergency, the HPTS Technician reports to the Shift Supervisor in the Control Room. The HPTS Technician is responsible for performing initial radiological release dose projections based on effluent release monitors and meteorological conditions. If an ALERT (or higher) emergency is declared, the HPTS Technician will report to or make contact with the Health Physics Coordinator located in the TSC after being relieved of dose projection responsibilities by the Dose Assessment Coordinator in the EOF and after being released by the Shift Supervisor.

5.1.8 Shift Security Supervisor

Upon declaration of an emergency, the Shift Security Supervisor reports to the Shift Supervisor. The responsibilities of the Shift Security Supervisor include Plant access control, personnel accountability, and normal and emergency security activities as established by the Security Plan. The Shift Security Supervisor is assisted by the Security Force in carrying out these responsibilities.

5.1.9 Security Force

The Security Force reports to the Shift Security Supervisor and performs duties in accordance with the Security Plan. Security personnel also provide security support as necessary. Security performs the paging function for Emergency Response Organization Augmentation upon direction from the SS/EC.

5.1.10 Control Room Communicator (COMN 3319)

Upon declaration of an emergency, the Shift Supervisor assigns I&C Technicians or other qualified personnel as Control Room Communicators. The Control Room Communicators initiate notifications of off-site authorities as directed by the Shift Supervisor. The Communicators will maintain communications with the off-site authorities and others as directed by the Shift Supervisor. If an ALERT (or higher) emergency is declared, the responsibility for communication with the NRC via the ENS line will be transferred to the TSC Communicator in the TSC and responsibility for off-site notifications will be transferred to the Off-site Liaison Coordinator in the EOF. After being relieved of communications responsibilities, the Control Room Communicators may be assigned other duties or report to the appropriate coordinator in the TSC as directed by the Shift Supervisor.

5.1.11 Emergency Teams

Emergency Teams may be formed at the direction of the Shift Supervisor from available personnel.

5.1.11.1 Fire Brigade (COMN 3413)

The Fire Brigade consists of on-shift Plant personnel in accordance with the Fire Protection Program. The Fire Brigade responds to on-site fires and/or hazardous chemical/oil spills and reports to the Shift Supervisor.

5.1.11.2 Medical Emergency Response Team (MERT) (COMN 41801)

The MERT consists of a team leader and at least one team member, both of whom are trained in first aid procedures. The MERT reports to the Shift Supervisor and responds to illness or injuries on-site requiring immediate treatment beyond that which can be self-administered. During an emergency classification, MERT personnel will continue to be under the direction of the Shift Supervisor in the Control Room.

5.1.11.3 Search and Rescue Team (COMN 3324)

The Search and Rescue Team consists of at least two personnel, at least one of which is qualified in first aid procedures. Health Physics support will be provided if necessary. The Search and Rescue Team is formed from on-shift personnel at the direction of, and reports to, the Shift Supervisor. If an ALERT (or higher) emergency is declared, Search and Rescue Teams will originate from the TSC and report to the Operations Support Coordinator.

5.1.11.4 Emergency Repair Team (COMN 3325)

The Emergency Repair Team consists of at least two Plant personnel with appropriate skills for the repair situation. Health Physics support will be provided if necessary. The Emergency Repair Team is formed at the direction of, and reports to, the Shift Supervisor. If an ALERT (or higher) emergency is declared, Emergency Repair Teams will originate from the TSC and report to the Operations Support Coordinator.

5.2 EMERGENCY RESPONSE ORGANIZATION (FIGURE 5-2, TABLE 5-2)

Mobilization of the Emergency Response Organization (Figure 5-2) is initiated by the Shift Supervisor at the ALERT (or higher) emergency declaration. Direction and control of Emergency Response Organization activities are carried out from the TSC and EOF. Desired staffing levels and response time goals for filling emergency positions and activating the Emergency Response Facilities in the Emergency Response Organization are specified in Table 5-2.

Positions in the Emergency Response Organization (ERO) that are considered minimum staffing to activate the Emergency Response Facilities (TSC/EOF) are defined as Rapid Responders and are designated in Table 5-2. Rapid Responder functions include overall control of the Emergency Response Organization, technical assessment of Plant parameters, in-plant radiological controls, emergency repairs, dose assessment, offsite notifications, protective action recommendations, and communications with the NRC. Rapid Responders are trained and capable of performing tasks specified for their reporting staff. The remaining positions are necessary to fully staff and implement all intended functions of the Emergency Response Organization.

The Staffing levels shown in Table 5-2 do not include members of the On-shift Emergency Response listed on Table 5-1. Responsibilities of the members of the Emergency Response Organization are as follows:

5.2.1 Emergency Coordinator (EC) (COMN 3327) (RAPID RESPONDER)

The Emergency Coordinator is responsible for directing overall emergency response on-site. Initially, the Shift Supervisor assumes the responsibilities of Emergency Coordinator. At the ALERT (or higher) emergency classification levels, the EDO will relieve the Shift Supervisor and assume the Emergency Coordinator duties. The Emergency Coordinator directs the Emergency Response Organization from the TSC after relieving the Shift Supervisor.

Specific responsibilities of the Emergency Coordinator include: **(COMN 42570)**

- o Classifying and declaring emergencies;
- o Decision making for implementing strategies identified in the Severe Accident Management Guidelines;
- o *Directing operations of Emergency Response Organization;
- o *Requesting the formation of emergency teams;
- o *Initiating the implementation of on-site protective actions;
- o Authorizing personnel exposure in excess of 10CFR20 limits;
- o *Ensuring that Emergency Response Organization is kept up-to-date on emergency conditions; and
- o *Ensuring that site-wide announcements are made on the Plant PA system.

The responsibilities that the Emergency Coordinator may delegate are indicated above with an asterisk (*).

The Manager, Callaway Plant is trained and assigned as the primary Emergency Coordinator. Selected EDOs are also trained for the position of Emergency Coordinator. **(COMN 3328)**

5.2.2 Operations Group

5.2.2.1 Shift Supervisor

The Shift Supervisor continues to direct Plant operation activities from the Control Room after being relieved of responsibility for emergency response activities by the Emergency Coordinator. The Shift Supervisor reports to the Emergency Coordinator for the purpose of coordinating Plant operation activities with emergency response.

5.2.2.2 On-shift Personnel

On-shift personnel not required to support Plant operations may be released to the On-site Emergency Response Organization at the discretion of the Shift Supervisor. Remaining personnel and additional Operations department personnel responding to the emergency will continue to operate from the Control Room and Field Office.

5.2.2.3 Control Room/TSC Liaison (CTL)

The CTL reports to the Shift Supervisor in the Control Room. The CTL is responsible for communicating information concerning Plant conditions and operations to the TSC.

5.2.3 Operations Support Group

5.2.3.1 Operations Support Coordinator (OSC) (COMN 3336)

The OSC reports to the Emergency Coordinator in the TSC. The OSC assesses Plant information from the Control Room and technical support staff to establish emergency team priorities and direct operation support activities.

5.2.3.2 Emergency Team Coordinator (ETC)

The ETCs report to the Operations Support Coordinator in the TSC. The ETCs assist the Operations Support Coordinator in formation, briefing, direction, and tracking of emergency teams. The Fire Brigade and MERT continue to report and take direction from the Shift Supervisor in the Control Room.

5.2.3.3 Support Area Personnel

Mechanical, Electrical, and I&C Supervisors and labor force assemble in the Support Area of the TSC and report to the Emergency Team Coordinators to form emergency teams as needed.

5.2.3.4 Stores Personnel

An individual knowledgeable of the materials systems reports to the Operations Support Coordinator in the TSC. The Stores person is responsible for obtaining parts, supplies, and materials from the warehouse when needed.

5.2.4 Technical Assessment Group

5.2.4.1 Technical Assessment Coordinator (TAC) (RAPID RESPONDER) (COMN 3333)

The TAC reports to the Emergency Coordinator. The TAC is responsible for technical assessment of Plant conditions to identify EALs and emergency mitigating recommendations to the EC. The TAC is also responsible for coordinating Protective Action Recommendations (PAR)s consistent with Plant Conditions with the Recovery Manager and Dose Assessment Coordinator in the EOF prior to the arrival of the PMC or PAC.

5.2.4.2 TSC Lead Engineer (TLE) (COMN 3351)

The TLE reports to the Technical Assessment Coordinator in the TSC. The TLE is responsible for assisting the TAC in directing and controlling the Engineering staff.

5.2.4.3 TSC Engineering Staff

The TSC Engineering Staff reports to the Technical Assessment Coordinator in the TSC. They are responsible for diagnosing and analyzing potential and actual Plant problems, and providing recommended courses of action to the Technical Assessment Coordinator. These responsibilities include: assessment of core physics, thermal hydraulics, and general plant conditions. They may be dispatched to Plant areas for surveillance purposes as directed by the Technical Assessment Coordinator.

5.2.4.4 Engineering Status Board Logkeepers (ESL)

The ESLs report to the TAC and are responsible for maintaining the logs and status boards for the Technical Assessment Group.

5.2.4.5 Chemistry Coordinator (CC)

The CC reports to the Technical Assessment Coordinator and assumes responsibility for Plant Chemistry operations from the Shift Supervisor. The CC directs primary and secondary Chemistry operations (including post-accident chemistry), and non-radiological environmental monitoring. The CC ensures the Technical Assessment Coordinator is aware of Chemistry activities and provides input to the TSC Engineering Staff in assessing Plant Chemistry problems. The CC directs Rad/Chem Technicians-Chemistry.

5.2.5 Health Physics Group

5.2.5.1 Health Physics Coordinator (HPC) (RAPID RESPONDER) (COMN 3331)

The HPC reports to the Emergency Coordinator. The HPC is responsible for assessing on-site radiological conditions, reviewing radiological EALs, and directing in-plant radiation protection activities.

5.2.5.2 Support Area Personnel

Rad/Chem Technicians and Supervisors assemble in the Support Area of the TSC to provide radiation protection support for on-site emergency activities and those qualified as Chemistry Technicians may assist the On-shift Chemistry Technician in sampling and analysis to identify the source and magnitude of the emergency. Rad/Chem personnel from the Support Area are also dispatched to the EOF to support off-site field monitoring operations and dose assessment.

5.2.6 TSC Communicator (RAPID RESPONDER)

The TSC Communicator reports to the Emergency Coordinator and, when requested by the NRC, will man the ENS line.

5.2.7 Security

5.2.7.1 Security Coordinator (SC)

The SC reports to the Emergency Coordinator in the TSC. The SC assumes overall Plant security responsibility from the Shift Security Supervisor and directs the Security Force through the Shift Security Supervisor. These responsibilities include access control, personnel evacuation and accountability, coordination of any off-site law enforcement agency involvement, and normal and emergency security activities in accordance with the Security Plan.

5.2.7.2 Security Force

Security Personnel continue to operate within their normal on-shift organization under the direction of the Security Coordinator.

5.2.8 Administrative Support Group

5.2.8.1 Administrative Coordinator (AC)

The AC reports to the Emergency Coordinator in the TSC. The AC is responsible for updating the Emergency Coordinator on status of the TSC activation or deactivation. The AC is also responsible for ensuring that technical documents are available, providing food and beverage needs, and ensuring continuity of resources for the On-site Emergency Response Organization. **(COMN 3341)**

The AC coordinates activities with the Logistical Support Coordinator in the EOF.

5.2.8.2 Clerical Support Staff

The Clerical Support Staff reports to the Administrative Coordinator in the TSC. They provide clerical support, perform log keeping, technical drawing retrieval, records filing, delivery of messages, and maintain non-technical status boards as directed.

5.2.9 Recovery Manager (RM) (RAPID RESPONDER) **(COMN 3361)**

The RM has overall command and control of the entire Callaway Plant Emergency Response Organization.

The responsibilities of the RM include:

- *Establishing and maintaining communications with the Emergency Coordinator;
- *Requesting off-site support (e.g., NSSS, A/E, INPO, Federal, State, and local);
- *Ensuring responsibility for communications with off-site agencies is transferred from the Control Room to the EOF Emergency Response Organization (excluding NRC ENS communications);

- o Authorizing notifications to off-site agencies;
- o Assuming responsibility from the Control Room for making Protective Action Recommendations;
- o *Maintaining command and control over personnel in the EOF and providing considerations necessary for their safety;
- o *Ensuring coordinated emergency response among Callaway Plant and off-site agencies;
- o Authorizing personnel exposure in excess of 10CFR20 limits (The Emergency Coordinator also has this authority).

The responsibilities that the RM may delegate are indicated with an asterisk (*).

5.2.10 Protective Measures Group

5.2.10.1 Protective Measures Coordinator (PMC)

The PMC reports to the Recovery Manager in the EOF. The PMC is responsible for formulating Protective Action Recommendations.

The PMC is also responsible for assisting the Recovery Manager, State officials and Federal officials in the interpretation of any Plant related data.

5.2.10.2 Plant Assessment Coordinator (PAC)

The Plant Assessment Coordinator reports to the Protective Measures Coordinator in the EOF. The PAC reviews Plant conditions and EALs to verify the adequacy of the existing Protective Action Recommendations and assists in formulating of new Protective Action Recommendations when necessary.

5.2.10.3 Plant Assessment Staff

The Plant Assessment Staff reports to the Plant Assessment Coordinator in the EOF. They are knowledgeable in Plant equipment, systems, and operations. They may provide additional technical expertise while maintaining the status boards displaying Plant conditions.

5.2.10.4 Dose Assessment Coordinator (DAC)
(RAPID RESPONDER) (COMN3375)

The DAC reports to the Protective Measures Coordinator in the EOF. The DAC is responsible for performing dose projection calculations based on effluent monitors and field data, directing Field Monitoring Teams, reviewing effluent based EALs and assisting the Protective Measures Coordinator in the formulation of Protective Action Recommendations. A second Dose Assessment Coordinator assists in these duties.

5.2.10.5 Dose Assessment Staff (COMN 3355)

The Dose Assessment Staff reports to the Dose Assessment Coordinator in the EOF. The Dose Assessment Staff is responsible for field monitoring team communications and updating radiological status boards.

5.2.10.6 Field Monitoring Teams (COMN 3396)

Field Monitoring Teams are dispatched within the Emergency Planning Zone under the direction of the Dose Assessment Coordinator. They are responsible for making direct radiation measurements and collecting air samples to provide data for off-site dose assessment. In cooperation with the State Department of Health, Field Monitoring Teams also assist in collection of environmental sample media.

5.2.11 Logistical Support Group

5.2.11.1 Logistical Support Coordinator (LSC)

The LSC reports to the Recovery Manager in the EOF. The LSC is responsible for contracting with off-site vendors for engineering services, materials, and services needed for emergency mitigation and restoration of the Plant.

The LSC is also responsible for providing administrative and logistical support to all of the Emergency Response Organization.

5.2.11.2 Logistical Support Staff

The Logistical Support Staff reports to the Logistical Support Coordinator in the EOF. The Logistical Support Staff is responsible for the development of specifications for repair parts, equipment, and services, locating materials and services needed, and expediting their delivery to the site. They may initiate purchase orders, contracts for services or whatever procurement means approved by the Recovery Manager to obtain goods and services to assist in mitigation and recovery of this situation. The Logistical Support Staff also provides administrative support to the EOF Emergency Response Organization.

5.2.12 Off-site Liaison Group

5.2.12.1 Off-site Liaison Coordinator (OSL)
(RAPID RESPONDER)

The OSL reports to the Recovery Manager in the EOF and assumes off-site notification responsibilities from the Communicator in the Control Room. The OSL is also responsible for keeping off-site authorities up-to-date regarding on-site emergency response activities, receiving responding representatives from off-site agencies, assisting in meeting their communications and logistic needs, and other duties as assigned by the RM.

5.2.12.2 EOF Communicator

The EOF Communicator report to the Off-site Liaison Coordinator in the EOF. EOF Communicator transmit Protective Action Recommendations and emergency notification updates to State and local agencies and other off-site authorities as directed by the Off-Site Liaison Coordinator.

5.2.13 The Joint Public Information Group

5.2.13.1 Company Spokesperson

The Company Spokesperson provides Callaway Plant's official response during news conferences and media events. The Company Spokesperson has access to information pertaining to the emergency through the Recovery Manager and Emergency Coordinator. The Company Spokesperson is the company's approval authority for all emergency related information released to the media.

5.2.13.2 Technical Representatives

The Technical Representatives report to the Company Spokesperson and provide technical information to the JPIC Editor and the Company Spokesperson. They may also assist the Company Spokesperson in presentation of information and answering questions during media briefings.

5.2.13.3 JPIC Coordinator

The JPIC Coordinator reports to the Company Spokesperson and coordinates the release of Callaway Plant emergency information at the JPIC. The JPIC Coordinator provides support to the Company Spokesperson for media presentations.

5.2.13.4 JPIC Administrator

The JPIC Administrator reports to the JPIC Coordinator, to assist in equipment setup and administrative duties for the JPIC organization.

5.2.13.5 JPIC Editor

The JPIC Editor reports to the JPIC Coordinator and is responsible for composition of written information to be released.

5.2.13.6 JPIC Media Host

The JPIC Media Host reports to the JPIC Administrator and is responsible to provide accommodations and support to the media.

5.3 EMERGENCY RESPONSE ORGANIZATION SUPPORT

5.3.1 Private Sector Organizations

Callaway Plant has arranged for additional support during emergencies from private sector organizations through letters of agreement listed in Appendix C.

5.3.2 Governmental Organizations

Callaway Plant coordinates emergency response planning with Federal, State and local organizations and agencies involved with emergency response within the Emergency Planning Zone of the Callaway Plant. Each participating organization is assigned specific responsibility and authority for both planning and emergency response. This includes notifications and information exchange between on-site and off-site organizations.

Callaway Plant, as appropriate, notifies and exchanges information with off-site agencies when emergencies are declared at the Callaway Plant. This notification or exchange of information to off-site agencies does not signify a request for assistance. However, assistance is provided as discussed below by Federal, State, and local agencies, if specifically requested.

5.3.2.1 Federal Agencies

In the event of an emergency, notifications and requests for assistance are made to various Federal agencies and organizations. The Recovery Manager or Emergency Coordinator is responsible for ensuring the required support is requested. Air transportation for responding personnel and equipment can be accommodated at Lambert Field Airport, St. Louis, Missouri and limited accommodations are available at Columbia Regional Airport near Columbia, Missouri. Rental cars are available at these locations. The following agencies may, depending on the emergency situation, require notification and provide assistance.

5.3.2.1.1 U. S. Nuclear Regulatory Commission (NRC)

The NRC is promptly notified upon declaration of any emergency at the Callaway Plant. Notification is made to the NRC Headquarters Operations Officer (HOO), who is available 24 hours per day. The HOO notifies appropriate NRC Headquarters and Regional personnel.

The NRC responds to emergencies in accordance with guidelines of NUREG 0728, "NRC Incident Response Plan" and the Region IV Incident Response Supplement.

The anticipated arrival time for NRC Region IV representatives is 4-6 hours. Office space and communications for NRC representatives are provided in the Technical Support Center and Emergency Operations Facility.

5.3.2.1.2 Department of Energy (DOE)

The DOE provides assistance during emergencies at the Callaway Plant as requested by the NRC or the Federal Emergency Management Agency (FEMA). Generally FEMA notifies, requests, and coordinates the Federal response.

The anticipated arrival times for DOE representatives and the DOE mobile laboratory, if requested, are 6-8 hours and 24 hours, respectively. Office space and communication facilities for DOE representatives are provided in the Emergency Operations Facility.

5.3.2.1.3 Federal Emergency Management Agency (FEMA)

FEMA ensures the development of effective State and local radiological emergency response plans, and coordinates planning efforts with State and Federal agencies. During emergencies, FEMA is contacted by the State, coordinates Federal agency response, and assists the State in emergency response, if requested. SEMA, requests, and coordinates the FEMA response.

In the event of a major emergency or disaster, requests by the Governor of Missouri for a Presidential declaration of emergency or disaster could occur. FEMA, under this declaration, coordinates overall direction of Federal resources that could be brought to bear to alleviate loss, hardship, or suffering of local communities or individuals affected by the situation.

5.3.2.1.4 United States Coast Guard (USCG)

The Missouri River flows through southern sectors of the Plume Exposure Pathway (10-mile EPZ). As such, restricted access of river vessel traffic may be required as a dose-savings measure during emergencies involving off-site releases of radioactive material. The Missouri State Emergency Management Agency (SEMA) notifies the USCG, District 2, of emergencies which may require such action. The USCG has the authority to restrict vessel traffic in such instances.

5.3.2.1.5 Federal Aviation Administration (FAA)

The FAA provides support to an emergency at the Callaway Plant if air restrictions have to be made to provide for dose saving. The FAA has the authority to implement any restricted air space control over the affected area. Any request for restricting air space will be coordinated through the State Emergency Management Agency.

The FAA, using National Weather Service data, also provides Callaway Plant with meteorological information should on-site meteorological instrumentation fail. Information which can be obtained is wind speed, wind direction, and forecasts as needed.

5.3.2.16 Radiation Emergency Assistance Center/Training Site (REAC/TS)

The Radiation Emergency Assistance Center/Training Site (REAC/TS) is a part of the Department of Energy response network. REAC/TS provides treatment capabilities and consultation assistance on a 24-hour basis for medical emergencies involving radiation.

5.3.2.2 State Agencies

Various State agencies have roles in emergency planning and emergency response for emergencies at Callaway Plant. The "key" State agencies are discussed in this section. For detail of the roles of other participating State agencies, refer to the Missouri Nuclear Accident Plan Callaway.

5.3.2.2.1 State Emergency Management Agency (SEMA)

SEMA serves as the lead agency for developing and maintaining State emergency response plans and assists local jurisdictions in the development of local plans. SEMA, in cooperation with the Missouri Department of Health (DOH), develops and conducts emergency response training for State and local agencies with emergency response roles.

At the declaration of any emergency at the Callaway Plant, the Plant notifies SEMA. SEMA, after verification of the emergency, notifies DOH and any other State agencies which may be required to respond. If a liquid radioactive release is involved, the State Department of Natural Resources is also contacted directly by the Callaway Plant. SEMA will contact the Federal Emergency Management Agency (FEMA). Information obtained from Callaway Plant and local authorities is utilized to evaluate the support required by the State for emergency response.

SEMA operates from the State Emergency Operations Center (EOC) in Jefferson City, Missouri. A Forward Command Post (FCP) may be established at the Callaway Plant's Emergency Operations Facility. The FCP staff normally consists of representatives from SEMA and the DOH. Local agencies may also send representatives to the EOF to provide face-to-face communications with Callaway Plant and State authorities. The FCP relays pertinent information to the State EOC and local EOCs. SEMA may exercise control of the State's response from either the State EOC or the FCP.

Callaway Plant Protective Action Recommendations for the general public are made to SEMA and local authorities. DOH evaluates the recommendations and provides independent recommendations to local authorities.

SEMA continues to coordinate the support of State agencies until DOH determines that State assistance is no longer required.

Callaway Plant has provisions for receiving SEMA representatives at the EOF at the ALERT (or higher) emergency classification level.

5.3.2.2.2 Missouri Department of Health (DOH)

DOH serves as the lead State technical assistance agency and works with SEMA in the development and maintenance of State emergency response plans and radiological response training programs. DOH develops and establishes State Protective Action Guides. DOH is also responsible for establishing a medical record system for personnel exposed to radiation in State responses to emergencies.

As the lead State agency for technical response, DOH performs radiological monitoring, dose projections, advises State and local agencies about protective actions, determines exposure levels for State response personnel, determines the need for decontamination, coordinates emergency medical support, and provides information and guidance for the public through SEMA.

SEMA notifies DOH of emergencies at the Callaway Plant. DOH representatives operate from the FCP in the EOF. Upon mobilization of DOH, the agency establishes communication with Callaway Plant and SEMA. Initial off-site radiological assessment by DOH is based on information provided by Callaway Plant. Subsequent evaluation of the off-site radiological condition is based on information provided by Callaway Plant, as well as current data obtained by State field monitoring teams, changes in meteorological conditions, and any available dosimetry data. This information is used by DOH when recommending protective actions to SEMA and local authorities.

DOH continues directing technical response for the State including off-site radiological monitoring and surveillance until off-site conditions are at acceptable levels as defined by State Protective Action Guides Restorative Actions.

Callaway Plant has provisions for receiving DOH representatives at the EOF at the ALERT (or higher) emergency classification.

5.3.2.3 Local Agencies

Callaway Plant coordinates with SEMA in emergency planning and emergency response with four (4) counties, which partially lie within the Plume Exposure Pathway (10-mile EPZ), and with the City of Fulton. The county jurisdictions are Callaway, Gasconade, Montgomery, and Osage Counties. **(COMN 42673)**

Each jurisdiction is responsible for its own emergency planning and response. The four counties and Fulton coordinate the plans and have prepared for 24 hour per day operations during emergencies.

Upon the declaration of any emergency at the Callaway Plant, the Plant notifies the dispatch centers of the four counties.

Callaway Plant makes off-site Protective Action Recommendations to local authorities. The County Commissioners, who are responsible for directing EOC activities, evaluate these recommendations and implement protective actions for protection of individuals within their jurisdiction. This may include activation of the public alert system.

Callaway Plant has provisions for receiving local authorities at the EOF at the ALERT (or higher) emergency classification. The local authorities work closely with the State and company authorities in coordinating off-site activities. Office space and communication facilities are provided in the EOF.

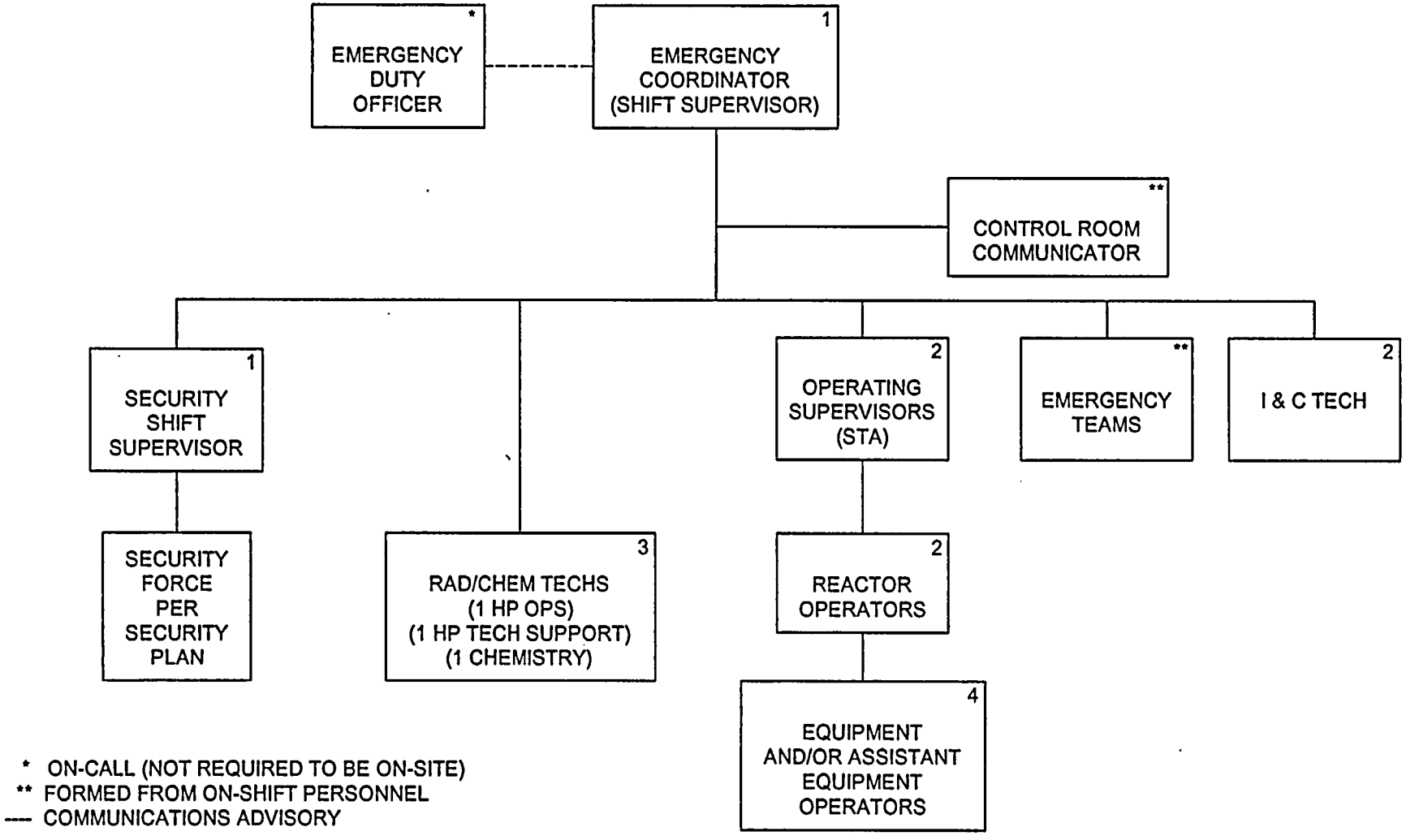
Callaway Plant dispatches Technical Representatives to the local Emergency Operations Centers, if requested. These individuals provide supplemental information, as may be requested by the local authorities, to assist in interpretation and explanation of technical information pertaining to the Callaway Plant. These Technical Representatives provide supplemental information and do not replace the communication or notification chain.

Callaway Plant has obtained agreements with specific local organizations as listed in Appendix C.

FIGURE 5-1

ON-SHIFT EMERGENCY RESPONSE

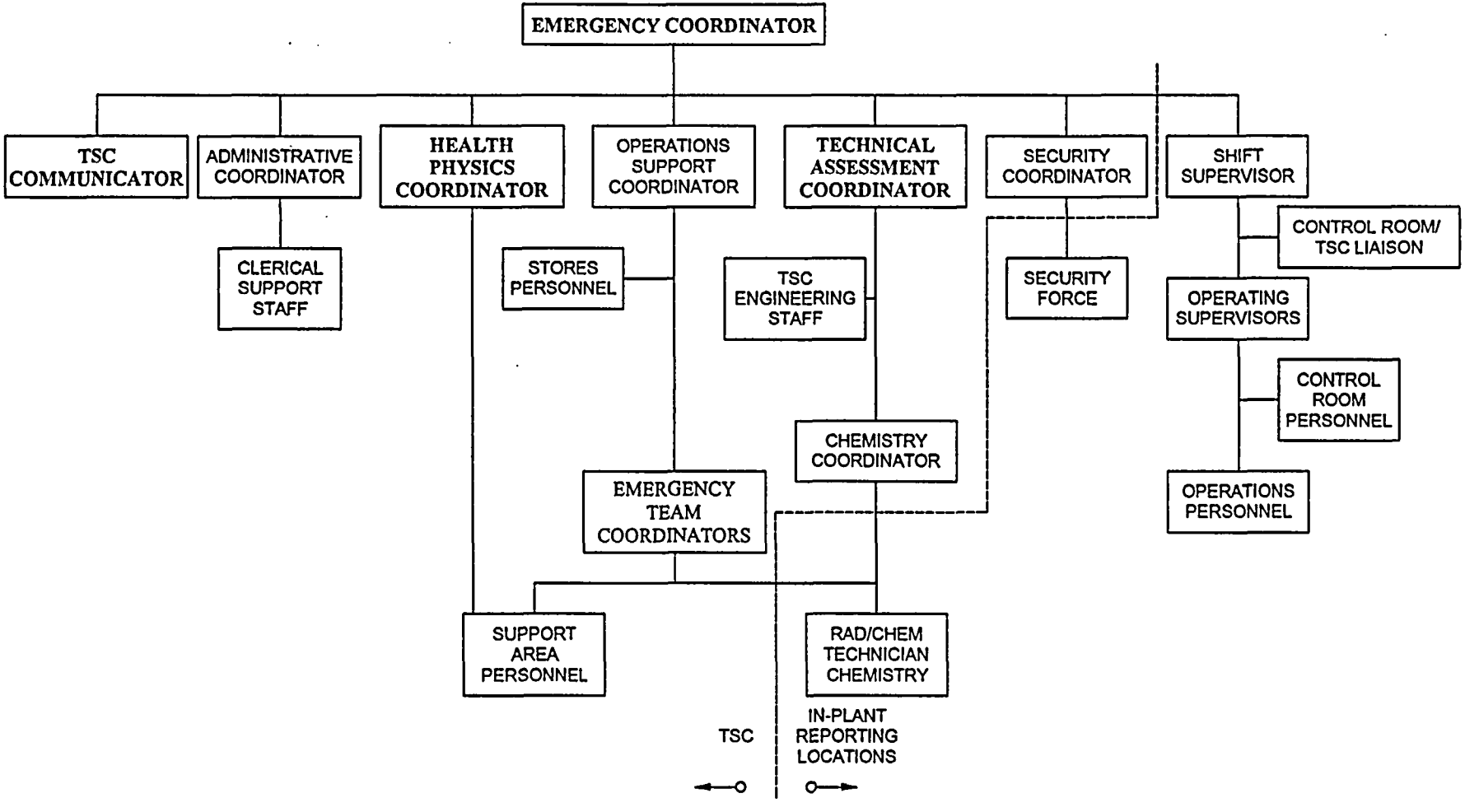
(Minimum normal on-shift organization composition is indicated by numbers in upper right-hand corner of each box.)



* ON-CALL (NOT REQUIRED TO BE ON-SITE)
** FORMED FROM ON-SHIFT PERSONNEL
---- COMMUNICATIONS ADVISORY

FIGURE 5-2

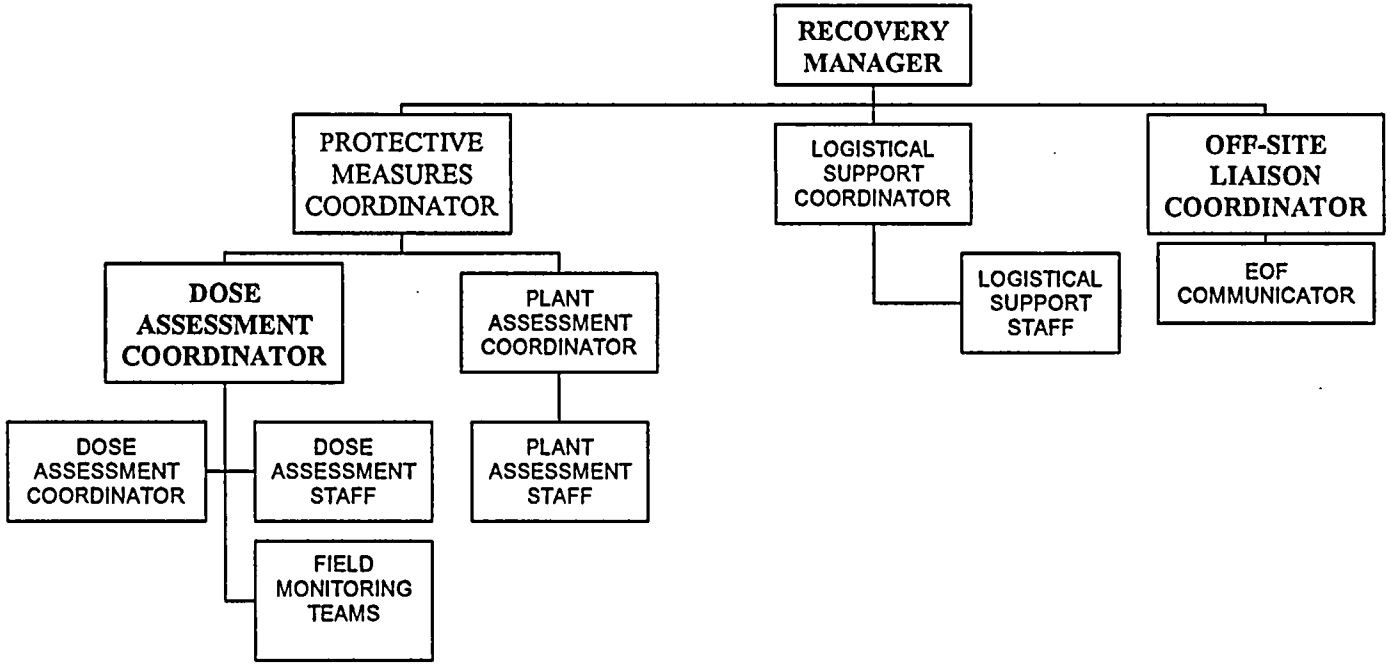
EMERGENCY RESPONSE ORGANIZATION (On-site)



Bold text indicates positions filled by Rapid Response Personnel.

FIGURE 5-2

EMERGENCY RESPONSE ORGANIZATION (EOF)



Bold text indicates positions filled by Rapid Response Personnel.

FIGURE 5-2

EMERGENCY RESPONSE ORGANIZATION (JPIC)

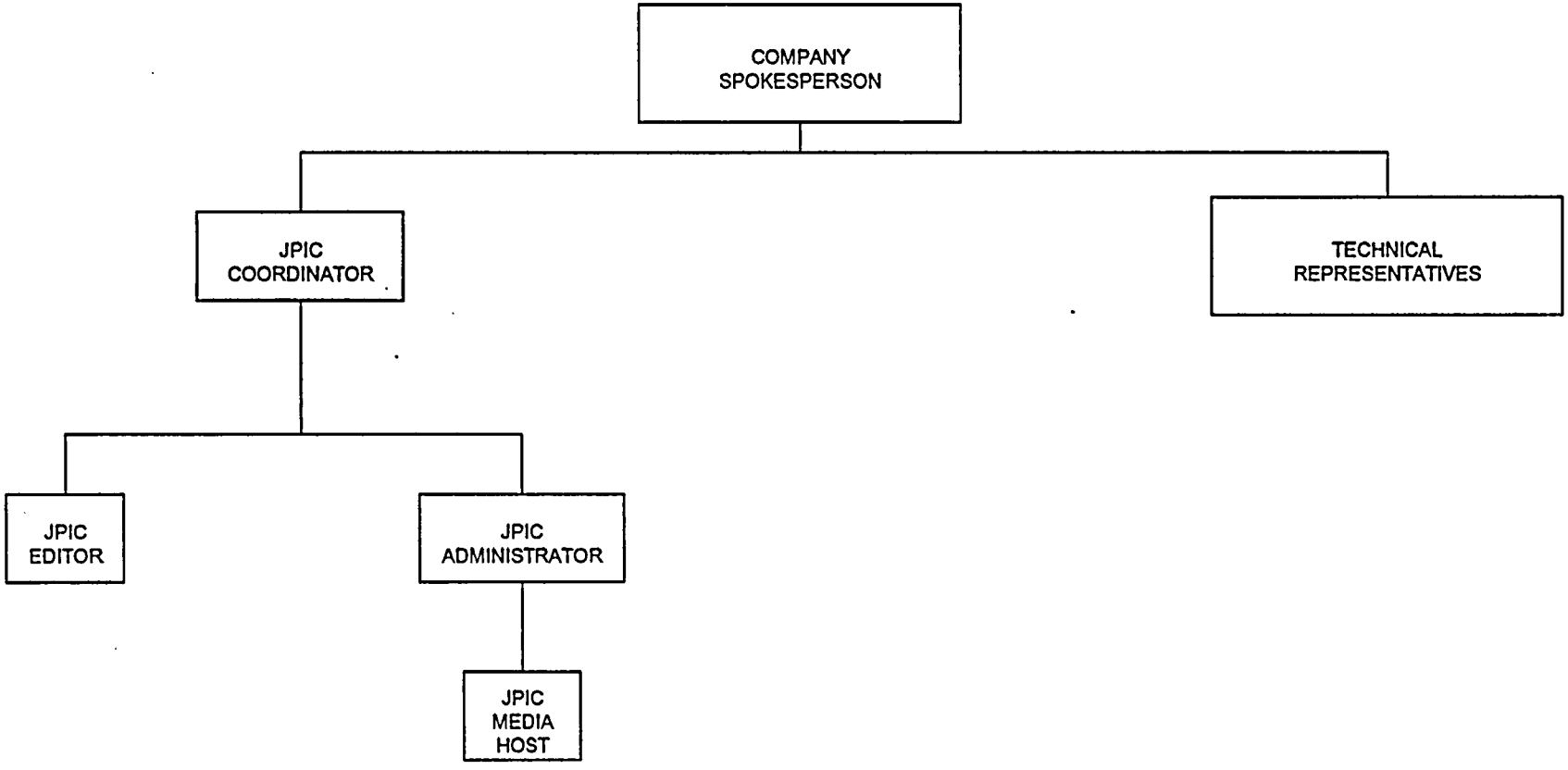


FIGURE 5-3

FUNCTIONAL INTERFACES OF EMERGENCY RESPONSE ORGANIZATIONS

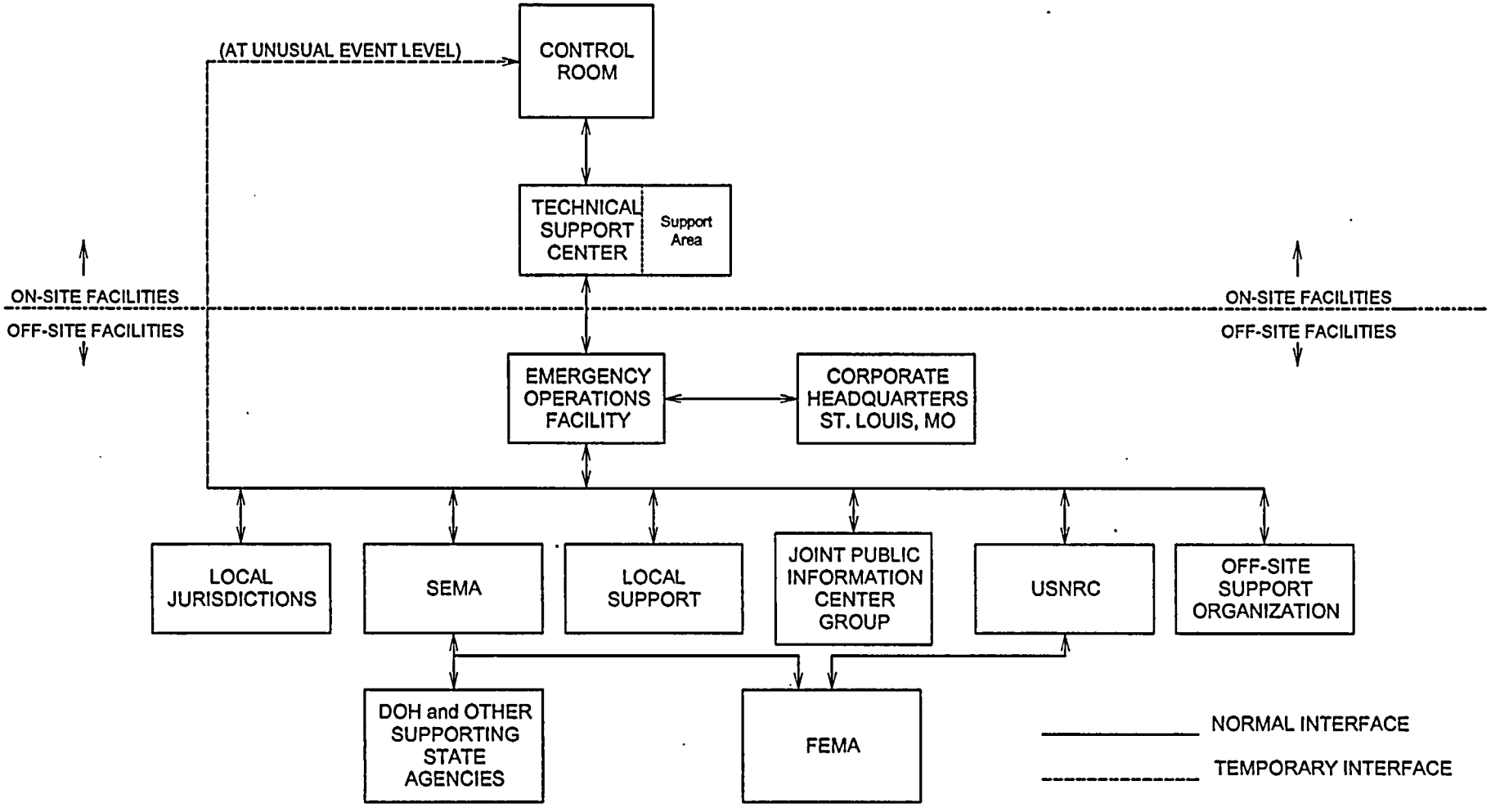


TABLE 5-1
EMERGENCY STAFFING REQUIREMENTS
ON-SHIFT EMERGENCY RESPONSE +

EMERGENCY POSITION	MIN. #	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL	LOCATION
Shift Supervisor (Acting Emergency Coordinator)	1	Initial Emergency Management	Initial Direction and Control of Plant Operations, Accident Assessment, Protective Action Decision Making, Requesting Support, and Off-site Notification / Communications Coordination	UNUSUAL EVENT	Immediate (on-shift)	CR
Operating Supervisor	2	Supervision, Assessment	Supervises Control Room Operators, Technical Support and Assessment, Fire Brigade Leader, and Monitors SPDS, and Off-site Notification / Communications Coordination	UNUSUAL EVENT	Immediate (on-shift)	CR
Reactor Operators	2	Plant Operations	Plant Operations and Accident Assessment	UNUSUAL EVENT	Immediate (on-shift)	CR
Equipment Operators (EO) and Assistant Equipment Operators (AEO)	4	Plant Operations	Auxiliary Plant Operations, and Emergency Team Members As Required	UNUSUAL EVENT	Immediate (on-shift)	Plant Areas
Rad/Chem Technician	1	Health Physics Operations	Perform Surveys, Sampling, Monitoring, Analysis, Job Coverage, Emergency Team Support	UNUSUAL EVENT	Immediate (on-shift)	Plant Areas
Rad/Chem Technician	1	Health Physics Tech Support	Evaluate effluent monitors and perform off-site dose projections	UNUSUAL EVENT	Immediate (on-shift)	CR or Plant Areas
Rad/Chem Technician	1	Chemistry	Chemistry Sampling and Radiochemical Analysis	UNUSUAL EVENT	Immediate (on-shift)	Plant Areas
I&C Technician	2	Repair & Corrective Actions	Emergency Repair, Off-site Notification/Communications Coordination, and Emergency Teams As Required	UNUSUAL EVENT	Immediate (on-shift)	Plant Areas

TABLE 1
EMERGENCY STAFFING REQUIREMENTS
ON-SHIFT EMERGENCY RESPONSE +

EMERGENCY POSITION	MIN. #	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL	LOCATION
Shift Security Supervisor	1	Security, Accountability, Evacuation	Supervise Security Force per Callaway Security Plan	UNUSUAL EVENT	Immediate (on-shift)	On-site
Security Force	*	Plant Security, Accountability, Evacuation	Per Security Plan	UNUSUAL EVENT	Immediate (on-shift)	On-site
Control Room Communicator	**	Notification/Communications Coordination	Notify Licensee, State, Federal, and Local Authorities, Call-out Of Support Personnel, Coordination Of Communications	UNUSUAL EVENT	Immediate (on-shift)	CR
Emergency Teams	**	Repair and Corrective Actions	Search and Rescue, Emergency Repair Activities, Fire Brigade, MERT	UNUSUAL EVENT	Immediate (on shift)	On-site

\+ Any vacancy in an emergency position created by sickness or injury to any personnel already On Shift should be filled as soon as practical

* As per Security Plan

** Position(s) filled by existing personnel on shift

TABLE 5-2
EMERGENCY STAFFING REQUIREMENTS
EMERGENCY RESPONSE ORGANIZATION (On-site)

EMERGENCY POSITION	DESIRED NUMBER	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL+ Normal Hours	RESPONSE GOAL+ Off Hours	LOCATION
Emergency Coordinator#	1	Emergency Management	Direction and Control of On-Site Emergency Response, accident assessment and emergency declarations	ALERT	15 Minutes	75 Minutes	TSC
TSC Communicator (ENS)#	1	Notifications/ Communications	Maintain NRC ENS Communications link	ALERT	15 Minutes	75 Minutes	TSC
Administrative Coordinator	1	Coordination of Administrative Support	Direct Administrative/Clerical Support including logistics, Coordinates Activation of Facility	ALERT	15 Minutes	75 Minutes	TSC
Clerical Support Staff	*	Administrative Support	Records retrieval, document reproduction, messengers, filing, etc.	ALERT	15 Minutes	As Needed	TSC
Health Physics Coordinator#	1	Radiological Assessment	Directs Assessment of On-Site Radiological Conditions, Directs Radiological Support for Emergency Activities	ALERT	15 Minutes	75 Minutes	TSC
Operations Support Coordinator	1	Coordination of corrective actions by Emergency Teams	Directs and Coordinates corrective and emergency maintenance, and Forms, Briefs and Debriefs Emergency Teams	ALERT	15 Minutes	75 Minutes	TSC
Stores Personnel	1	Supply Support	Obtains parts, supplies, and materials from Warehouse	ALERT	15 Minutes	75 Minutes	TSC

\+ Facility activation will be done as soon as practical. Facility Activation Goals for the TSC and EOF are 90 minutes for off hours and 30 minutes during normal working hours (assumes 15 minutes from arrival at the facility). Response times may vary due to inclement weather and/or road conditions.
\# Minimum positions needed for facility activation. A facility is considered activated when designated minimum personnel are ready to assume their responsibilities.
* As needed.
** Can be filled from paged personnel and/or dispatched from personnel in the TSC Support Area.

TABLE 2
EMERGENCY STAFFING REQUIREMENTS
EMERGENCY RESPONSE ORGANIZATION (On-site)

EMERGENCY POSITION	DESIRED NUMBER	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL+ Normal Hours	RESPONSE GOAL+ Off Hours	LOCATION
Emergency Team Coordinators Mechanical Electrical	 1 1	Emergency Team Coordinator	Directs Emergency Team formation, briefing, dispatch, tracking and support	ALERT	15 Minutes	75 Minutes	TSC
CR/TSC Liaison	1	Coordination and transfer of information	Coordinate CR to TSC Communications	ALERT	15 Minutes	75 Minutes	Control Room
Technical Assessment Coordinator#	1	Technical Support and Recommendations for Emergency Declarations	Directs technical analysis of plant conditions to formulate EAL and emergency mitigating recommendations to the EC	ALERT	15 Minutes	75 Minutes	TSC
TSC Lead Engineer	1	Supervise Engineering Staff	Assist TAC in command and control of Engineering Staff	ALERT	15 Minutes	75 Minutes	TSC
Engineering Statusboard/Logkeepers	3	Maintains logs and status boards	Maintains logs and statusboards for Technical Assessment group	ALERT	15 Minutes	75 Minutes	TSC
TSC Engineering Staff Mechanical Engineer Electrical Engineer Reactor/Nuclear Engineer I&C Engineer	 1 1 1 1	Engineering evaluation of Plant Systems and Conditions	Analyze Plant Engineering Problems, Recommend courses of Action, Maintain Technical Status Boards, Evaluate EALs	ALERT	15 Minutes	75 Minutes	TSC
Chemistry Coordinator	1	Chemistry Support	Direct primary and secondary Chemistry activities, evaluate chemical conditions	ALERT	15 Minutes	75 Minutes	TSC

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\# Minimum positions needed for facility activation. A facility is considered activated when designated minimum personnel are ready to assume their responsibilities.
* As needed.
** Can be filled from paged personnel and/or dispatched from personnel in the TSC Support Area.

TABLE 2
EMERGENCY STAFFING REQUIREMENTS
EMERGENCY RESPONSE ORGANIZATION (On-site)

EMERGENCY POSITION	DESIRED NUMBER	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL+ Normal Hours	RESPONSE GOAL+ Off Hours	LOCATION
Security Coordinator	1	Security	Direct Security activities per Security Plan	ALERT	15 Minutes	75 Minutes	TSC
On Shift Emergency Response		See Table 5-1		Unusual Event	15 Minutes	Immediate	See Table 5-1
Support Area Personnel Including:		Emergency Team Support	Emergency repair, search and rescue, fire fighting, team members, support emergency operations. Obtaining supplies and materials from the Warehouse	ALERT	15 Minutes		TSC Support Area
Rad/Chem Support	14		Radiological Support for Emergency Teams, additional radiological support, Field Monitoring Teams, Dose Assessment Staff, Chemistry activities	ALERT	15 Minutes	75 Minutes	TSC Support Area
Mechanics	2	Mechanical repairs	Evaluation and repair of mechanical problems impacting plant operations	ALERT	15 Minutes	75 Minutes	TSC Support Area
Electricians	2	Electrical Repairs	Evaluation and repair of electrical problems impacting plant operations	ALERT	15 Minutes	75 Minutes	TSC Support Area
I&C Technicians	1	I&C Repairs	Evaluation and repair of I&C problems impacting plant operations	ALERT	15 Minutes	75 Minutes	TSC Support Area

\+ Facility activation will be done as soon as practical. Facility Activation Goals for the TSC and EOF are 90 minutes for off hours and 30 minutes during normal working hours (assumes 15 minutes from arrival at the facility). Response times may vary due to inclement weather and/or road conditions.
\# Minimum positions needed for facility activation. A facility is considered activated when designated minimum personnel are ready to assume their responsibilities.
* As needed.
** Can be filled from paged personnel and/or dispatched from personnel in the TSC Support Area.

TABLE 2
EMERGENCY STAFFING REQUIREMENTS
EMERGENCY RESPONSE ORGANIZATION (EOF)

EMERGENCY POSITION	DESIRED NUMBER	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL+ Normal Hours	RESPONSE GOAL+ Off Hours	LOCATION
Recovery Manager#	1	Emergency Management	Manage Overall Callaway Plant Emergency Response, Protective Action Recommendations, Off- Site Notifications and Communication, Interface with Off-Site Authorities	ALERT	15 Minutes	75 Minutes	EOF
Protective Measures Coordinator	1	Recommend Protective Actions to RM	Review and Validate Recommendation for Protective Actions using Plant Conditions and Off-Site Dose Assessments	ALERT	15 Minutes	75 Minutes	EOF
Dose Assessment Coordinators# ***(One needed for facility activation.)***	2	Dose Assessment	Direct Field Monitoring Activities, Calculate Off-site Dose Projections, Perform Assessments, Confirm PARs based upon Dose Projections	ALERT	15 Minutes	75 Minutes	EOF
Dose Assessment Staff	2**	Field Team Communications, Maintain Status Boards	Communicate with and Record Field Monitoring Teams data, coordinate team efforts as directed by Dose Assessment Coordinator, maintain status boards, man the HPN Line when directed	ALERT	15 Minutes	75 Minutes	EOF
Field Monitoring Teams	2**	Plume tracking, collection of radiological data from the field	Collect radiological environmental data as directed	ALERT	15 Minutes	75 Minutes	Mobile
Plant Assessment Coordinator	1	Review of Plant Conditions and Recommendation of PARs	Reviews and validates plant conditions and EALs to verify existing and formulate new protective action recommendations	ALERT	15 Minutes	75 Minutes	EOF

\+ Facility activation will be done as soon as practical. Facility Activation Goals for the TSC and EOF are 90 minutes for off hours and 30 minutes during normal working hours (assumes 15 minutes from arrival at the facility). Response times may vary due to inclement weather and/or road conditions.
\# Minimum positions needed for facility activation. A facility is considered activated when designated minimum personnel are ready to assume their responsibilities.
* As needed.
** Can be filled from paged personnel and/or dispatched from personnel in the TSC Support Area.

TABLE 2
EMERGENCY STAFFING REQUIREMENTS
EMERGENCY RESPONSE ORGANIZATION (EOF)

EMERGENCY POSITION	DESIRED NUMBER	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL+ Normal Hours	RESPONSE GOAL+ Off Hours	LOCATION
Plant Assessment Staff	2	Recommend PARs based on Plant Conditions	Analyze and interpret plant conditions to Evaluate PARs, Maintain Technical Status Boards	ALERT	15 Minutes	75 Minutes	EOF
Logistical Support Coordinator	1	Procurement of goods and services	Direct Support activities and assist in procurement of identified materials, initiate contracts for goods and services, Provide Administrative and Clerical direction and support	ALERT	15 Minutes	2 Hours	EOF
Logistical Support Staff Material Eng. Buyer, etc. Clerical Support	 2 *	 Procurement of goods and services General Clerical Tasks	Develop Purchase specifications, solicit bids for goods and services, Assist Logistical Support Coordinator, Provide Clerical Support	ALERT	15 Minutes	2 Hours	EOF
Off Site Liaison Coordinator#	1	Notification/ Communication	Coordinate: Off-site Notifications, EOF Activities, Support for Local, State and Federal Responders	ALERT	15 Minutes	75 Minutes	EOF
EOF Communicator	1	Communications	Man EOF communication links	ALERT	15 Minutes	75 Minutes	EOF

+ Facility activation will be done as soon as practical. Facility Activation Goals for the TSC and EOF are 90 minutes for off hours and 30 minutes during normal working hours (assumes 15 minutes from arrival at the facility). Response times may vary due to inclement weather and/or road conditions.
# Minimum positions needed for facility activation. A facility is considered activated when designated minimum personnel are ready to assume their responsibilities.
* As needed.
** Can be filled from paged personnel and/or dispatched from personnel in the TSC Support Area.

TABLE 5-2
EMERGENCY STAFFING REQUIREMENTS
EMERGENCY RESPONSE ORGANIZATION (JPIC)

EMERGENCY POSITION	DESIRED NUMBER	FUNCTION	MAJOR TASKS	RESPONSE LEVEL	RESPONSE GOAL+	LOCATION
Company Spokesperson	1	Media Interface	Official Company representative, Obtain and disseminate emergency information, Conduct Media briefings	ALERT	2 Hours	JPIC
JPIC Technical Representatives	2	Technical Support	Provide technical information to Company Spokesperson, Provide technical input for media briefings and news releases	ALERT	2 Hours	JPIC / EOF
JPIC Coordinator	1	Public/Media Relations	Support the Company Spokesperson, Coordinate information on Callaway Plant with SEMA	ALERT	2 Hours	JPIC
JPIC Administrator	1	Public/Media Relations	Administration and Logistics of JPIC	ALERT	2 Hours	JPIC
JPIC Editor	1	Public/Media Relations	Composes written news releases	ALERT	2 Hours	JPIC
JPIC Media Host	1	Public/Media Relations	Accommodate Media Needs	ALERT	2 Hours	JPIC

\+ Facility activation will be done as soon as practical. Facility Activation Goals for the TSC and EOF are 90 minutes for off hours and 30 minutes during normal working hours (assumes 15 minutes from arrival at the facility). Response times may vary due to inclement weather and/or road conditions.
\# Minimum positions needed for facility activation. A facility is considered activated when designated minimum personnel are ready to assume their responsibilities.
* As needed.
** Can be filled from paged personnel and/or dispatched from personnel in the TSC Support Area.

CHAPTER 6.0

EMERGENCY MEASURES

This chapter establishes the methodology of the emergency response, and is the basis for the Emergency Plan Implementing Procedures (EIPs) which define emergency actions to be taken at a specific level of emergency.

Emergency measures follow a process which contains the following definable elements:

- o Recognition and Evaluation;
- o Classification and Declaration;
- o Notification;
- o Mobilization;
- o Assessment Actions;
- o Corrective Actions;
- o Protective Actions;
- o Aid to Affected Personnel;
- o Public Information.

6.1 RECOGNITION AND EVALUATION

Initial recognition of emergency conditions normally occurs in the Control Room. Emergency conditions are indicated by alarms, instrument readings, and/or reports to the Control Room. The Shift Supervisor, with assistance from the Operating Supervisor will evaluate the conditions through the use of established Emergency Action Levels (EAL)s to determine if an EAL has been reached or exceeded.

6.2 CLASSIFICATION AND DECLARATION

If the Shift Supervisor finds that a specific Emergency Action Level (EAL) has been reached or exceeded, the emergency will be classified, as defined in Chapter 4, and the appropriate emergency classification will be declared. **(COMN 42546)** Certain situations may require the Shift Supervisor to make a judgmental decision. If a judgmental decision is necessary, the Shift Supervisor should take into account:

- o Potential effects on-site and off-site;

- o Potential for the situation to escalate or de-escalate;
- o Need for manpower augmentation;
- o Need to activate any Emergency Response Facilities.

Upon declaring an emergency, the Shift Supervisor assumes the position of Emergency Coordinator and announces to Control Room personnel that an emergency has been declared. An announcement is made over the public address system to inform site personnel of the situation.

6.3 NOTIFICATION (COMN 3946)

After the declaration of an emergency, the Emergency Coordinator ensures that notifications are made to:

- o Emergency Duty Officer;
- o State and local notification points;
- o Nuclear Regulatory Commission;
- o Recovery Manager;
- o Institute for Nuclear Power Operations (at ALERT or higher emergency classification);
- o American Nuclear Insurers (at ALERT or higher emergency classification).

Initial notifications to the State and local authorities shall be initiated within 15 minutes after the declaration of an emergency. Periodic updates are made to the State and local authorities upon activation of the State and local Emergency Operations Centers. **(COMN 3947)** These follow-up notifications should be made whenever significant changes in Plant status occur, or approximately every half-hour when conditions are relatively stable. Follow-up notifications should be made with the same urgency as initial notifications when changes in Protective Action Recommendations are involved. When conditions are relatively stable and the Plant remains at an UNUSUAL EVENT, the follow-up notification frequency may be reduced with the consensus of SEMA and the EPZ counties. Updates and notifications should be shared with State and local authorities present in the EOF.

Notifications inform the State and local authorities of the emergency classification, release information, plant status, Protective Action Recommendations, and radiological and meteorological data used to form protective action recommendations.

6.3.1 EMERGENCY DUTY OFFICER (EDO)

The EDO is notified by the Shift Supervisor (Emergency Coordinator) upon declaration of any emergency classification. At a minimum, the following topics should be discussed:

- o Classification of the emergency (potential need to reclassify);
- o Current Plant status and actions taken;
- o Augmentation/Paging of Emergency Response Organization (necessary or required augmentation);
- o Notification of authorities.

6.3.2 NUCLEAR REGULATORY COMMISSION (NRC) (COMN 42037)

Notification of the NRC will be initiated by a Communicator (upon direction from the Emergency Coordinator) utilizing the Emergency Notification System (ENS). Once communications with the NRC is established, it will be maintained until the NRC directs otherwise.

6.3.3 STATE AND LOCAL NOTIFICATION POINTS

6.3.3.1 Local Notification Point (COMN 3948)

Notification to the four counties (Callaway, Montgomery, Gasconade, and Osage) and the City of Fulton is initiated, upon direction from the Emergency Coordinator or Recovery Manager, by a Communicator simultaneously transmitting the notification to all the county Emergency Communications Centers (ECC)s via the SENTRY Notification System. These ECCs are manned 24 hours per day, 7 days per week.

If a back-up method of notification is needed, the Communicator may use the Back-up Radio System (BURS) or telephone to notify the ECCs.

6.3.3.2 State Notification Point (COMN 3949)

The first notification to the State Emergency Management Agency (SEMA), upon direction from the Emergency Coordinator, is initiated by a Communicator via the SENTRY Notification System.

During off normal hours, notification to the State will be made using the State Notification Point Telephone. The State Notification Point will then call the Callaway Plant to verify the emergency. If verification is not received within approximately 30 minutes, the Communicator will re-initiate notification to the State Notification Point.

The State Notification Point will notify SEMA. Once SEMA mans the State EOC or State Forward Command Post at the EOF, use of the State Notification Point for notifications or updates is discontinued.

6.3.3.3 State Department of Natural Resources (COMN 42540)

The State Department of Natural Resources (DNR) receives direct notification from the Callaway Plant whenever an emergency is declared that involves a release of a radioactive liquid. This notification is initiated by a Communicator contacting the State Department of Natural Resources via commercial telephone.

If there is no liquid radioactive release from the Callaway Plant, the State Department of Natural Resources is notified of the emergency by the State Emergency Management Agency as outlined in the Missouri Nuclear Accident Plan - Callaway.

6.4 MOBILIZATION

The number and types of personnel needed to mitigate the circumstances of an emergency will depend upon three factors:

- Classification of the emergency (providing a relative indication of the severity);
- Probability for the situation to escalate or de-escalate;
- Specific nature of the emergency (e.g., radiological, equipment failure, natural disaster).

The classification of an emergency is utilized for determining the minimum number and types of personnel anticipated to be needed. The Emergency Coordinator determines if additional personnel are necessary to mitigate or terminate the events leading to or resulting from the emergency. If necessary, the Emergency Coordinator may augment/page portions of the Emergency Response Organization prior to their mandated time. EIPs provide for both the timely callout of the Emergency Response Organization (Chapter 5) and the staffing of their associated Emergency Response Facilities (Chapter 7).

In addition to personnel needed to mitigate the consequences of the emergency, personnel are also needed to ensure an accurate and timely release of information to the media and general public. The Emergency Response Organization also provides for the timely dissemination of emergency information to the media and general public. For emergency classifications, where greater media interest is anticipated, provisions are made for establishing a Joint Public Information Center (JPIC) for more extensive coordinated media briefings and conferences.

During normal working hours, plant alarms, the public address system, and the cellular paging system are the primary means of notifying plant personnel.

If an ALERT (or higher) classification is declared during normal working hours, all qualified personnel report to their Emergency Response Facility and then unnecessary personnel will be dismissed. Some departments have policies that designate specific personnel to respond during normal working hours. **(CARS 99-582)** Emergency response

during off-hours is by Emergency Response Duty Personnel and Emergency Response Augmentation Personnel.

During off normal working hours, the plant alarms, public address system, and the cellular paging system are used to notify personnel. An automated calling system is an alternate or additional method of mobilizing selected ERO personnel.

The Emergency Response Organization is notified via the Cellular Paging System. Emergency Response Duty personnel (Rapid Responders) report to the TSC and the EOF within approximately 75 minutes to relieve the Control Room of emergency response functions not directly related to Plant operation.

Emergency Response Augmentation Personnel respond to their designated facilities within approximately 75 minutes (2 hours for some positions). Together, the EmergencyResponse Organization is capable of fulfilling all intended functions for each Emergency Response Facility as detailed in Chapter 7.

6.5 ASSESSMENT ACTIONS

Effective coordination and direction of all elements of the emergency response organizations, including public agencies, requires continuing assessment throughout the emergency: Initial assessment and emergency classification are most often the result of exceeding predetermined Emergency Action Levels as discussed in Chapter 4.

The initial assessment of Plant conditions, radiation levels, and on-site/off-site consequences is conducted by the Shift Supervisor as the Emergency Coordinator. During off-normal hours the Emergency Coordinator initiates the augmentation/paging of the Emergency Response Organization based on the emergency classification. Assessment actions continue throughout the emergency. Continued assessment may result in reclassification of the emergency with applicable subsequent emergency response actions taken. Upgrading of the emergency classification depends on experience, judgment, and specific limits as specified in the Emergency Action Levels (EAL)s for each emergency class.

6.5.1 ASSESSMENT ACTION FOR CONTROL OF PLANT OPERATIONS

The existence of any emergency condition causes increased monitoring of Control Room instrumentation, particularly the indicated values that triggered the emergency, and those that may be related. A Safety Parameter Display System (SPDS) within the Control Room is immediately accessible to Control Room personnel to aid them in rapidly and reliably determining the safety status of the Plant.

The Shift Supervisor is responsible for initial assessment actions. When advised of an abnormal situation, the Shift Supervisor's first priority is to put the Plant into a safe condition. The Shift Supervisor's initial action is to assess Plant indications in accordance with emergency operating procedures. These procedures are located in the Control Room for immediate access by Control Room personnel. The applicable Plant indications refer the Shift Supervisor to appropriate emergency operating procedures to be implemented by Plant operating personnel. The procedures reference the appropriate EIP for classification of the emergency (as applicable).

During the assessment phase, the operability of the Emergency Core Cooling System and the Containment Cooling System is of immediate concern. Operability of these systems may determine initial Protective Action Recommendations made to off-site authorities and protective actions taken for on-site personnel. Verification of the automatic activation of other engineered safeguard features is also an immediate concern. If proper activation of the engineered safeguard features is needed and has not occurred, manual initiation will be accomplished in accordance with established procedures. Proper activation of the engineered safeguard features should provide reasonable assurance that the Plant has stabilized.

If a complete failure of one or more safeguards functions occurs with indications of adequate core cooling, some Protective Action Recommendations may be advisable based on current Plant conditions or the potential for conditions to degrade. Should conditions indicate inadequate core cooling or the potential for a radiological release above normal operating limits, Protective Action Recommendations to off-site authorities may be warranted.

Assessment actions to determine the correct operability of principal components of the Emergency Core Cooling and Containment Cooling Systems, and to ascertain activation of the other engineered safeguard features, will be conducted according to established procedures.

Plant conditions that indicate inadequate core cooling may require additional actions beyond those identified in the Emergency Operating Procedures. A transition to the Severe Accident Management Guidelines may be necessary should this occur.

6.5.2 ENVIRONMENTAL ASSESSMENT FOR PROTECTION OF HEALTH AND SAFETY OF THE PUBLIC (COMN 3951)

Incidents involving potential or actual releases of radioactive materials to the environment require special methods of assessment to ensure that responses are appropriate for protection of site personnel and the population at risk. Rapid assessment of potential or actual releases of radioactive materials to the environment is critical for deciding appropriate protective actions. This assessment is based upon Plant parameters and meteorological conditions. This capability will be on-shift.

6.5.2.1 Short Term Assessment (COMN 42538)

Upon determination that the emergency involves an actual or potential release of radioactive material, dose projection calculations will be performed. Based on off-site dose projections and Plant conditions, the Emergency Coordinator or Recovery Manager provides off-site authorities with Protective Action Recommendations.

To determine the off-site doses, a number of factors are considered. These consist of weather conditions, the amount of radioactivity being released or having the potential to be released, the release pathway, flow rate, and field monitoring data.

The atmospheric stability class is based upon the present weather conditions and inputs from the Meteorological Instrumentation System (RD). Using the stability class, the correct atmospheric dispersion factors can be used to approximate air concentrations at various off-site locations. USNRC Regulatory Guide 1.145 has been used as guidance.

The amount of radioactivity being released, or having the potential to be released, can generally be determined utilizing the Radiation Monitoring System. The Radiation Monitoring System has the capability of determining the amount of radioactivity in the effluent and in various systems or areas of the plant, including inside of containment. In addition, isotopic analysis can be performed to determine the specific isotopic makeup of the RCS, containment atmosphere, and sump. Dose projections can be performed using Effluent or Process Radiation Monitor readings or isotopic analysis data. Emphasis can be placed on specific isotopes of concern. These isotopes include the isotopes specified in NUREG-0654, Rev 1.

Using the above information, Health Physics personnel can perform dose projections for situations involving an actual release of radioactive materials.

Field Monitoring Teams are utilized to track and quantify plume dose rates. Field Monitoring Teams are equipped with radios, cellular phones, and Geographical Positioning Units. Field Monitoring Teams are also equipped with radiation monitoring instruments to evaluate actual off-site dose rates and airborne radioactivity concentrations. **(COMN 42536)**

Data is reported by Field Monitoring Teams via radio to the EOF. Samples collected are returned to the EOF, or other locations designated by the Dose Assessment Coordinator, for further analysis as necessary.

Field monitoring activities continue throughout the duration of the incident (as required) so that the need for protective measures can be quickly assessed.

6.5.2.2 Long Term Assessment

Long term assessment of contaminated soil, vegetation, milk, and water is accomplished in accordance with EPA-400, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.

6.5.3 IN-PLANT RADIOLOGICAL CONTROLS

During the course of an emergency, normal Health Physics procedures shall be followed with the understanding that higher than normal radiation and/or contamination levels may be experienced. Deployment of Search and Rescue Teams, Emergency Repair Teams, Fire Brigade Teams, and Medical Emergency Response Teams under emergency conditions may require continued monitoring of in-plant radiation levels for the protection of on-site personnel.

In an emergency, priority is given to supporting efficient accident mitigation.

The Rad/Chem Technician, Health Physics has the initial responsibility for in-plant radiological controls. Upon activation of the TSC, the Health Physics Coordinator has responsibility for in-plant radiological controls and provides direction to Health Physics personnel. Initial in-plant radiological controls may be based on Control Room instrumentation readings, Radiation Monitoring System (RMS) readings, and system status reports. Additional information concerning in-plant radiological conditions may be gained during the debriefing of emergency teams.

6.5.4 REACTOR AND CORE DAMAGE ASSESSMENT (COMN 42534)

Assessment concerning the status of the reactor core is performed by the Shift Supervisor with the assistance of a Shift Technical Advisor (STA) qualified Operating Supervisor or Engineer. Initial assessment of core conditions is based on readings from Control Room instrumentation and assessment of SPDS data. Data which is assessed to determine core damage include:

- o Radiation Monitoring System readings;
- o Nuclear plant instrumentation readings;

Continued assessment of core conditions is performed under the direction of the TAC when engineers arrive at the TSC.

6.6 CORRECTIVE ACTIONS

Plant procedures contain steps for preventive and/or corrective actions to avoid or mitigate serious consequences of an emergency. Instrumentation and control systems provide indications, recordings, and control of systems necessary for the safe operation of the Plant.

These systems provide the operator with the information and controls needed to start up; operate at power; shut down the Plant; and if necessary, cope with abnormal operating conditions or emergencies. Control and display of information from these systems are centralized in the Control Room, and limited displays are accessible at the TSC and EOF. The information provided by this instrumentation provides a basis for emergency classifications.

Corrective actions may also involve response by emergency teams such as the Fire Brigade and Emergency Repair Teams.

6.7 PROTECTIVE ACTIONS

Protective actions are emergency measures taken to ensure that Callaway Plant personnel and the general public's health and safety are protected. Protective actions are initiated in the event actual or projected radiation or airborne radioactivity levels exceed predetermined values.

6.7.1 PROTECTIVE ACTIONS FOR PLANT PERSONEL

Protective actions for Plant personnel and visitors include alerting, accountability, access control and evacuation. Protective actions are taken to the degree appropriate whenever a radiological emergency has occurred, or may occur, which may result in concentrations of airborne radioactivity or radiation levels in excess of normal limits for a specified area or areas. In addition, protective actions are taken for other emergencies such as fires or natural disasters where personnel safety is threatened.

6.7.1.1 Alerting (COMN 42535)

When an emergency is recognized and classified, the Plant Emergency Alarm is sounded and an announcement is made on the Plant public address system. The announcement includes the classification of the event, a brief description of the event, and the required actions to be taken by personnel. Announcements for each emergency classification are in the emergency implementing procedures. Alerting of Plant personnel is accomplished as soon as assessment actions permit proper evaluation of conditions and corresponding actions.

6.7.1.2 Accountability (COMN 3983)

Personnel accountability is initiated at the discretion of the Emergency Coordinator during any of the emergency classifications. Accountability is the process of identifying personnel who remain within the Protected Area. Personnel inside the Protected Area are notified of accountability by the sounding of the Plant Emergency Alarm and an appropriate announcement. Accountability is accomplished by assembly or as part of the evacuation process.

When accountability is ordered, all essential personnel are accounted for in their designated Emergency Response Facility. They will log in utilizing a Security badge card reader or by signing on a status board or roster. Non-essential personnel (including emergency response personnel not needed to fill emergency positions) will assemble or evacuate as directed.

The Shift Security Supervisor then reports the names of missing or unaccounted personnel to the Emergency Coordinator via the Security Coordinator. If needed, a Search And Rescue Team would be formed.

Accountability shall be accomplished within 30 minutes from the time the order is given. **(COMN 42531)**

Accountability can be continuously maintained by controlling access, restricting activities, monitoring activities on status boards, and/or utilizing Security access readers.

6.7.1.3 Assembly **(COMN 42530)**

When an assembly is ordered, non-essential personnel assemble at pre-designated assembly areas. Visitors in the Protected Area are the responsibility of their escorts. Visitors are to be escorted to the access facility and directed to leave the site.

Certain visitors, such as NRC employees, government officials, or specialists assisting with the emergency, may remain in the Protected Area if specific approval is obtained. This approval will typically be from the Emergency Coordinator or the Security Coordinator.

6.7.1.4 Evacuation **(COMN 3986)**

The decision to evacuate non-essential personnel is made by the Emergency Coordinator, but is required during a Site or General Emergency.

In the event that radiological or meteorological conditions would create hazards for evacuating personnel, alternate measures (sheltering, delayed evacuation, alternate evacuation routes, etc.) should be considered.

When an evacuation is ordered, all non-essential personnel proceed to their assembly areas until radiological conditions and personnel requirements are established. Non-essential personnel in the Protected Area exit through the Security Access Facility at which they entered and are monitored for contamination by the portal monitors as they pass through the access. If an alternate access point is used, manual frisking for contamination will be performed. Personal vehicles are used to leave the area. Security officers may assist in controlling vehicles leaving the parking lot. If radiological and meteorological conditions indicate that personnel or their vehicles may have been contaminated, they will be directed to a Reception and Care Center established by the State for monitoring and if necessary, decontamination.

6.7.1.5 Security and Access Control

When a level of emergency has been reached that requires personnel accountability, the Shift Security Supervisor or Security Coordinator is responsible for limiting facility access to emergency response personnel only. Security personnel control access and screen personnel at Security stations established at access points to the Protected Area and EOF. **(COMN 3984)**

When an evacuation has been ordered, Security will patrol to verify that all visitors (see exceptions in Section 6.7.1.3) and non-essential personnel have evacuated the Owner Controlled Area and the Exclusion Area.

The Callaway County Sheriff's Department will provide access control in areas around the Plant in support of Plant Security. Access is authorized for: Callaway Plant employees having proper identification or driving a company vehicle; State and Federal personnel with State or Federal identification or driving an official government vehicle; and emergency vehicles (e.g., ambulance, fire trucks).

6.7.1.6 Monitoring and Decontamination (COMN 3985)

Personnel are monitored for contamination at the Security access point as they depart the Protected Area.

On-site emergency response personnel will be monitored for contamination (if required) at their respective emergency stations. Decontamination of on-site emergency response personnel will be conducted during the course of the emergency at the on-site decontamination facilities. These facilities are located in the proximity of the Health Physics Access Control Area.

If a release above normal operating limits is in progress, non-essential personnel will be directed to designated Reception and Care Centers for monitoring and decontamination, if necessary.

6.7.2 OFF-SITE ALERTING AND PROTECTIVE ACTIONS

The Recovery Manager recommends appropriate protective actions to off-site authorities. This is the responsibility of the Emergency Coordinator until the Rapid Responders arrive. The action which affords the higher level of dose avoidance is normally preferred. However, other technical factors such as release duration and plume arrival time are important considerations affecting off-site Protective Action Recommendations. Off-site authorities will decide which protective actions are to be implemented after considering the Plant's recommendation, recommendations from the State Department of Health (DOH), road and weather conditions, or other factors which may affect the implementation of protective actions for the public.

6.7.2.1 Alerting of the General Public

Prompt notification of the general public, in the event of an emergency at the Callaway Plant, is essential to provide reasonable assurance that sufficient time is available to implement protective actions, if warranted (i.e., sheltering, evacuation). Close coordination is required between the Callaway Plant, the counties within the 10-mile EPZ, and the State (SEMA). Notifications and Protective Action Recommendations are made to enable SEMA and the risk counties (Callaway, Gasconade, Montgomery, and Osage) to evaluate the impact of the emergency on their populations. The decision to implement protective actions for the public within its jurisdiction rests with each county and the City of Fulton. The County Commissioners for each county and the Mayor of Fulton have the authority to activate the Public Alert System in their jurisdictions. If they decide that protective actions are to be implemented, the Public Alert System is activated to alert the populace to listen to the local Emergency Alert System (EAS) station for instructions. The system is activated from each county's Emergency Communications Center. Sample draft EAS messages for release to the public by State and county authorities are contained in the Missouri Nuclear Accident Plan-Callaway, and the Radiological Emergency Response Plans of Callaway County/Fulton, Montgomery County, Osage County and Gasconade County.

The Public Alert System consists of fixed sirens and tone alert receivers. The fixed sirens are placed in various populated locations within the Callaway Plant 10-mile EPZ. The remaining population is alerted by use of tone alert receivers. This system provides alerting to approximately 100% of the population within the 10-mile EPZ. This system is discussed in detail in Appendix H.

6.7.2.2 Protective Actions for the General Public

The responsibility and authority for deciding protective actions for the general public rests with local emergency response organizations, according to the Missouri Nuclear Accident Plan-Callaway. Appendix G of the RERP contains maps showing the demography of the Plume Exposure Pathway EPZ, and population evacuation sectors and evacuation routing within the Plume Exposure Pathway EPZ. When Plant conditions warrant (i.e., a release above normal operating limits requiring a protective action recommendation is imminent or occurring) a recommendation to take immediate actions, such as sheltering or evacuation, is made by the Emergency Coordinator or the Recovery Manager to the State (SEMA) and local authorities responsible for deciding upon and implementing protective actions. Recommendations for protective actions are based on both actual and potential releases, taking into consideration reactor core and containment conditions as well as the anticipated duration of the release and the plume arrival times.

At the GENERAL EMERGENCY classification, evacuation will be recommended by the Plant for the public within a two-mile radius and five miles downwind, as a minimum. **(COMN 3954)**

The Emergency Coordinator or Recovery Manager makes recommendations to the affected local authorities. The local authorities evaluate the recommendations in light of any constraints, determine the area(s) to be evacuated, and communicate instructions to the public via the Public Alert System and EAS. Implementation of protective actions for the general public is described in the Radiological Emergency Response Plans for Callaway County/Fulton, Osage County, Montgomery County, and Gasconade County, and in the Missouri Nuclear Accident Plan-Callaway.

6.7.2.3 Post-Plume Phase Protective Actions

During the post-plume phase of the incident, when the primary concerns are exposure to and possible ingestion of deposited radioactive materials, the extent of environmental contamination will be evaluated by the State Department of Health assisted by the utility. Protective actions recommended by the Department of Health will be based upon the comparison of field data to the limits established in EPA-400, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.

6.7.3 USE OF ON-SITE PROTECTIVE EQUIPMENT AND SUPPLES

A variety of protective equipment is available on-site to minimize radiological exposures, contamination spread, and fire fighting hazards.

Portable Health Physics equipment is available for both normal operations and emergency situations. The portable instrument pool is accessible for use from various site locations.

Emergency equipment kits are designated for storage at specific Plant locations (i.e., Control Room, Technical Support Center, etc.) and the actual contents and quantities of each kit are delineated in and maintained in accordance with Plant Procedures. The contents of emergency equipment kits vary between kits due to storage location and intended application. **(COMN 3938)**

6.7.3.1 Respiratory Protection Equipment

Supplies of respiratory protection equipment are available on-site. It is the responsibility of Health Physics and Chemistry personnel to determine when the use of respiratory protective equipment is appropriate and to select the correct type of equipment for conditions expected to be encountered.

6.7.3.2 Protective Clothing

A quantity of protective clothing is maintained on-site for routine use and is available for use during emergencies. Protective clothing is intended to keep contamination off the clothing and skin of individuals, and to control the spread of contamination. Generally, Health Physics personnel identify contaminated areas and specify the appropriate protective clothing that is to be worn. During emergencies, protective clothing may be worn when entering known or potentially contaminated areas and is removed when exiting these areas. Protective clothing is also available as a replacement clothing should personal clothing become contaminated.

6.7.3.3 Emergency Dosimetry

Emergency dosimetry is located in close proximity to all on-site Emergency Response Facilities. Dosimetry will be issued to emergency response personnel as instructed by Health Physics personnel.

6.7.3.4 Potassium Iodide (KI)

Potassium Iodide (KI) may be taken as a blocking agent to reduce the uptake of radioiodine by the thyroid. Potassium Iodide is administered in accordance with Health Physics procedures.

6.7.4 CONTAMINATION CONTROL MEASURES

6.7.4.1 On-Site Area

To prevent or minimize ingestion of radioactive materials deposited within the Protected Area, affected areas are isolated, as necessary. Details of contamination control measures, exposure to elevated airborne activity levels, and control of contaminated tools and equipment for on-site areas are contained in Health Physics Operating Procedures and Emergency Plan Implementing Procedures.

6.7.4.2 Off-site

For areas beyond the Exclusion Area Boundary but within the Emergency Planning Zone, Field Monitoring Teams will identify contamination and radiation levels. Areas where contamination levels exceed EPA 400 Guidelines will be isolated and access restricted to minimize dose to the general public below these levels.

6.8 AID TO AFFECTED PERSONNEL

6.8.1 Emergency Response Personnel Exposure Criteria

Radiological exposure is kept as low as reasonably achievable. Radiation Exposure is controlled in accordance with Health Physics Procedures.

Exposure records are maintained for Plant personnel by the Health Physics Department. This information is used in determining emergency team assignments. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides. Self-reading dosimeters are available for emergency workers in addition to TLDs. Dosimetry is read at periodic intervals dependent upon radiation levels.

The Operations Support Coordinator and Health Physics Coordinator are responsible for coordinating emergency team assignments. In all cases where personnel may exceed the 10CFR20 occupational limits, authorization will be in accordance with the Callaway Plant Health Physics Program. Health Physics personnel are also responsible for distribution of self-reading and permanent dosimetry devices to emergency response personnel and assuring accountability of each worker's dose.

6.8.2 DECONTAMINATION AND FIRST AID

Provisions have been made to assist personnel who are injured or who may be contaminated by radioactive material. Portable first aid kits are available at strategic locations. Selected on-shift personnel are trained in first aid. In addition, on-site decontamination areas equipped with decontamination supplies, and other specialized equipment are located near the Health Physics Access Control Area on the 1984' elevation in the Control Building. Personnel found to be contaminated undergo decontamination under the direction of Health Physics personnel. Where contamination and major injuries are involved, personnel are transported to off-site medical facilities where they will receive prompt medical attention. Waste fluids and wastes from decontamination of personnel or material are collected and handled as radioactive wastes.

6.8.3 MEDICAL TRANSPORTATION

Ambulance service is available through agreement with the Callaway County Ambulance District.

6.8.4 MEDICAL TREATMENT (COMN 42515)

For treatment of injuries with radiological complications, Callaway Plant will utilize the Callaway Community Hospital. Backup facilities are provided by University Hospital & Clinics, Columbia, Missouri.

6.9 PUBLIC INFORMATION

Public information is an integral part of emergency preparedness. Public information is recognized as a continuous responsibility, and programs have been developed to keep the public informed during normal operations and during emergencies.

6.9.1 PUBLIC INFORMATION DURING EMERGENCIES

The Public Information function of the Emergency Response Organization assures that a steady flow of accurate, timely information is initiated and maintained. Callaway Plant will maintain open communications with the public, public officials, employees, and other groups at all times. Meeting these goals requires close continuing coordination between all emergency response organizations.

The JPIC Coordinator assumes the responsibility of obtaining and releasing emergency information. The Joint Public Information Center (JPIC) Organization supports formal news conferences where the Company Spokesperson presents the company's official responses and answers questions.

6.9.2 RUMOR CONTROL

A Rumor Control Center is established in the JPIC by SEMA. The Rumor Control Center may be staffed at the ALERT classification. The Rumor Control Center is considered an extension of the JPIC and is considered a cooperative operation of Callaway Plant, the State of Missouri, and the affected local governments for the purpose of rumor control.

The Rumor Control Center functions with several telephones operating from a single rumor control number. The number is publicized through the Emergency Alerting System (EAS) when the Rumor Control Center is functional. Public information materials also advise the public of the rumor control number.

FIGURE 6-1

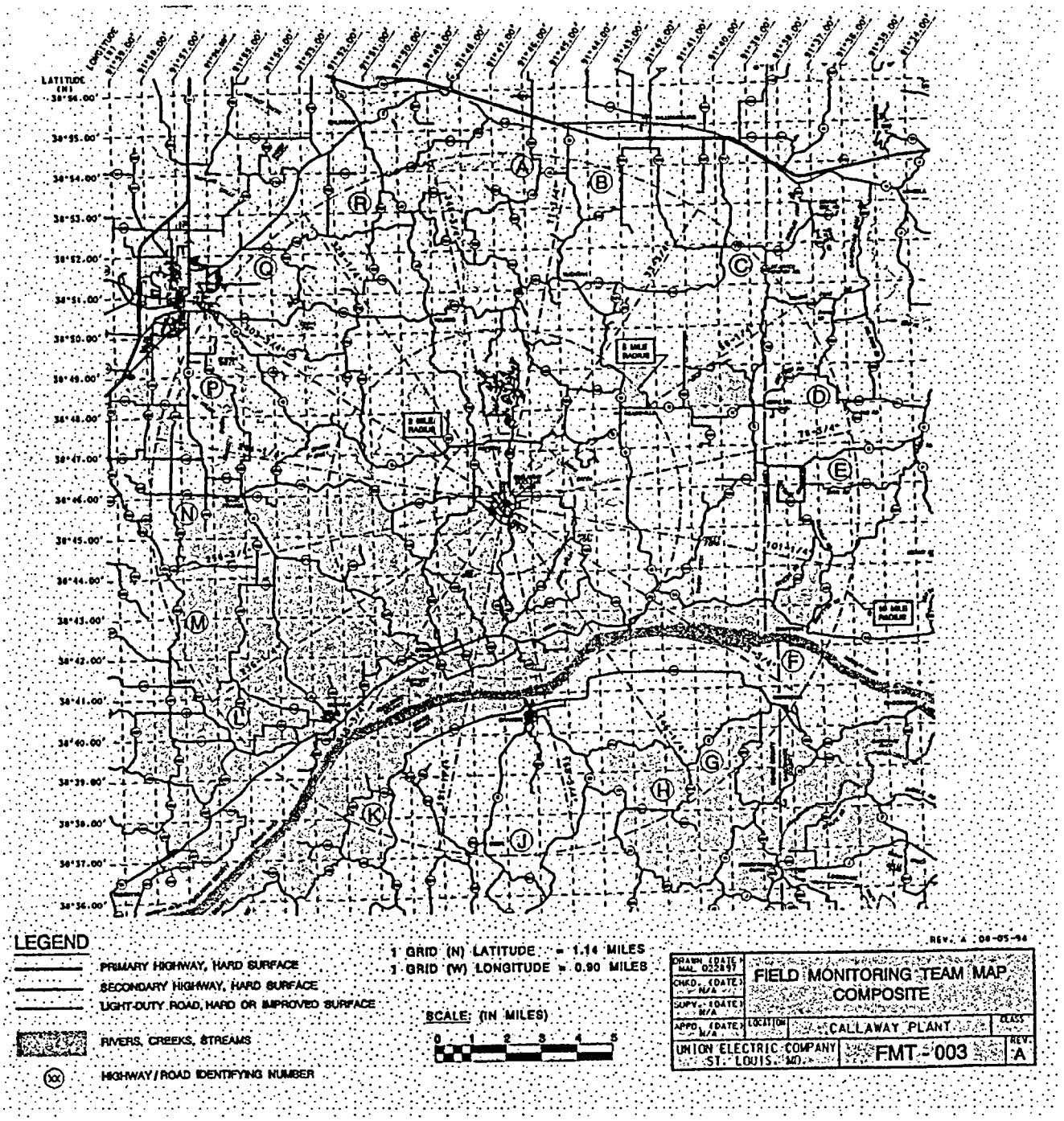

LEGEND
PRIMARY HIGHWAY, HARD SURFACE
SECONDARY HIGHWAY, HARD SURFACE
LIGHT-DUTY ROAD, HARD OR IMPROVED SURFACE
RIVERS, CREEKS, STREAMS
HIGHWAY/ROAD IDENTIFYING NUMBER
1 GRID (N) LATITUDE = 1.14 MILES
1 GRID (W) LONGITUDE = 0.90 MILES
SCALE: (IN MILES)
0 1 2 3 4 5
FIELD MONITORING TEAM MAP, COMPOSITE
CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO.
FMT-003
REV. A

TABLE 6-1

ASSESSMENT ACTIONS

ACTION		DESCRIPTION
1.	Surveillance of Control Room Instrumentation	Radiation levels, pressure, temperature, flow, and meteorological data are monitored. Reactor Operators can assess Plant status by observing sensor readout. Most sensors have visual and audible alarms. Data is provided to the Emergency Coordinator as necessary for his assessment. Reactor Operators will take corrective actions as necessary. Certain key safety and Plant parameters are accessible at the EOF and TSC.
2.	Personnel Accountability	Accountability is the responsibility of the Shift Security Supervisor or Security Coordinator. Personnel accountability is performed and maintained in accordance with security instructions.
3.	In-plant Radiological Surveys	Health Physics personnel perform these surveys. The radiation levels from the Area Radiation Monitors (ARM)s and ventilation monitoring systems are monitored to assist in these evaluations. Contamination surveys of equipment and personnel are conducted with portable instruments from the emergency equipment kits or at routine storage locations.
4.	Exclusion Area Boundary Surveys	Handled by Field Monitoring Teams.
5.	Off-site Dose Assessment	Dose assessment personnel use computers, effluent monitors, meteorological data, and data supplied by deploying Field Monitoring Teams.
6.	Environmental Monitoring	Samples of various environmental media are collected and analyzed by Field Monitoring Teams deployed by the Callaway Plant and the Missouri Department of Health. Additional analytical capabilities are provided at normal on-site facilities and from a contract laboratory if required. Data from the permanently deployed off-site/TLD environmental monitoring stations is also used to assess off-site consequences.
7.	Assessment Reporting	In the case of actual or potential off-site consequences, the State and local authorities are immediately notified in accordance with the Missouri Nuclear Accident Plan-Callaway. Local authorities use predetermined criteria to initiate various protective actions for the public.

TABLE 6-2

PROTECTIVE ACTION GUIDELINES
PLUME PHASE (EARLY PHASE)
GENERAL POPULATION

PAG (projected dose)	Recommended Protective Actions	Comments
1-5 rem[a]	Evacuation (or sheltering)[b]	Evacuation (or, for some situations, sheltering) should normally be initiated at 1 rem.

[a] The sum of the Deep Dose Equivalent resulting from exposure to external sources and the Committed Effective Dose Equivalent incurred from all significant inhalation pathways during the early phase. Committed Dose Equivalents to the thyroid and to the skin may be 5 and 50 times larger, respectively.

[b] The preferred Protective Action is to Evacuate. Sheltering should only be considered for the following situations. Travel conditions that would present an extreme hazard, or for controlled releases from containment if there is assurance that the release is short term and the area near the plant cannot be evacuated before the plume arrives.

TABLE 6-3

POST-PLUME PHASES
(INTERMEDIATE AND LATE PHASES)
RECOMMENDED PROTECTIVE ACTIONS

Projected Dose[a] (rem)	Protective Actions	Comments
>0.5 in first year	Apply dose reduction techniques.	First priority should be given to cleanup of residences of pregnant women who exceed these levels.
≥ 2.0 in first year	Relocate affected population.[b] Maintain evacuation in affected areas.	Evacuation should have occurred during the Plume Phase. If not, relocate.
≥ 0.5 in any subsequent year	Relocate affected population, consider implementing dose reduction techniques, consider decontamination of essential cases, consider long-term relocation.	If the projected dose in any year after the first year is projected to exceed 0.5 rem, implement Protective Actions. Apply dose reduction techniques.
≥5.0 for 50 years	Same as above.	If the summation of all the projected doses exceeds 5.0 rem, then Protective Actions should be implemented.

[a] The projected sum of Deep Dose Equivalent from external gamma radiation and Committed Effective Dose Equivalent from inhalation of resuspended materials from exposure or intake during the first year. Projected dose refers to the dose that would be received in the absence of shielding from structures or the application of dose reduction techniques.

[b] Persons previously evacuated from areas outside the relocation zone defined by the PAG may return to occupy their residences. Cases involving relocation of persons at high risk from such action (e.g., patients under intensive care) should be evaluated individually.

TABLE 6-4

FOOD CHAIN CONSIDERATIONS [1,2]
RECOMMENDED PROTECTIVE ACTIONS

Projected Dose[3] (rem)	Ingestion Protective Actions	Comments
>0.5 rem Whole Body or >1.5 rem Thyroid	Take actions to prevent or reduce the concentration of radioactivity in animal feeds, foodstuffs, and water supplies.	**Preventative Actions** These levels are considered to be action levels for dose from the food chain. Protective Actions should be implemented as a minimum at these levels.
>5.0 rem Whole Body or >15.0 rem Thyroid	Removal of products from commerce, condemnation of materials, possible storage for decay unless loss of food source presents a more severe problem than uptake.	**Emergency Actions** Projected Dose at or above these levels requires these protective actions.

1 Guidance on Off-site Emergency Radiation Measurement Systems.
Phase 3 - Water and Non-Dairy Food Pathway (FEMA REP-13/May 1990)

2 Guidance on Offsite Emergency Radiation Measurement Systems.
Phase 2 - The Milk Pathway (FEMA REP-12/September 1987)

3 Table 1, FEMA REP-13/May 1990

CHAPTER 7.0

EMERGENCY RESPONSE FACILITIES AND EQUIPMENT

This Chapter describes Emergency Response Facilities, communication systems, assessment equipment, protective facilities and equipment, decontamination facilities and supplies, medical and first aid facilities, and damage control equipment and supplies.

7.1 EMERGENCY RESPONSE FACILITIES

7.1.1 CONTROL ROOM (CR)

The Control Room is the on-site location from which the Plant is operated and is the point for on-site emergency response direction prior to staffing of the Technical Support Center. The Control Room is designed to enable operators to startup, operate, and shutdown the Plant during both normal and emergency conditions. It is located on the 2047'-6" elevation of the Control Building and habitability systems are provided to permit access and occupancy during Design Basis Accidents.

The Control Room contains:

- Plant public address system stations;
- Commercial telephone links;
- Dedicated telephone links;
- SENTRY and Back-up Radio System (BURS);
- Control Room Instrumentation;
- Pertinent mechanical and electrical drawings;
- Controlled copies of applicable portions of the Callaway Plant Operating Procedures;
- Controlled copies of applicable portions of the Callaway Plant Severe Accident Management Guidelines;
- Status boards;
- Plant Radio Console;
- Protective breathing apparatus;
- Emergency radiological monitoring equipment;

Measurements and indications of required Regulatory Guide 1.97, Rev. 2, variables are available in the Control Room.

The Operations Field Office Conference Room, across the hall from the Control Room, is used as an extension to the Control Room in case of an emergency. On-shift personnel assemble in this room during an emergency, in order to minimize personnel in the Control Room. Personnel in this conference room are under the direction of the Control Room. If the Operations Field Office Conference Room becomes uninhabitable, then personnel will be moved to the Control Room or TSC as needed.

7.1.2 TECHNICAL SUPPORT CENTER (TSC) (FIGURE 7-1)

The TSC is the central point for direction of the emergency response on-site. The TSC provides the main communications link between the Plant and other Emergency Response Facilities. The TSC is staffed by designated technical, engineering, management, administrative, and NRC personnel. During emergencies, the TSC operates uninterrupted to provide plant management and technical support to Plant operations personnel. The TSC also relieves the Plant operators of peripheral duties not directly related to reactor system manipulations.

The TSC is located within the Protected Area, adjacent to the Service Building. It has adequate shielding and ventilation to ensure habitability during Design Basis Accidents. An emergency diesel generator allows facility operation during loss of off-site power.

The following functions are performed at the TSC:

- Management of on-site emergency response;
- Direction of on-site Health Physics activities;
- Direction of on-site emergency maintenance;
- Direction of site personnel accountability and security;
- Direction of site safety and hazards control;
- Performance of engineering and technical analyses for Control Room support;
- Assemblage of emergency repair/support personnel;
- Briefing, dispatching and direction of emergency repair personnel.

The TSC has the capability to support Plant management and technical personnel assigned there during an emergency. The TSC has access to important Plant parameters as required in Regulatory Guide 1.97, Rev. 2, via the Plant Computer System. Dedicated communications are available with the Control Room, EOF, and NRC. The TSC has the capability to transmit data and facsimiles.

The TSC has access to controlled copies of the necessary Plant records, operational specifications, procedures, Severe Accident Management Guidelines, as-built drawings, schematics, and diagrams essential for evaluation of the Plant under accident conditions. These include the NUREG-0696 specified documents.

7.1.3 EMERGENCY OPERATIONS FACILITY (EOF) (FIGURE 7-2)

The EOF is where coordination between on-site and off-site emergency response activities is done, and is staffed by predesignated emergency response personnel. It is located approximately 1 mile west of the plant, and houses the Recovery Center and offices for governmental representatives, the NRC, and a room that can accommodate small briefings.

The EOF is designed to be habitable under Design Basis Accidents. In the event the EOF becomes uninhabitable, a backup EOF will be established at the Ike Skelton Training Site southeast of Jefferson City, Missouri, approximately 25 miles southwest of the Plant site.

The EOF has the ability for communications with the following:

- Control Room;
- TSC;
- Field Monitoring Teams;
- Joint Public Information Center;
- State and Local Government;
- NRC;
- Corporate Headquarters.

The EOF has data access through the Plant Computer System (PCS). The EOF also has facsimile transmission and reproduction capabilities. The EOF is equipped with a diesel generator to be used as a source of emergency power.

7.1.3.1 Backup Emergency Operations Facility (Figure 7-4)

This facility is set up when needed in the State's Emergency Operations Center at the Ike Skelton Training Site southeast of Jefferson City, Missouri. In the event the EOF becomes uninhabitable, EOF resources are distributed between the TSC and the Backup EOF.

7.1.4 JOINT PUBLIC INFORMATION CENTER (JPIC)

A Joint Public Information Center is located at the Ike Skelton Training Site southeast of Jefferson City, Missouri. News media briefings can be held here. The facility, when activated, has necessary equipment for communications with the EOF and St. Louis Corporate Office Building.

7.1.5 CORPORATE HEADQUARTERS SUPPORT

Additional corporate support of Callaway Plant emergency operations is available from the Nuclear Division and Corporate Communications Area of Ameren Corporation Headquarters in St. Louis, Missouri. Any needed corporate support is directed and managed through the EOF Emergency Response Organization.

7.1.6 COUNTY/CITY EMERGENCY OPERATIONS CENTERS (EOC)s

Portions of the counties of Callaway, Osage, Gasconade, and Montgomery are within the boundary of the Plume Exposure Pathway EPZ. Each county's EOC is the focal point of the local emergency response. The City of Fulton and Callaway County share an EOC.

The EOCs are in the following locations:

- Callaway/Fulton - Callaway County Law Enforcement Center, Fulton, Missouri;
- Osage - Osage County Court House, Linn, Missouri;
- Gasconade - Gasconade County Courthouse, Hermann, Missouri;
- Montgomery - Montgomery County Courthouse, Montgomery City, Missouri.

7.1.7 STATE EMERGENCY OPERATIONS CENTER (EOC)

The State Emergency Operations Center is the primary point through which the governor, or his authorized designee, exercises overall control and coordination of off-site emergency response operations through SEMA. SEMA coordinates actions and operations involving response and coordinates resources required to support decisions affecting the emergency. The State EOC is located in the Ike Skelton Training Site southeast of Jefferson City, Missouri. A Forward Command Post may be set up and utilized in the Emergency Operations Facility.

7.1.8 AMEREN CORPORATE COMMUNICATIONS

The Corporate Communications Function is located in the Ameren Corporation Headquarters in St. Louis, Missouri. Equipment available in this facility includes telephones and facsimile equipment. The facility and available equipment provide the capability to communicate with the JPIC and EOF, and to disseminate information to news media, selected interest groups, employees, and the general public.

7.2 COMMUNICATIONS SYSTEMS

The communications systems in use at the Callaway Plant are designed to provide a reliable and timely flow of information during normal operations and during emergencies. These communication systems are available, on a 24-hour basis, to on-shift and Emergency Response Organization personnel for any communications, notifications, or activations needed. To ensure communication system reliability during an emergency, the following provisions have been incorporated into the systems:

- o Redundancy;
- o Backup/alternate communication systems;
- o Dedicated communication systems.

In addition, many of these systems are in routine use, which lessens the probability of undetected system failures.

The following sections provide a description of the communication systems available for use in the event of an emergency.

7.2.1 PUBLIC ADDRESS (PA) SYSTEM

The PA system is used for communications between the emergency teams, Control Room, TSC, and EOF, as required.

The PA System specifics are explained in the Plant FSAR.

7.2.1.1 Alarms

A multi-tone generator capable of producing a number of alarms is incorporated within the PA System. These alarms can be heard throughout the Plant area. In high noise areas a blue flashing light is activated with the alarm. The alarms are activated from the Control Room as directed by the Shift Supervisor. The alarms are as follows:

- Plant Fire Alarm - A "siren" used only in the event of fire emergencies;
- Plant Emergency Alarm - A "yelp", sound used to alert site personnel of unusual or abnormal conditions;
- Containment Evacuation Alarm - A "pulse" used to alert site personnel that conditions in containment necessitate immediate evacuation of containment.

These alarms are followed by a clarifying announcement.

7.2.2 TOUCHTONE TELEPHONE SYSTEM

The touchtone telephone system consists of telephone stations located throughout the plant site (including the EOF and Intake Structure).

Information pertaining to the telephone system design and operation is contained in Chapter 9 of the FSAR.

This system is the primary means of communications between members of the Emergency Response Organization, and with outside organizations that may provide emergency response resources.

7.2.2.1 Cellular Phone

Mobile communications with the EDO is provided by a cellular telephone. The cellular telephone is accessed through the touchtone telephone system.

During an emergency, the cellular telephone system may be utilized to contact and maintain communications with the EDO, Corporate personnel, and used as a backup for Field Monitoring Teams.

7.2.2.2 Cellular Paging System

Pagers will be worn by the Emergency Response Organization in order to ensure adequate and timely response to the Plant during an emergency situation.

7.2.3 DEDICATED COMMUNICATION SYSTEMS

Four independent telephone systems are available for backup communications between the Emergency Response Facilities. Each system operates independently from the other systems and allows for either selective signaling of any station on the system or an "All-Call" feature where any one station can signal all other stations on the system. The four systems are described in the following subsections.

7.2.3.1 Technical Assessment Line

The Technical Assessment Line is a dedicated telephone line between the Control Room, Technical Support Center, and Emergency Operations Facility. This line is used to relay information concerning the Plant status. This line is normally used by the following:

- o Control Room/TSC Liaison;
- o Technical Assessment Group;
- o Protective Measures Group.

7.2.3.2 Dose Assessment Line

The Dose Assessment Line is a dedicated telephone line between the Control Room, Technical Support Center, Plant Computer Room, and Emergency Operations Facility. This line's primary use is to relay information concerning dose assessment activities. This line is normally used by the following:

- o Protective Measures Group;
- o Health Physics Group;
- o Dose Assessment Group.

7.2.3.3 Operations Support Line

The Operations Support Line is a dedicated line connecting the TSC, including the support area, to the Control Room. This line's primary use is to obtain personnel support, such as the formation of emergency teams. The line is normally used by the following:

- o Operations Support Coordinator;
- o Control Room/TSC Liaison;
- o Emergency Team Coordinator.

7.2.3.4 Emergency Management Line

The Emergency Management Line is a dedicated line connecting the Emergency Operations Facility to the Technical Support Center and Control Room. This line's primary use is communication between emergency management personnel. This line is normally used by the following:

- o Recovery Manager;
- o Emergency Coordinator;
- o Control Room/Shift Supervisor.

7.2.4 SENTRY

SENTRY is a computerized notification system. It allows a notification form to be completed on screen and transmitted to the four (4) EPZ counties and the State Emergency Operations Center. This system can be activated from the Control Room and EOF. Its backup is the Back-Up Radio System (BURS).

7.2.5 BACK-UP RADIO SYSTEM (BURS)

The Back-up Radio System is a communication link between the Callaway Plant and off-site emergency response agencies. The primary use of this system is the backup notification of off-site agencies and the coordination of off-site activities during a radiological emergency.

The system uses 800 MHz radios. There are radio control base units in the Plant Control Room, TSC and EOF, as well as each county EOC and the State EOC.

The backup to this system is the commercial touchtone telephone system. Notifications may also be initiated through the Callaway County/City of Fulton EOC via the Security radio.

7.2.6 STATE AND LOCAL FORWARD COMMAND POST

Commercial telephones are available in the State and Local office at the Emergency Operations Facility (State and Local Forward Command Post). These telephones are used by the State and local representative to maintain communications with their respective Emergency Operation Centers.

7.2.7 RADIO COMMUNICATION SYSTEMS

Callaway Plant maintains a plant radio system that is in routine use and available for use during an emergency. This system is in the Field Monitoring Team vehicles and is used to communicate during emergencies.

7.2.8 EMERGENCY COMMUNICATIONS WITH THE NRC

The NRC telephone network is part of the Federal Telecommunications System (FTS) network provided for government use. This network connects the Callaway Plant to the NRC in Bethesda, Maryland. It is installed on uninterruptible power sources for reliability.

7.2.8.1 NRC Emergency Notification System (ENS)

The NRC Emergency Notification System (ENS) is an FTS telephone used for official communications with NRC Headquarters.

The NRC Headquarters has the capability to patch into the NRC Regional offices. The primary purpose of this phone is to provide a reliable method for the initial notification of the NRC and to maintain continuous communications with the NRC after initial notification.

ENS telephones are located in the Control Room, TSC, and EOF.

7.2.8.2 Health Physics Network (HPN)

The Health Physics Network (HPN) is an FTS line used for official communication between the Plant and the NRC used primarily for the transmittal of radiological information between NRC personnel on-site and regional NRC personnel.

The HPN phones are located in the EOF and TSC.

7.2.8.3 Reactor Safety Counterpart Link (RSCL)

The Reactor Safety Counterpart Link is an NRC phone line established to conduct internal NRC discussions on Plant and equipment conditions separate from Plant personnel. This is the channel by which the NRC Operations Center supports NRC reactor safety personnel at the site. In addition, this link may be used between the Reactor Safety Team Director and Callaway Plant management at the site.

RSCL telephones are located in the EOF and TSC.

7.2.8.4 Protective Measures Counterpart Link (PMCL)

The Protective Measures Counterpart Link is an NRC phone line established to conduct internal NRC discussions on radiological releases and meteorological conditions, and the need for protective actions separate from Callaway Plant. This is the channel by which the NRC Operations Center supports NRC protective measures counterpart personnel at the site. In addition, this link may also be used for discussions between Protective Measures Team Director and Callaway Plant management at the site.

The PMCL telephones are located in the EOF and TSC.

7.2.8.5 Management Counterpart Link (MCL)

The Management Counterpart Link is established for any internal discussions between the Executive Team Director or Executive Team members and the NRC Director of Site Operations or top level Callaway Plant management at the site.

The MCL telephone is located in the EOF.

7.2.8.6 Emergency Response Data System (ERDS)

The Emergency Response Data System is the channel over which the raw reactor parametric data is transmitted from the site to the NRC Operations Center.

The ERDS can be activated from the Control Room or from the Technical Support Center Plant Computer System terminals.

7.2.8.7 Local Area Network (LAN) Access

The Local Area Network Access is established for access to any of the products or services provided on the NRC Operations Center's local area network. This includes technical projections, press releases, status reports, E-mail, and various computerized analytical tools.

The LAN channel is located in the EOF.

7.3 ASSESSMENT EQUIPMENT

This section describes on-site and off-site facilities and monitoring equipment used in initial and continuing assessment during an emergency.

7.3.1 ON-SITE SYSTEMS AND EQUIPMENT

7.3.1.1 Natural Phenomena Monitors

Natural phenomena monitors are grouped into the meteorological and seismic categories.

7.3.1.1.1 Meteorological System

The Meteorological System meets the applicable requirements of NUREG-0654 (Rev. 1) and Safety Guide 23 (dated 2-17-72), to the extent described in Section 2.3 of the FSAR.

This system is maintained by the Plant Surveillance and Preventative Maintenance program. There is an emergency auto start electric generator for the primary tower and a manual start diesel generator in the EOF for the backup tower in case of power failure. The National Weather Service in St. Louis, Missouri is available for additional and backup meteorological data.

7.3.1.1.2 Seismic Instrumentation

Seismic instrumentation is provided to supply information necessary for the evaluation of the effects of earthquakes on the plant Seismic Category I structures, systems, and components. Readout is available in the Control Room.

All seismic detectors operate on three orthogonal axes and are oriented with one axis vertical and one axis related to the major horizontal axis used in the seismic analysis of the Plant. This system is maintained by the Plant Surveillance System and Preventive Maintenance Program.

7.3.1.2 Radiation Monitoring System

The two general Radiation Monitoring Systems in use at the Callaway Plant are the Process/Effluent, and Area Radiation Monitoring Systems.

7.3.1.2.1 Process/Effluent Radiation Monitoring System

The purpose of the Process/Effluent Radiation Monitoring System is to monitor, record, alert, and control the release of radioactive materials that may be generated during the Plant's operation under normal or accident conditions.

The Process/Effluent Radiation Monitoring System is a digital system. A Control Room minicomputer, detector assemblies, and local microprocessors are the main components of this system. The Control Room minicomputer is the central computer which continuously communicates with local microprocessors through redundant data highways, provides radiological status display, and performs various system alarm and control functions.

A radiation monitor is comprised of a lead shielded detector assembly, a local microprocessor, and accessories. A detector assembly can have Particulate (P), Iodine (I), Gas (G) or Gamma detectors and check-source channels, specific to the type of radiation monitor. Each channel generates signals proportional to the noted radiation levels. The local microprocessor processes these signals, computes average concentration levels for various time intervals, stores this data, transmits the data to the minicomputer upon request, and performs alarm and control functions.

In addition each safety related monitor is directly connected to a Control Room digital display module for redundancy.

The Process/Effluent Radiation Monitoring System includes the following types of monitors:

- Airborne Radiation Monitors - These are off-line monitors which measure particulate, iodine, and noble gas radiation levels. These monitors are listed in the FSAR.

- o Liquid Radiation Monitors - These are off-line monitors which measure the concentration of gamma producing nuclides in a liquid stream. These monitors are listed in the FSAR.

- o Wide Range Gas Monitors (WRGM) continuously monitor the expected range of radioactivity levels of noble gases discharge through unit and radwaste building vents during normal and accident conditions. The monitors are designed to meet the requirements of Reg. Guide 1.97 Rev. 2, NUREG-0578 and NUREG-0737.

- o Containment High Range Area Radiation Monitors - These monitors are designed to measure the gamma radiation level inside the containment area, before and after a LOCA. These monitors are listed in the FSAR.

- o Secondary Side Release Monitors (SSRM) continuously monitor for the steam released from the steam-generator power operated relief valves (PORV)s and the auxiliary feedwater pump turbine exhaust for gamma radiation levels. The monitors are designed to meet the requirements of Reg. Guide 1.97, Rev. 2.

- o TSC and EOF Building continuous air monitors are stand alone monitors which monitor the work area for airborne radioactivity. An alarm function on the continuous air monitor would indicate the need for additional air sampling. This would be performed using a portable air sampler to obtain grab samples. Air sampler filter media would be analyzed to determine particulate and radioiodine concentration levels. Monitoring is designed to meet the requirements of NUREG-0696 and NUREG-0654. The monitors are not connected to the Control Room minicomputer and do not perform any control functions external to their own system.

7.3.1.2.2 Area Radiation Monitoring System

The purpose of the Area Radiation Monitoring System (ARMS) is to monitor radiation levels in the power block where personnel may be required to work and alert against abnormal or high radiation levels in those areas. The ARMS also provides a record of radiation levels in expected high radiation areas as a function of time.

The Area Radiation Monitoring System detects and measures ambient gamma radiation at various points. It also provides an audible and visual alarm in the areas monitored and in the Control Room, if area radiation levels exceed a specified limit or, if there is a malfunction in a monitor's electronic circuitry. The areas under surveillance are the ones where radioactive material may be present, stored, handled, or inadvertently introduced. These areas are listed in the FSAR.

In addition, monitors are provided in the Control Room to alert the operators in the event that abnormal radiation levels are present. The radiation level is indicated locally at the detector, at the ARMS cabinets and the Plant Computer for recording. Since all of the ARMS are connected to common annunciator alarms, verification of which channel has alarmed is done at the ARMS cabinets in the Control Room or on the Plant Computer.

7.3.1.3 Portable Monitoring Equipment

Portable monitoring equipment includes radiation detection instruments and air sampling equipment.

7.3.1.3.1 Portable Radiation Detection Instruments

Low and high range instruments are available to measure gamma radiation levels from a fraction of a mrem/hr to 1,000 Rem/hr. Instruments for alpha, beta, and neutron radiation measurements are available. A listing of the instruments typically available is given in FSAR. Portable instruments are also used to monitor habitability in Emergency Response Facilities.

7.3.1.3.2 Portable Air Sampling Equipment

Air samplers are available to collect low volume air samples for analysis of particulate and radioiodine concentrations. The air samples are initially analyzed in the field using a portable count rate instrument.

Emergency radioiodine sampling is done with silver zeolite cartridges. With minimal interferences from noble gases, gross radioiodine concentrations as low as 1E-7 uCi/cc can be measured.

7.3.1.4 Personnel Monitoring Equipment

Personnel monitoring is provided by use of thermoluminescent dosimeters (TLDs), direct-reading secondary monitoring devices (SMDs), and portable survey instruments. Personnel entering the Radiological Controlled Area (RCA) are issued TLD badges which are used to measure exposure to beta-gamma and neutron radiation. TLDs are analyzed on a periodic basis by Plant personnel. This provides the official record of personnel exposure to beta-gamma and neutron radiation. SMDs are also worn by personnel in the RCA and provide a day-to-day estimate of personnel exposure.

Both TLDs and SMDs are available in selected Emergency Equipment Kits for emergency use.

7.3.1.5 Personnel Survey Instrumentation

Personnel survey instrumentation consists of G-M count rate meters (contamination friskers), portal monitors, and a whole body counting system. Portable count rate meters (friskers) are available at checkpoints and other areas that can be used to determine the presence and location of contamination. Portal monitors are available at the normal exits from the RCA. The whole body counting system is readily available to quickly supply information concerning internal contamination levels.

7.3.1.6 Control Room Instrumentation

Information necessary to monitor the nuclear steam supply system (NSSS), the containment system, and the Balance of Plant (BOP)is displayed on the operator's console and the various vertical boards located within the Control Room. Hot shutdown information is also displayed on the auxiliary shutdown control panel outside the Control Room. These indications include the information to control and operate the unit through all operating conditions, including anticipated operating occurrences, and accident and post-accident conditions.

7.3.1.7 Analysis Capabilities

Laboratory facilities include the Hot Chemistry Laboratory and Counting Room adjacent to the HP Office, the Radwaste Lab, and a Cold Chemistry Laboratory in the Turbine Building. These facilities are designed to handle all chemical and radiological sampling and analysis during all normal modes of operation.

External laboratory services have also been retained for analysis of high activity and environmental samples. If utilized, the EOF would operate as a central collection point for the receit and analysis of field monitoring data and environmental sampling media.

7.3.1.8 DELETED per Rev. 024 CN 01-005.

7.3.1.9 Protective Action Assessment Capabilities

Two methods are available for determining the potential radiological impact to the general public following a major accident. Initial off-site protective actions can be based on plant conditions using Plant Parameter Based Assessment, or a Release Path Dose Assessment can be performed using plant effluent monitors and meteorological monitoring equipment.

7.3.1.9.1 Plant Parameter Based Assessment

Plant parameters will be evaluated by Control Room personnel to determine potential radiological impact to the general public. Indications to monitor these parameters are available on the Plant Computer. The evaluation is performed using a status tree that provides immediate predetermined Protective Action Recommendations based on the magnitude of the radiological source term and the potential for a release above normal operating limits to the environment. The estimate of the source term is based on the degree of core damage and modifying factors. The potential for release is based on fission product barrier integrity. This approach provides a basis for making Protective Action Recommendations before a release actually occurs.

7.3.1.9.2 Release Path Dose Assessment

Protective Action Recommendations based on plume exposure pathway dose projections can be developed, using a computer based straight line Gaussian model for atmospheric dispersion. The model uses wind speed and atmospheric stability classification to determine relative concentrations and transit times. Default isotopic mixes for predefined accident types, or an actual isotopic mix based on sample analyses can be used. Dose conversion factors are taken from the document EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, dated May 1992. Information from field monitoring teams, in-plant grab samples, or effluent monitor data from the Plant Computer System can be input to the program along with estimated release duration to calculate doses at the Exclusion Area Boundary and at two, five, and ten miles from the plant.

7.3.1.10 Plant Computer System (PCS)

The PCS is designed to gather, store, and display data on the general condition of the Plant including information to perform release path dose assessment. This system is also able to display data from other Plant subsystems such as the Safety Parameter Display System (SPDS).

The PCS is able to display data at the TSC, EOF, Balance of Plant Computer Room, HP Office, and the Control Room. The displays come in a variety of formats such as group displays, point displays, summaries, alarm review, video trend, and bar chart displays.

The PCS enables emergency response personnel assigned to the TSC and EOF to aid Control Room operators in assessing emergency conditions. The PCS can be used for:

- o Reviewing the accident sequence;
- o Determining appropriate mitigating actions;
- o Evaluating the extent of any damage;
- o Determining Plant status during recovery operations;

- o Evaluating Plant radiological conditions;
- o Evaluating process radiation monitors for plume exposure pathway dose assessment;
- o Evaluating meteorological conditions and effluent flow rates for release rate and atmospheric dispersion characteristics.

The PCS meets the data system requirements of NUREG-0696 and has the ability to call up the Plant parameters identified in Regulatory Guide 1.97.

7.3.1.11 Safety Parameter Display System (SPDS)

The Safety Parameter Display System (SPDS) is an application on the PCS. The Safety Parameter Display System is designed to provide Control Room operators with centralized and easily understandable Plant safety information in order to aid them in rapidly and reliably determining the safety status of the Plant and in rapidly detecting abnormal operating conditions.

The SPDS meets the requirements of NUREG-0696 and some of the monitored parameters include:

- o Reactivity control;
- o Reactor core cooling and heat removal from the primary system;
- o Reactor coolant system integrity;
- o Radioactivity control;
- o Containment integrity.

The SPDS provides graphical displays containing minimum sets of key parameters representative of the Plant safety status during normal, heat up and cool down, and cold shutdown operations. More detailed information is provided on multiple supporting displays. The displays use color-coding and pattern recognition techniques to indicate off-normal values, and are validated and updated on an essentially real-time basis. The SPDS interfaces with the PCS to access Plant data.

7.3.1.12 Containment POST-LOCA Hydrogen Monitoring System

Each redundant hydrogen monitoring train in the hydrogen monitoring subsystem consists of a hydrogen analyzer and two associated sample lines with isolation valves inside and outside the containment. These sampling lines are designed to be free of water traps (runs where liquid could accumulate), and are equipped with sufficient heat tracing to prevent condensation of the sample being supplied to the analyzers.

After the sample has been analyzed, it is returned to the containment. The analyzers are located in accessible areas outside of the containment. The operation of the hydrogen gas analyzer is based on the measurement of thermal conductivity of the gaseous containment atmosphere sample. The operation of the hydrogen monitoring subsystem is not limited due to radiation, moisture, or temperature expected at the equipment location.

The containment post LOCA hydrogen monitoring system is powered by a safeguards (1E) bus. In case of loss of power the system is automatically transferred to an emergency diesel generator.

7.3.1.13 Fire Protection System

The Fire Protection System provides a means for detecting, alarming, and extinguishing fires. Alarms are provided to warn personnel of a fire in a specific area and of an impending system initiation.

The Plant is designed to be self-sufficient from a fire fighting standpoint, as indicated in the FSAR, and is not dependent on off-site support. However, additional support may be requested from the local volunteer fire agencies if needed.

7.3.2 FACILITIES AND EQUIPMENT FOR OFF-SITE MONITORING

Off-Site monitoring is accomplished with portable equipment for measuring radiation and airborne radioactivity levels. This equipment is stored in Emergency Equipment Kits for field monitoring activities.

To provide surveillance during the operation of the Plant, continuously operating air particulate samplers are located around the Plant. The particulate samplers are equipped with a charcoal TEDA impregnated cartridge. The cartridge is mounted behind the filter paper attachment. To monitor radiation exposure levels, thermoluminescent dosimeters (TLD)s are mounted in various environmental locations.

7.4 PROTECTIVE FACILITIES AND EQUIPMENT

Control Room shielding and ventilation are designed to allow personnel habitability during Design Basis Accident conditions. The TSC and EOF have shielding and ventilation similar to the Control Room for habitability during the course of an accident. Essential emergency equipment is available in or near the Control Room, TSC, and EOF.

7.5 DECONTAMINATION FACILITIES AND SUPPLIES

There is a decontamination facility located within the Plant on elevation 1984' of the Control Building and in the EOF. Both facilities are equipped with shower and decontamination supplies.

The EOF decontamination area drains are connected to a radioactive waste storage tank.

7.6 MEDICAL AND FIRST AID

There is a First Aid Room on elevation 1984' of the Control Building and additional first aid supplies are located at various locations within the Protected Area.

7.7 DAMAGE CONTROL EQUIPMENT AND SUPPLIES

Fire hose stations, extinguishers, and hydrants are strategically located throughout the Plant for use in the event of fire. Self-contained breathing apparatuses are available to Plant Personnel for fire fighting or entry into airborne radioactivity areas, toxic gas areas, or areas void of oxygen.

FIGURE 7-1

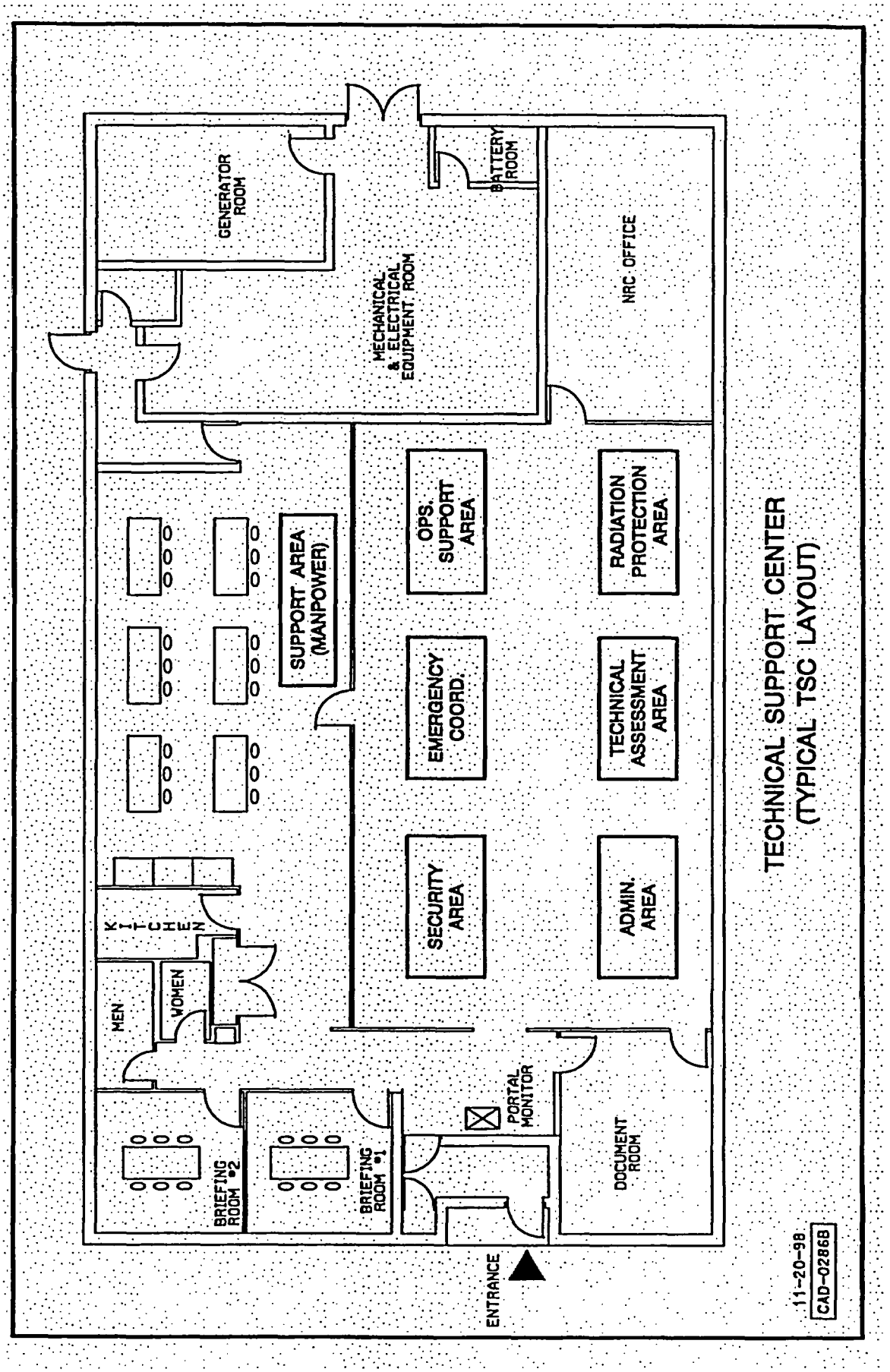

GENERATOR ROOM
BATTERY ROOM
MECHANICAL & ELECTRICAL EQUIPMENT ROOM
NRC OFFICE
SUPPORT AREA (MANPOWER)
OPS. SUPPORT AREA
RADIATION PROTECTION AREA
EMERGENCY COORD.
TECHNICAL ASSESSMENT AREA
SECURITY AREA
ADMIN. AREA
KITCHEN
MEN
WOMEN
BRIEFING ROOM #2
BRIEFING ROOM #1
PORTAL MONITOR
DOCUMENT ROOM
ENTRANCE
TECHNICAL SUPPORT CENTER
(TYPICAL TSC LAYOUT)
11-20-98
CAD-02868

FIGURE 7-2

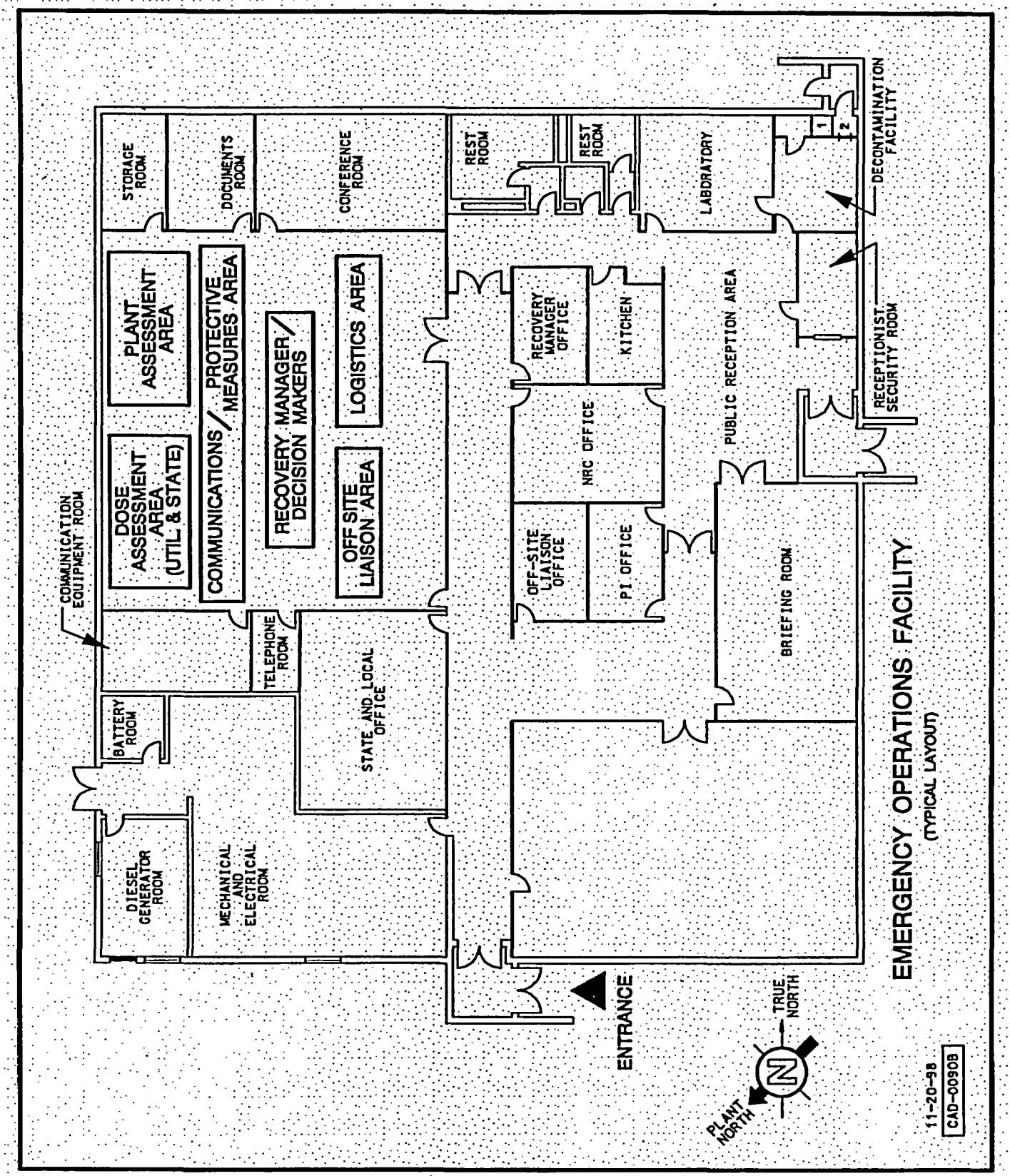

STORAGE ROOM
DOCUMENTS ROOM
CONFERENCE ROOM
REST ROOM
REST ROOM
LABORATORY
DECONTAMINATION FACILITY
PLANT ASSESSMENT AREA
PROTECTIVE MEASURES AREA
COMMUNICATIONS
RECOVERY MANAGER/ DECISION MAKERS
LOGISTICS AREA
RECOVERY MANAGER OFFICE
KITCHEN
PUBLIC RECEPTION AREA
RECEPTIONIST SECURITY ROOM
DOSE ASSESSMENT AREA (UTIL & STATE)
OFF SITE LIAISON AREA
NRC OFFICE
COMMUNICATION EQUIPMENT ROOM
TELEPHONE ROOM
OFF-SITE LIAISON OFFICE
PI OFFICE
BRIEFING ROOM
BATTERY ROOM
STATE AND LOCAL OFFICE
DIESEL GENERATOR ROOM
MECHANICAL AND ELECTRICAL ROOM
ENTRANCE
TRUE NORTH
PLANT NORTH
EMERGENCY OPERATIONS FACILITY
(TYPICAL LAYOUT)
11-20-98
CAD-00908

FIGURE 7-3

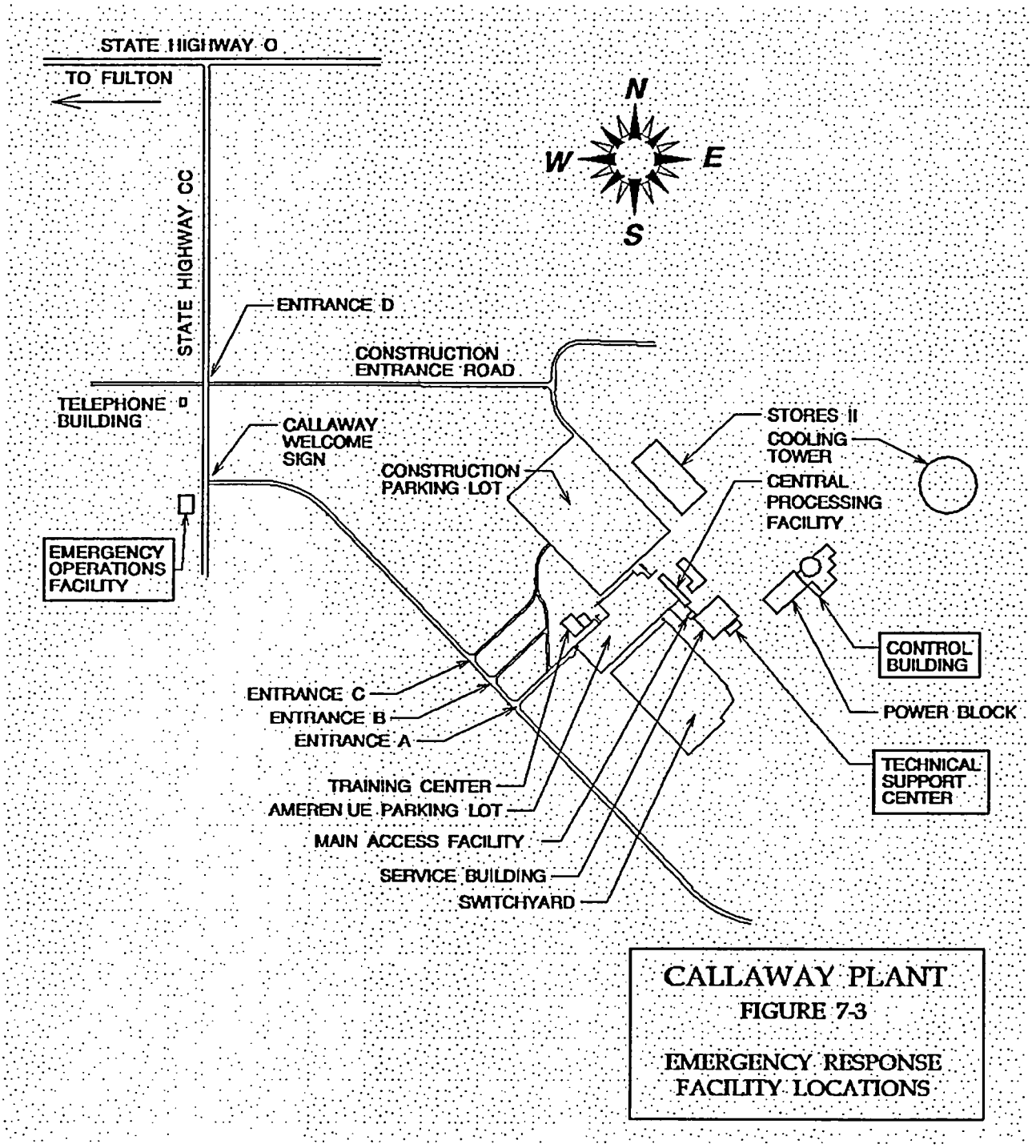
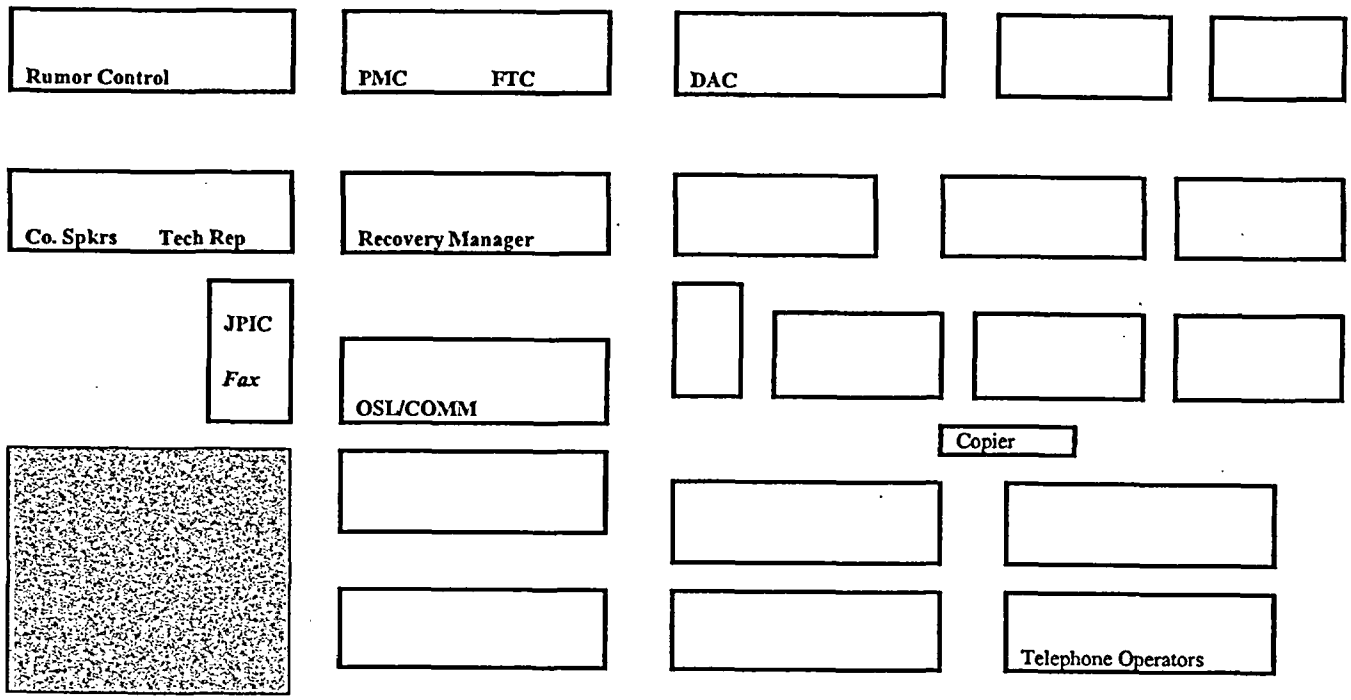

STATE HIGHWAY O
TO FULTON
STATE HIGHWAY CC
N
W
E
S
ENTRANCE D
CONSTRUCTION ENTRANCE ROAD
TELEPHONE BUILDING
CALLAWAY WELCOME SIGN
CONSTRUCTION PARKING LOT
STORES II
COOLING TOWER
CENTRAL PROCESSING FACILITY
EMERGENCY OPERATIONS FACILITY
CONTROL BUILDING
POWER BLOCK
TECHNICAL SUPPORT CENTER
ENTRANCE C
ENTRANCE B
ENTRANCE A
TRAINING CENTER
AMEREN UE PARKING LOT
MAIN ACCESS FACILITY
SERVICE BUILDING
SWITCHYARD
CALLAWAY PLANT
FIGURE 7-3
EMERGENCY RESPONSE FACILITY LOCATIONS

Figure 7-4

Backup Emergency Operations Facility
with JPIC in State EOC
(Typical Layout)



CHAPTER 8.0

MAINTAINING EMERGENCY PREPAREDNESS

The Callaway Plant Radiological Emergency Preparedness Program is administered under the direction of the Superintendent, Protective Services. Maintenance of this program consists of:

- o Direction of the Emergency Preparedness staff;
- o Review and updating of the Emergency Preparedness Program;
- o Review and updating of the RERP and associated implementing procedures;
- o Coordination of emergency response plans and activities between Callaway Plant, State, and local agencies;
- o Assurance of on-site RERP training;
- o Conduct of drills and exercises;
- o Assurance of maintenance of Emergency Response Facilities;
- o Assurance of maintenance and inventory of emergency equipment and supplies;
- o Coordination of Public Information activities related to Emergency Preparedness;
- o Assurance of the administration and maintenance program of the Public Alert System.

8.1 RERP TRAINING

Training for all emergency response personnel is divided into four training programs: RERP training for on-site personnel who respond during an emergency; RERP training for off-site personnel; news media orientation; and a Public Information Program.

All training, including drills and exercises, shall provide for formal critiques in order to identify weak or deficient areas that need corrections. Any weaknesses or deficiencies that are identified shall be corrected. **(COMN 42978)**

8.1.1 RERP TRAINING FOR ON-SITE PERSONNEL

RERP training for on-site personnel is the responsibility of the Training Department. Plant personnel granted unescorted access to the Protected Area receive an orientation on the RERP. In addition, personnel who may be assigned emergency response positions within an Emergency Response Organization, receive additional RERP training, as necessary. Personnel must meet the minimum criteria for the required training as specified for the emergency position and identified in the EIPs. Periodic retraining, typically on an annual basis, is conducted to update the knowledge and skills of on-site and corporate personnel. Personnel who do not complete retraining within the specified period are disqualified.

All classroom training is tracked and documented in accordance with Callaway Plant Training Procedures.

8.1.1.1 Training For Non-Emergency Response Personnel

Non-emergency response personnel (individuals not assigned a position in the Emergency Response Organization) receive General Employee Training (GET) in accordance with the Callaway Plant Training Procedure. RERP topics to be taught during GET should include:

- o Duties and responsibilities of emergency response and non-emergency response personnel;
- o Emergency classifications;
- o Assembly areas;
- o Alarms;
- o Emergency response;
- o Accountability and evacuation.

8.1.1.2 Training For Emergency Response Personnel

Emergency response personnel receive training and retraining specific to their positions in the Emergency Response Organizations. Initial training and retraining programs are provided for personnel responsible for:

- o Directing or coordinating the Emergency Response Organization (directors and coordinators);
- o Accident assessment;
- o Radiological monitoring and radiological analysis;
- o Security and fire fighting;
- o Repair and damage control/corrective action;

- o First aid and rescue;
- o Transmission of emergency information and instructions.

8.1.1.3 Training for Emergency Preparedness Staff

Training for personnel responsible for the Callaway Plant's emergency planning effort is provided by participation in industry, NRC, INPO, and FEMA sponsored emergency planning seminars and workshops.

Emergency Preparedness staff also receive training necessary for unescorted access to the Plant and training necessary to perform emergency planning functions as assigned by the Superintendent, Protective Services.

8.1.2 RERP TRAINING FOR OFF-SITE PERSONNEL (COMN 42722)

Off-site RERP training is the responsibility of the Missouri State Emergency Management Agency (SEMA) in conjunction with the Department of Health and local county agencies. The Callaway Plant provides support to these agencies as requested.

Initial and follow-up training of State and local personnel who implement radiological emergency response plans is provided. The training is designed to enhance comprehension of the plans and procedures, and to orient personnel to their specific emergency response function.

In addition, those emergency response personnel who will conduct activities within the Plume Exposure Pathway (EPZ) receive training on radiological exposure control to include dosimetry, management of total dose through exposure time limitations, reading and recording of personnel dose data, and the use of radioprotective drugs.

Training for off-site fire fighting personnel includes radiological hazards which may be encountered while fighting fires in the Plume Exposure Pathway.

Personnel who receive training include the following:

- o Directors or coordinators and staff of the emergency response organizations;
- o Law enforcement, security, and fire fighting personnel;
- o First aid and rescue personnel;
- o Off-site emergency preparedness personnel;
- o Medical support personnel;
- o Communications personnel.

For those local support services who may enter the site, Callaway Plant provides training which includes site access procedures and the identity (by position and title) of the individual who requests the services.

8.1.3 NEWS MEDIA ORIENTATION

Orientation of the news media is aimed at acquainting them with the emergency plans and definitions, points of news media contact in emergencies, identification of Public Information personnel, basic Callaway Plant information, basic radiation information, and other matters of interest. This program is done on an annual basis.

8.1.4 PUBLIC INFORMATION PROGRAM

Callaway Plant has developed a Public Information Program to adequately inform those individuals located within the Plume Exposure Pathway EPZ.

A variety of public information materials have been developed and distributed to appropriate locations throughout the EPZ. These materials have been prepared through a joint effort with State and local authorities and are updated as appropriate. These materials may include:

- Public information materials distributed to each residence within the EPZ and placed in locations frequented by transient populations;
- Information placed in high visibility publications such as local newspapers;
- Informational signs posted in areas frequented by transient populations such as the Reform Wildlife Management Area and Missouri River Accesses;
- Information booklets distributed with Tone Alert Radios.

At least annually, Callaway Plant, in conjunction with State and local authorities, reviews and updates the public information material and distributes it to individuals residing in the Plume Exposure Pathway EPZ.

8.2 DRILLS AND EXERCISES

Drills are supervised instruction periods aimed at testing, developing, and improving emergency response skills. Periodic drills are conducted at the Callaway Plant to evaluate emergency response capabilities and test specific aspects of emergency plans, implementing procedures and equipment. Evaluations of these drills are conducted and deficiencies identified and corrected. Some drills are scheduled while others are unannounced. Drills are also held under varying weather conditions.

Exercises test the integrated capability of the Emergency Response Organization as well as a major portion of the basic elements of the RERP. Exercises involving the Callaway Plant Emergency Response Organization, the State, and local jurisdictions within the Plume Exposure Pathway will be conducted biennially in accordance with NRC and

FEMA guidelines. Off-year functional drills are conducted between biennial exercises. Off-site responders are invited to participate in off-year functional drills. The drill and exercise scenarios are varied from year to year such that all major elements of the RERP and the preparedness of the Emergency Response Organization are tested within a six (6) year period. If the exercise includes State and local participation, plans for mobilization of personnel and resources adequate to verify their capability are coordinated with appropriate State and local authorities. Periodically, arrangements will be made for federal agencies to participate in exercises. Provisions are also made to start an unannounced drill or exercise between 6:00 p.m. and 4:00 a.m., once every six (6) years.

Each year, the following objectives will be met by the radiological emergency response drills and/or biennial exercise:

- o Demonstrate the ability to perform accident detection and assessment;
- o Demonstrate the ability to classify an emergency;
- o Demonstrate the ability to notify on-site and off-site emergency response personnel;
- o Demonstrate primary communications between the Plant, its various facilities and other emergency response organizations;
- o Demonstrate emergency radiological controls;
- o Demonstrate the ability to make Protective Action Recommendations to off-site authorities;
- o Demonstrate the ability to augment emergency response organizations;
- o Demonstrate the ability to staff the On-Shift Emergency Response Organization.

The scenarios for use in exercises and selected drills include, but are not limited to, the following:

- o Basic objectives, guidelines, and evaluation criteria;
- o Participating organizations, date, time, and places;
- o A sequence of real and simulated events, and associated parameters and data;
- o A narrative summary describing the conduct of the exercises or drills to include such things as: simulated casualties, rescue of personnel, use of protective clothing, and deployment of radiological monitoring teams;
- o A description of the advance arrangements for materials to be provided to observers, controllers, and evaluators.

Drill and exercise scenarios are written to allow a certain amount of free play and decision making. Controllers are instructed at pre-drill or exercise briefings as to which portions of the scenario permit free play and which portions require control. One person is assigned as the Lead Controller and is responsible for overall drill or exercise control. The drill or exercise controllers should possess the necessary technical expertise to adequately control their respective functional areas. All drills and exercises are conducted and documented in accordance with the implementing procedure for drills and exercises or the Plant Preventative Maintenance and Surveillance Programs.

Evaluators from the NRC and FEMA will be invited to evaluate and critique the exercises. A critique is scheduled at the conclusion of the exercise to evaluate the ability of organizations to respond as called for in the RERP. Formal evaluations are based on these critiques, including incorporation of participants' comments. Weak areas are noted, and corrective actions, including RERP and procedural changes and/or remedials, are initiated by the Superintendent, Protective Services, or his designee.

8.2.1 COMMUNICATIONS DRILLS

Communications drills are tests performed and evaluated in accordance with the Plant Preventative Maintenance and Surveillance Programs. Communications with Federal, State and local governments will be tested monthly. Once a quarter, this will be done transmitting a simulated emergency notification to ensure the content of the message is understood. Field monitoring team communications are tested annually from the EOF and Backup EOF. These tests are done from different sectors in the field and also include the aspect of understanding message content.

8.2.2 MEDICAL EMERGENCY DRILL

A medical emergency drill involving a simulated contaminated individual, and providing for periodic participation by the local support service agencies (i.e., ambulance and off-site medical treatment facility) is conducted annually. The medical drill may be performed as part of the biennial exercise.

8.2.3 RADIOLOGICAL MONITORING DRILLS

Plant environs and radiological monitoring drills (on and off-site) are conducted annually. These drills include collection and analysis of all sample media (e.g., water, vegetation, soil, and air) and provisions for communications and record keeping. Guidance is provided in the Plant's surveillance program.

8.2.4 HEALTH PHYSICS DRILLS

Health Physics related drills which involve response to, and analysis of simulated elevated airborne and liquid samples and direct radiation measurements in the environment are conducted semi-annually.

8.2.5 FIRE DRILLS

Fire drills are conducted in accordance with the Fire Protection Program.

8.3 REVIEW AND UPDATING OF THE RERP AND EIPS (COMN 3924)

The Emergency Preparedness staff has responsibility for the development and updating of the RERP and its EIPs.

Revisions to the RERP and associated EIPs are accomplished and distributed to appropriate organizations, agencies, and individuals in accordance with Plant procedures. Also, changes made to the RERP and EIPs are marked or documented to indicate the sections or areas changed in accordance with appropriate Plant procedures. The Manager, Callaway Plant, reviews and approves changes and modifications to the RERP and its EIPs.

Telephone numbers in the EIPs will be reviewed quarterly to ensure notifications, communications, and callout of emergency response personnel can be effectively facilitated.

The Superintendent, Protective Services is responsible for assuring that the RERP and letters of agreement/purchase orders in the RERP are reviewed annually. The RERP and the letters of agreement are updated periodically, as needed, to maintain these documents in current condition.

The Superintendent, Protective Services, or designee, ensures through letters, meetings, seminars, or other means available, that all elements of the total emergency response organization are informed of the RERP, the associated EIPs, and revisions thereto.

8.4 REVIEW AND UPDATING OF THE EMERGENCY PREPAREDNESS PROGRAM (COMN 2681)

Problems, deficiencies, and areas needing improvement may be identified in a number of ways. These include but are not limited to: drills and exercises, regulatory changes, self assessment, technical review, individual staff use or review, evaluations and tests, training, etc. The Superintendent, Protective Services, or a designee, is responsible for evaluating these comments and recommendations. Any deficiencies, recommendations, or improvement items are tracked to ensure a satisfactory resolution in accordance with appropriate Plant administrative procedures.

The Nuclear Safety Review Board (NSRB) is responsible for providing an independent review of the emergency preparedness program at least every 12 months by persons who have no direct responsibility for implementation of the emergency preparedness program. The review includes an evaluation for adequacy of:

- o Interfaces with State and local governments;
- o Drills and exercises;

- o Emergency response capabilities;
- o EIPs.

The results of the reviews along with recommendations for improvements are documented, reported to corporate and Plant management, and retained for a period of at least five (5) years. The portion of the review involving the evaluation for adequacy of interfaces with State and local governments is made available to the appropriate State and local governments. The Emergency Action Levels (EAL)s are reviewed annually with off-site officials to renew familiarity and discuss questions.

8.5 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT AND SUPPLIES

To ensure the operational readiness of emergency supplies and equipment, Plant personnel conduct inspections of emergency equipment and supplies designated for emergency use in accordance with the Plant Preventive Maintenance and Surveillance Programs.

8.6 EMERGENCY PREPAREDNESS (EP) ORGANIZATION

The EP Organization is responsible for development, implementation, and maintenance of the Radiological Emergency Response Program. This organization, under the direction of the Superintendent, Protective Services, has the responsibility and authority to ensure that Callaway Plant is prepared to handle a radiological emergency.

8.6.1 ORGANIZATION

The Emergency Preparedness Organization consists of Superintendent, Protective Services and supporting staff. A brief summary of responsibilities of the EP staff is enumerated in the following sub sections. Members of the EP staff have the authority to perform the duties and responsibilities to which they are assigned.

8.6.1.1 Superintendent, Protective Services (COMN 42505)

The responsibilities of the Superintendent, Protective Services include:

- o Overall responsibility for the Radiological Emergency Response Plan and Emergency Plan Implementing Procedures;
- o Ensuring coordination of emergency response plans and activities between Callaway Plant, State, and local agencies;
- o Ensuring that Plant staff receive training for handling radiological emergencies;
- o Ensuring development and implementation of a Drill and Exercise Program;
- o Ensuring arrangement, administration, and maintenance of Emergency Response Facilities and emergency response equipment;

- o Ensuring development and implementation of the Public Alert System Maintenance Program;

- o Representing Callaway Plant before NRC, FEMA, State, and local agencies in matters related to emergency preparedness.

8.6.1.2 Emergency Preparedness Staff

The Emergency Preparedness staff reports to the Superintendent, Protective Services, and is generally responsible for planning and administering emergency planning activities. These responsibilities include:

- o Review and update of the RERP and EIPs, ensuring that information and data in the RERP and EIPs are consistent with each other and with federal regulations and guidelines;

- o Coordination of activities and emergency response plans between Callaway Plant, State, and local agencies;

- o Coordination of radiological emergency response drills and exercises;

- o Maintenance of Emergency Response Facilities and emergency response equipment;

- o Coordination of Public Information activities related to Emergency Preparedness;

- o Coordination of maintenance activities affecting the Public Alert System.

The EP staff consists of Callaway Plant employees knowledgeable in emergency planning regulations, Plant operations, health physics, and/or other related disciplines.

CHAPTER 9.0

RECOVERY

In any emergency situation the immediate concern is to limit the consequences of the incident such that the health and safety of the public, Plant personnel, and protection of equipment and property is afforded. Once the proper actions have been taken and control of the situation is established, emergency activities may shift to recovery activities. Recovery activities are directed to safely restore the Plant as nearly as possible to its pre-emergency condition.

This chapter establishes criteria to be utilized for determining when to enter into a recovery phase and provides guidance for establishing a recovery organization and directing recovery operations.

9.1 TRANSITION FROM EMERGENCY OPERATIONS TO RECOVERY OPERATIONS

Certain conditions must be evident prior to shifting from emergency operations to recovery operations. A recovery organization can be established when Plant conditions are stable and no longer present a potential or actual hazard to the general public, and damage to the Plant has been substantially reduced. The Emergency Coordinator informs the Recovery Manager when the conditions are such that recovery can be declared. The Emergency Coordinator or Recovery Manager notifies the NRC of the intent to declare recovery prior to declaration, if possible. The following criteria sets guidelines for determining when recovery is to be declared and a recovery organization (if necessary) put into effect:

- In-plant radiation levels are stable or decreasing with time, and
- The reactor is stable with adequate core cooling capability, and
- Releases of radioactive materials to the environment are controlled and within radioactive effluent controls limits, and
- Fire, natural events, security threats, or similar emergency conditions are under control and Plant effects assessed.

The Recovery Manager evaluates the Emergency Coordinator's recommendation that transition into recovery operations begin. When the Recovery Manager concurs that recovery operations are to commence, the Recovery Manager ensures that the Emergency Coordinator notifies the On-site Emergency Response Organization that recovery has been declared. The Recovery Manager also ensures that the EOF Emergency Response Organization and off-site authorities are informed of recovery declaration.

The Emergency Coordinator and Recovery Manager determine the staffing requirements necessary to support recovery operations at the Plant. Once the requirements have been determined, the emergency organizations are modified appropriately to meet the need. The duties and responsibilities of the individuals who transferred into the Recovery Organization remain similar to those they had in the Emergency Response Organization. Some modifications may have to be made as required by recovery operations. The Recovery Manager determines the availability of any additional resources requested by off-site authorities to support off-site recovery activities. The Emergency Coordinator and Recovery Manager will ensure that on-site and off-site organizations are informed of recovery activities.

Emergency Plan Implementing Procedures, provide guidance for establishing and directing the Recovery Organization. These procedures may be used as issued or modified to meet the recovery needs. Additional procedures may also be developed as necessary to cover a particular recovery need.

Once the Recovery Organization is established, "key members" of the organization direct the recovery efforts necessary to restore the Plant to its pre-emergency condition.

If the Normal Plant Organization is capable of handling minor recovery activities, the Manager, Callaway Plant, or his designee, may assume the responsibilities of the Recovery Manager for recovery operations.

9.2 RECOVERY ORGANIZATION

When emergency and post-accident conditions indicate that recovery efforts are complicated or long-term, Callaway Plant will shift from Emergency Response Organization response to a long-term Recovery Organization. A suggested basic structure for a long-term Recovery Organization is shown in Figure 9-1; however, the specific make-up of the Recovery Organization is dependent on the nature, scope, and magnitude of recovery efforts necessitated by the emergency. Key recovery management responsibilities that may be considered are discussed in the following subsections.

9.2.1 RECOVERY MANAGER (RM)

The Recovery Manager has overall control of recovery activities and directs recovery operations and would be vested with the authority to commit resources as necessary to support recovery efforts. The RM would coordinate the recovery with the Manager, Callaway Plant and off-site organizations and utilize input from these entities.

9.2.2 OPERATIONS COORDINATOR

The Operations Coordinator would report to the Recovery Manager and be responsible for day-to-day Plant operations. The Operations Coordinator would coordinate recovery operations within the Plant to ensure that modifications and repairs are performed in a safe and competent manner. Requirements for reentry into affected and evacuated areas of the Plant during recovery would be established by the Operations Coordinator and evaluated and approved by the Recovery Manager.

9.2.3 ENGINEERING COORDINATOR

The Engineering Coordinator would report to the Recovery Manager and be responsible for providing and coordinating technical support to operations and recovery activities. This support includes core physics, thermal hydraulics, design activities, procedure development and also ensuring that specifications for procurement of materials and equipment are met.

9.2.4 WORK CONTROL COORDINATOR

The Work Control Coordinator would report to the Recovery Manager and be responsible for normal and outage planning and scheduling activities to support recovery.

9.2.5 LICENSING AND FUELS COORDINATOR

The Licensing and Fuels Coordinator would report to the Recovery Manager and be responsible for providing licensing and technical support to the recovery effort in areas of reactor systems and fuel related concerns. The Licensing & Fuels Coordinator would also be the liaison between Callaway Plant and the NSSS supplier, A/E, and other contractors.

9.2.6 RADIOLOGICAL ASSESSMENT COORDINATOR

The Radiological Assessment Coordinator would report to the Recovery Manager and be responsible for coordinating activities involving Plant personnel or equipment, assisting the State Department of Health (DOH) in estimating and assessing total population exposure calculations, and coordinating off-site sampling and analysis.

9.2.7 ADMINISTRATIVE SERVICES COORDINATOR

The Administrative Services Coordinator would report to the Recovery Manager and be responsible for ensuring that administrative, logistical, and personnel support is available to support recovery operations.

9.2.8 PUBLIC INFORMATION

A Public Information Coordinator will be appointed by Corporate Communications to assist the Recovery Manager and the recovery effort. The position need not be physically located at the plant site.

9.2.9 ADDITIONAL SUPPORT

Additional support would include assistance from organizations external to Callaway Plant as well as other functions.

Additional support would be available to the Recovery Manager from firms such as the Wolf Creek Nuclear Operations Corporation, the Institute of Nuclear Power Operations, and others as deemed necessary. Prearranged agreements with various organizations are on file as Letters of Agreement.

Additional support can be provided by various Company organizations as necessary. This would be provided in a manner similar to normal operations, with the exception that other company management would be advised of the potential need for support during the early phase of a serious emergency. This gives these organizations additional preparatory time to support the recovery effort.

9.3 OBJECTIVES OF THE RECOVERY ORGANIZATION

During the initial stages of recovery, the organization would be prepared for 24-hour per day operations. As recovery activities progress, recovery operations may be geared to long-term concerns and 24-hour per day operations may not be required.

9.3.1 SHORT-TERM OBJECTIVES

Initially, the Recovery Organization would focus on the following short-term objectives:

- o Maintaining the Plant in a safe and stable condition;
- o Maintaining control of the release of radioactive material to the environment;
- o Maintaining control of personnel exposures;
- o Maintaining adequate communication with federal, State and local agencies;
- o Maintaining adequate capability to provide timely and factual information to the general public.

9.3.2 LONG-TERM OBJECTIVES

After the short-term objectives are addressed by the Recovery Organization, the long-term objectives would focus on:

- o Restoring the Plant to its pre-emergency condition;
- o Providing for the storage and/or disposal of waste material generated during the emergency and recovery phases;

- o Evaluating the cause of the emergency, response to the emergency, and potential effects on future Plant operations.

9.4 CONCEPT OF OPERATIONS

Administrative controls imposed on normal operations would be maintained during the recovery phase as conditions allow. Procedures would be generated for each specific operation and maintenance evolution and would be reviewed for nuclear safety concerns, personnel safety, and environmental impact by the Onsite Review Committee.

9.5 REENTRY

If an evacuation of personnel from any portion of the Plant is ordered during an emergency, reentry to the affected area(s) will be controlled utilizing pre-established guidance. In the event radiological conditions prevent normal access to areas, personnel will be informed of necessary equipment and pertinent information to ensure personnel safety and limit personnel exposure. If extensive training is required prior to reentry, personnel will receive formal training. This training could include: respiratory protection, ALARA, posting of areas, dosimetry, industrial safety, etc.

In the event that the general public was evacuated during the emergency, the Recovery Organization would assist the Department of Health (DOH) in the decisions to expand or relax Protective Action Recommendations.

The Manager, Callaway Plant, or Emergency Coordinator establishes requirements for reentry into affected and evacuated areas of the Plant prior to allowing personnel access. The Recovery Manager evaluates and approves the requirements prior to allowing reentry of personnel to those Plant areas.

9.6 EXPOSURE CONTROL

During recovery, available information will be used to pre-plan work activities to ensure that the ALARA concept is achieved. Exposure to personnel will be documented in accordance with Health Physics procedures.

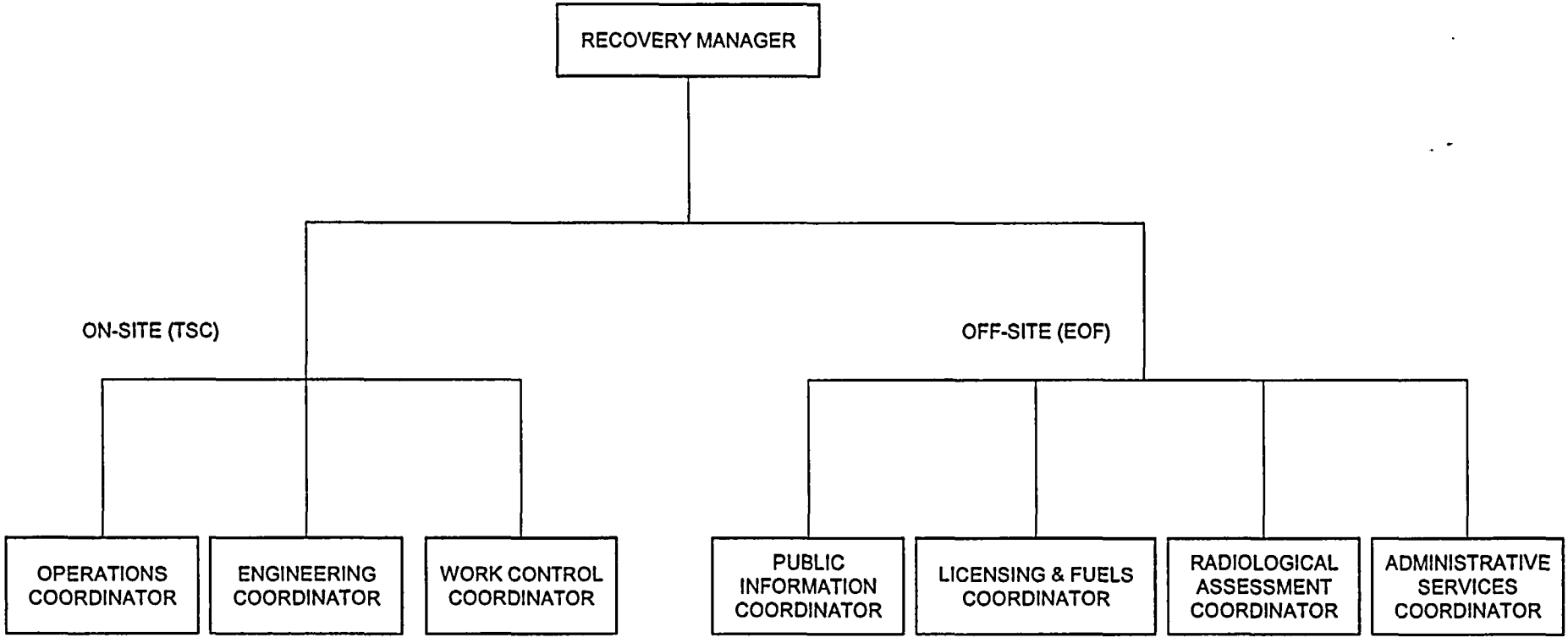
During recovery operations, the Plant will assist the State Department of Health in estimating and assessing total population exposure when releases of radioactive materials have occurred.

9.7 RESTORATION

The last element of a recovery program is restorative operations. The overall purpose of restoration is to prepare for resumption of full power operations. This facet of recovery would include a detailed investigation of the accident causes and consequences both to the Plant and the environment. Determinations would be made of the repair work required to perform necessary modifications to Plant equipment and/or procedures. Repair work and approved modifications would be carried out under appropriate authorizations. Tests would be performed to confirm that affected Plant systems are operable and acceptable for return to service.

FIGURE 9-1

SUGGESTED
RECOVERY ORGANIZATION



APPENDIX A

NUREG-0654/CALLAWAY PLANT RADIOLOGICAL EMERGENCY RESPONSE PLAN CROSS-REFERENCE

NUREG-0654 REFERENCE		RERP REFERENCE
A.	Assignment of Responsibility (Organization Control)	
	1.a	5.3
	1.b	5.0 - 5.3
	1.c	Figure 5-3
	1.d	5.1, 5.1.1, 5.2.1, 5.3.1
	1.e	6.3 - 6.3.3.3
	2.a	N/A
	2.b	N/A
	3	5.3, Appendix C
	4	5.0 - 5.2

NUREG-0654 REFERENCE		RERP REFERENCE
B.	On-site Emergency Response Organization	
	1	5.1 - 5.1.11.4, 5.2 - 5.2.8.2, Table 5-1, Figures 5-1 and 5-2
	2	5.1, 5.2.1
	3	5.1, 5.1.1, 5.2.1, 5.2.2.1
	4	5.2.1
	5	5.1, 5.2, 5.3, Tables 5-1, 5-2, and 5-3
	6	Figure 5-3
	7.a	5.2.8, 5.2.11
	7.b	5.2.4, 5.2.10, 9.2.3
	7.c	5.2.9, 5.2.10.1, 5.2.12.1
	7.d	5.2.13
	8	5.3.1, Appendix C
	9	5.5.2.3, Appendix C

NUREG-0654 REFERENCE		RERP REFERENCE
C.	Emergency Response Support and Resources	
	1.a	Appendix B
	1.b	5.3.2.1
	1.c	5.3.2.1
	2.a	N/A
	2.b	5.3.2.3
	3	5.3.2.1.2, 5.3.2.1.7, 5.3.2.2.2, 7.3.1.7, 7.3.1.8, 7.3.1.9.2.1, 7.3.2, Appendix C
	4	5.0 - 5.3, Appendix C
D.	Emergency Classification System	
	1	Tables 4-1 and 4-2
	2	4.1, 4.2, Table 4-1
	3	N/A
	4	N/A

NUREG-0654 REFERENCE		RERP REFERENCE
E.	Notification Methods and Procedures	
	1	6.3
	2	6.3, 6.4
	3	6.3
	4	Section 6.3, Figures 6-2 and 6-3
	4.a-n	6.3
	5	N/A
	6	6.3.3, 6.7.2.1, Appendix H
	7	6.7.2.2
F.	Emergency Communications	
	1.a	6.3.3.1, 6.3.3.2, 6.3.3.3, 7.2.4, 7.2.5 7.2.7
	1.b	6.3.3.1, 6.3.3.2, 6.3.3.3, 7.2.4, 7.2.5, 7.2.7
	1.c	6.3.2, 7.2.8
	1.d	7.2.2 - 7.2.7
	1.e	5.2, 5.3, 5.4, 6.4, 6.7.1.1
	1.f	5.1.10, 5.2.6, 7.2.8
	2	5.5.2.3, 7.2.5
	3	8.2.1

NUREG-0654 REFERENCE		RERP REFERENCE
G.	Public Education and Information	
	1	8.1.4
	2	8.1.4
	3.a	6.9, 7.1.5, 7.1.8
	3.b	7.1.3
	4.a	5.4.1
	4.b	5.4, 6.9
	4.c	6.9.2
	5	8.1.3
H.	Emergency Facilities and Equipment	
	1	7.1.2
	2	7.1.3
	3	N/A
	4	5.2, 5.3, 5.4, 6.4
	5	Tables 4-1 and 4-2
	5.a	7.3.1.1.1, 7.3.1.1.2
	5.b	7.3.1.2, 7.3.1.3, 7.3.1.4, 7.3.1.5
	5.c	Table 4-2, 7.3.1.6, 7.3.1.10, 7.3.1.11
	5.d	7.3.1.13
	6.a	7.3.1.1.1, 7.3.1.1.2

NUREG-0654 REFERENCE		RERP REFERENCE
H.	6.b	6.5.2, 7.3.1.3, 7.3.1.4, 7.3.1.5, 7.3.2
	6.c	7.3.1.7
	7	6.5.2.1, 7.3.2
	8	7.3.1.1.1
	9	7.1.2
	10	8.5
	11	6.7.3
	12	6.5.2.1
I.	Accident Assessment	
	1	Tables 4-1 and 4-2, 7.3
	2	6.5.1, 6.5.2, 7.3.1.2, 7.3.1.8, 7.3.1.9, 7.3.1.10, 7.3.1.11
	3.a	6.5.2.1, 7.3.1.9.2.1
	3.b	6.5.2.1, 7.3.1.2.1, 7.3.1.9.2.1
	4	Table 4-1, 6.5.2.1, 7.3.1.9.2.1
	5	7.3.1.1.1, 7.3.1.9.2.1
	6	6.5.2.1
	7	5.3.2.5, 5.3.2.6, 6.5.2.1, 7.3.1.3.1, 7.3.1.3.2, 7.3.2
	8	5.2.3.5, 5.3.2.6, 6.5.2.1, Table 5-2
I.	9	6.5.2.1, 6.7.3

NUREG-0654 REFERENCE		RERP REFERENCE
	10	6.5.2.1, Tables 6-2, 6-3, and 6-4
	11	N/A
J.	Protective Response	
	1.a	6.7.1.1, 6.7.1.2, 6.7.1.5, 7.2.1, 7.2.1.1
	1.b	6.7.1.1, 6.7.1.2, 6.7.1.5, 7.2.1, 7.2.1.1
	1.c	6.7.1.1, 6.7.1.2, 6.7.1.5, 7.2.1, 7.2.1.1
	1.d	6.7.1.1, 6.7.1.5, 6.7.2.1, 7.2.1, 7.2.1.1
	2	6.7.1.4
	3	6.7.1.4, 6.7.1.6
	4	6.7.1.4, 6.7.1.6
	5	6.7.1.2 - 6.7.1.5
	6.a	6.7.3, 6.7.3.1
	6.b	6.7.3.2
	6.c	6.7.3.4
	7	6.5.2.1, 6.7.2.2
	8	Appendix G
	9	N/A
	10.a	6.7.2.2, Figure 6-1, Appendix G
	10.b	Appendix G and H
	10.c	6.7.2.1, Appendix H
J.	10.d	N/A

NUREG-0654 REFERENCE		RERP REFERENCE
	10.e	N/A
	10.f	N/A
	10.g	N/A
	10.h	N/A
	10.i	N/A
	10.j	N/A
	10.k	N/A
	10.l	N/A
	10.m	6.7.2.2, Appendix G
	11	N/A
	12	N/A
K.	Radiological Exposure Control	
	1.a	6.8.1, 6.8.2
	1.b	6.8.1
	1.c	6.8.1
	1.d	6.8.1, 6.8.2
	1.e	6.7.4.1, 6.8.1, 6.8.2
	1.f	5.4.3.1, 6.8.1, 6.8.2
	1.g	6.8.2, 6.8.4
	2	5.2.1, 5.3.1, 6.8.1
	3.a	6.7.3.3, 6.8.1, 7.3.1.4
K.	3.b	6.8.1

NUREG-0654 REFERENCE		RERP REFERENCE
	4	N/A
	5.a	6.7.4.1
	5.b	6.7.1.6, 6.7.3, 6.7.4.1, 6.8.2
	6.a	6.7.4.1
	6.b	6.7.4.1
	6.c	6.5.3, 6.7.4.1, 9.5
	7	6.7.1.6, 6.7.3.2, 6.7.4.1, 6.8.2, 7.5
L.	Medical and Public Health Support	
	1	5.5.2.3, 6.8.2 - 6.8.4, Appendix C
	2	6.8.2, 7.6
	3	N/A
	4	5.5.2.3, Appendix C
M.	Recovery and Reentry Planning and Post-Accident Operations	
	1	9.1, 9.5
	2	9.2
	3	9.1
	4	9.6

NUREG-0654 REFERENCE		RERP REFERENCE
N.	Exercises and Drills	
	1.a	8.2
	1.b	8.2
	2.a	8.2.1
	2.b	8.2.5
	2.c	8.2.2
	2.d	8.2.3
	2.e(1)	8.2.4
	2.e(2)	8.2.4
	3.a	8.2
	3.b	8.2
	3.c	8.2
	3.d	8.2
	3.e	8.2
	3.f	8.2
	4	8.2
	5	8.2
O.	Radiological Emergency Response Training	
	1	8.1 - 8.1.4
	1.a	8.1.2
	1.b	N/A
	2	8.1.1, 8.2
	3	8.1.1, 8.1.1.2

	NUREG-0654 REFERENCE	RERP REFERENCE
O.	4.a	8.1, 8.1.1.2
	4.b	8.1.1.2
	4.c	8.1.1.2
	4.d	8.1.1.2, 8.1.2
	4.e	8.1.1.2
	4.f	8.1.1.2
	4.g	8.1.2
	4.h	8.1.2
	4.i	8.1.1.1, 8.1.1.2
	4.j	8.1.1.2
	5	8.1.1
P.	Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans	
	1	8.1.1.3
	2	8.0, 8.3, 8.6.1.1
	3	8.6, 8.6.1.2
	4	8.3, 8.4
	5	8.3
	6	2.3, Appendix I
	7	Appendix F
	8	Table of Contents, Appendix A
	9	8.4
	10	8.3

APPENDIX B

POLICY STATEMENT
SCOPE OF AUTHORITY AND RESPONSIBILITY OF
EMERGENCY COORDINATOR AND THE RECOVERY MANAGER

In the event of an emergency which requires the implementation of the Callaway Plant Radiological Emergency Response Plan (RERP), the Emergency Coordinator and Recovery Manager are authorized and have the responsibility to:

a. Evaluate, classify, and declare emergencies;

b. Activate and direct the Emergency Response Organization;

c. Direct that off-site authorities be notified;

d. Make protective action recommendations for the protection of the general public and site personnel; and

e. Request off-site assistance.

Additionally, until such time that the emergency is terminated or control is assumed by a superior corporate officer, the Emergency Coordinator and Recovery Manager are vested with the authority to commit AmerenUE resources which may be necessitated by an emergency situation. These resources include personnel, equipment and funds.

Authorization:

January 30, 2004
Date

Garry L. Randolph
Senior Vice-President and
Chief Nuclear Officer

APPENDIX C

LETTERS OF AGREEMENT

1. Callaway County Sheriff's Office, dated February 21, 2002.
2. Missouri State Highway Patrol, dated December 4, 2003.
3. Institute of Nuclear Power Operations, dated November 21, 2001.
4. Callaway Community Hospital, dated March 25, 2003.
5. Callaway County Ambulance District, dated December 2, 2003.
6. Emergency Mutual Assistance Agreement, Wolf Creek Nuclear Operating Corporation, dated April 13, 1993. (Verified April 3, 2003)
7. Westinghouse Electric Corporation, dated December 1, 1992. (The Emergency Response Plan was updated September 1999; Emergency Response Roster was updated June 13,2003.
8. Environmental, Inc. Midwest Laboratory (formerly Teledyne Isotopes Midwest Laboratory [TIML], dated May 1, 2002. Engineering Service Agreement N-36.
9. South Callaway Fire Protection District, dated March 14, 2003.
10. The Curators of the University of Missouri, dated January 1, 1994. (Verified December 2, 2003)
11. Radio Station KTXY, dated December 17, 2003.

APPENDIX F

LIST OF EMERGENCY PLAN IMPLEMENTING PROCEDURES (EIPS)

Procedure No.	Procedure Title	RERP Sections Implemented
EIP-ZZ-A0001	Emergency Response Organization	Chapter 5, 8.1.1
EIP-ZZ-A0020	Maintaining Emergency Preparedness	Chapter 8
EIP-ZZ-A0066	RERP Training Program	8.1, 8.1.1, 8.1.1.2
EIP-ZZ-C0010	Emergency Operations Facility Operations	5.2.9—5.2.12, 7.1.3
EIP-ZZ-PR020	Activation and Operation of the Joint Public Information Center	5.2.13, 6.9, 7.1.5
EIP-ZZ-SK001	Response to Security Events	Table 4-1, Group 3 EALs
EIP-ZZ-00101	Classification of Emergencies	Chapter 4, Table 4-1, 6.1, 6.2
EIP-ZZ-00102	Emergency Implementing Actions	5.1, 5.2, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8
EIP-ZZ-00200	Augmentation of the Emergency Organization	Chapter 5, 6.4, Tables 5-2
EIP-ZZ-00201	Notifications	5.1.10, 5.2.6, 5.3.2.3, 6.3, 6.7.2, 7.2.4, 7.2.5
EIP-ZZ-00211	Field Monitoring	5.2.5.2, 5.3.2.2.2, 6.5.2.1
EIP-ZZ-00212	Protective Action Recommendations	6.7.2, Tables 6-2, 6-3 6-4
EIP-ZZ-00213	Technical Assessment	5.1.1,5.1.2, 5.2.4, 6.5, 6.6

Procedure No.	Procedure Title	RERP Sections Implemented
EIP-ZZ-00217	Emergency Response Data System Activation	7.2.8.6
EIP-ZZ-00220	Emergency Team Formation	5.1.11
EIP-ZZ-00225	Reentry	9.5
EIP-ZZ-00226	Fire Response Procedure For Callaway Plant	5.1.11.1, 7.2.1.1, 7.3.1.13
EIP-ZZ-00230	Accountability	6.7.1.2
EIP-ZZ-00231	Response to Thunderstorm/High Winds/Tornado Watches and Warnings	
EIP-ZZ-00240	Technical Support Center Operations	5.2.3-5.2.8,, 7.1.2
EIP-ZZ-00260	Event Closeout/Plant Recovery	Chapter 9
EIP-ZZ-01211	Management Action Guides for Nuclear Emergencies (MAGNEM)	6.5.2
EIP-ZZ-03010	Hazardous Chemical/Oil Spill Response/Spill Cleanup Implementing Procedure	
EIP-ZZ-03010	APPENDIX A: Hazmat Locator	
EIP-ZZ-03010	APPENDIX B: Above Ground Oil Storage and Use Facilities	

NOTE: This is a sample list of procedures. The procedure number, title of any listed procedure, or the number of Emergency Plan Implementing Procedures, may be modified or revised based on revisions made to these procedures. Such modifications or revisions are reflected in the periodic updates to the RERP.

APPENDIX G

EVACUATION TIME ESTIMATE

FOR THE

CALLAWAY NUCLEAR PLANT

EMERGENCY PLANNING ZONE

JULY 2002

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1.0 INTRODUCTION

This report provides an estimate of time required to evacuate the population of the Plume Exposure Pathway Emergency Planning Zone (EPZ) surrounding the Callaway Nuclear Plant in Callaway County, Missouri. The guidance utilized in the preparation of this report is Appendix 4 of NUREG-0654, *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1.* Census data used in this document were extracted from the 2000 U.S. Census files.

1.1 SITE LOCATION

The Callaway Plant is located in Callaway County, Missouri, approximately 90 miles west of St. Louis, 25 miles northeast of Jefferson City, and 10 miles southeast of Fulton, as shown in Figure 1.

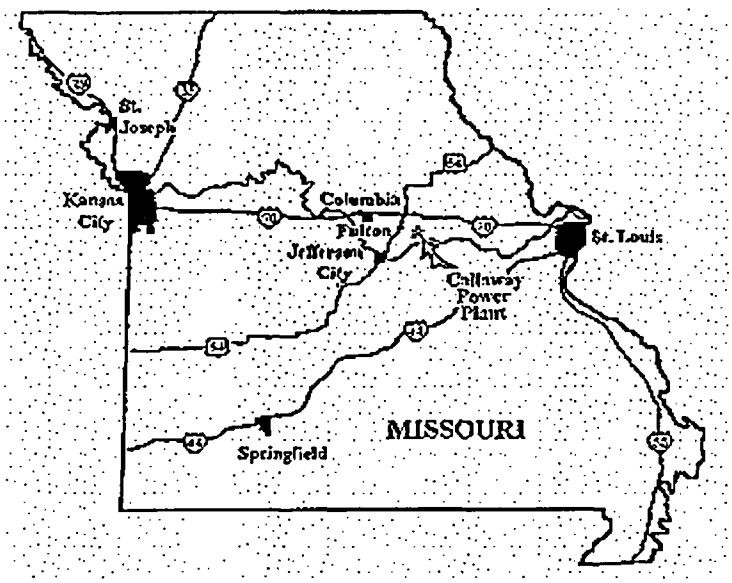


FIGURE 1
PLANT LOCATION

1.2 EMERGENCY PLANNING ZONE

Federal regulations establish an Emergency Planning Zone consisting of an area about 10 miles in radius, for the protection of populations from direct radiation exposure (the Plume Exposure Emergency Planning Zone). The area within the 10-mile radius of the Callaway Plant is predominantly rural. The City of Fulton is located approximately 10 miles northwest of the plant. Fulton has a population of 11,284 within the city limits and serves as the Callaway County Seat. Industry includes a large distribution warehouse, a firebrick plant, a potato chip company, farm implement manufacturers and other diversified businesses.

Fulton Public School District has five schools within the city. There is also one parochial school. Westminster College and William Woods University are located in Fulton, along with the Missouri School for the Deaf. Fulton is also the site of a State mental hospital and the Fulton Reception and Diagnostic Center (a State correctional facility). The institutionalized population averages 2,734. The institutionalized population will be sheltered in place at their respective facilities.

The highway system within approximately 10 miles of the Callaway Plant is typical of a rural area. The two major roadways are Interstate 70 (crossing the area approximately 10 miles north of the plant) and U.S. Highway 54 (approximately 10 miles west of the plant).

Other major physical features of the area include the Missouri River which flows from west to east approximately 5 miles south of the plant. One railroad line, the Union Pacific, is located immediately south of the river.

In light of these characteristics, an EPZ boundary (Figure 2) was established to:

- Follow roads for most of the boundary,
- Follow waterways and municipal boundary lines, and
- Follow straight lines through a sparsely populated area of Osage County.

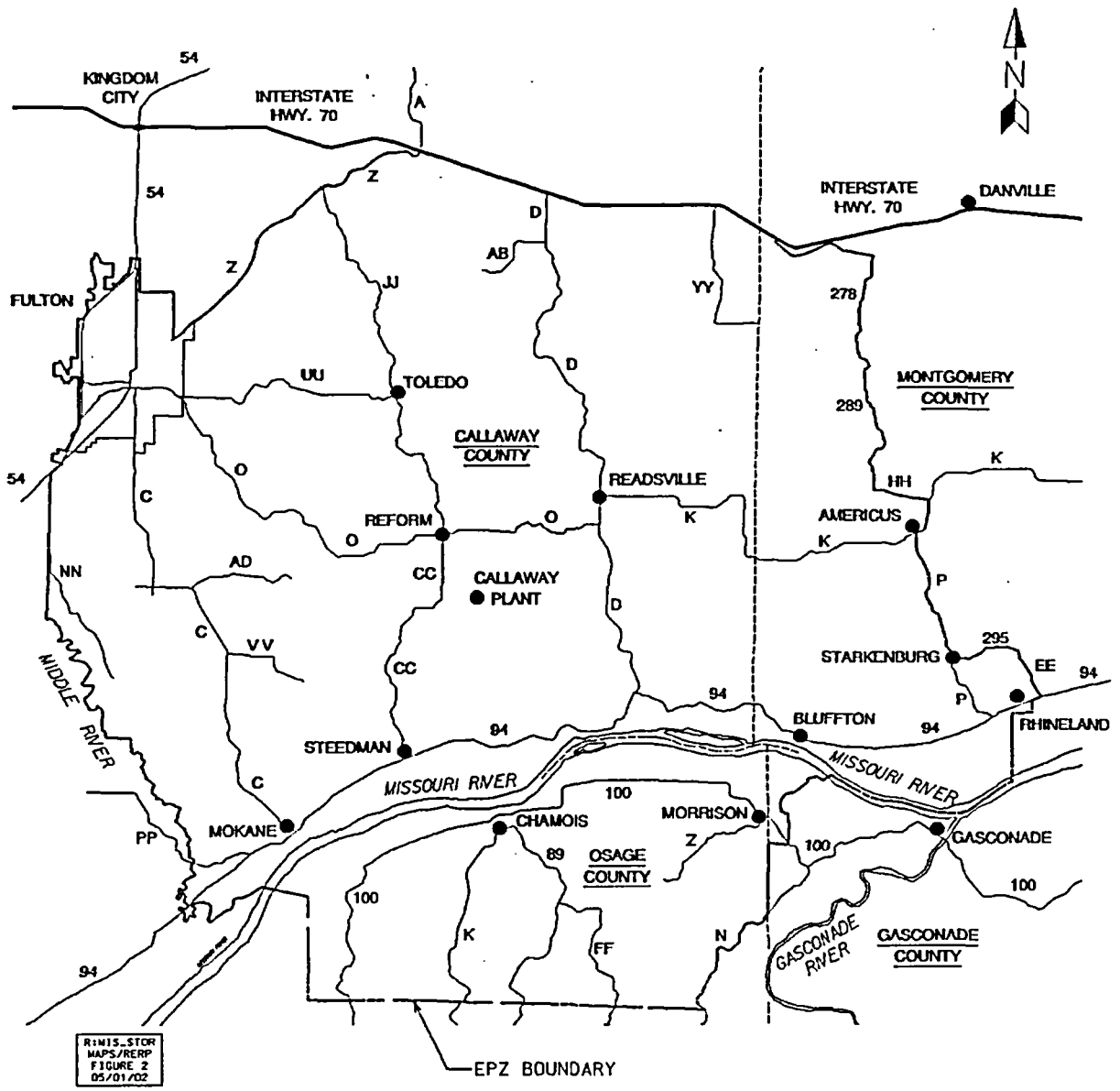


FIGURE 2
EPZ BOUNDARY

The resulting EPZ boundary encompasses an approximate 10-mile radius from the Callaway Plant. It extends an extra 5 miles in southern Montgomery County, and it also includes the City of Fulton because the 10-mile radius overlaps a small area within the southeast corner of the Fulton city limits.

The EPZ is divided into subareas whose boundaries mainly follow roads and political boundaries. These subareas are established so that the evacuation of a particular population segment can be done in the case that the entire EPZ is not evacuated. The EPZ and its subareas are shown in Figure 3.

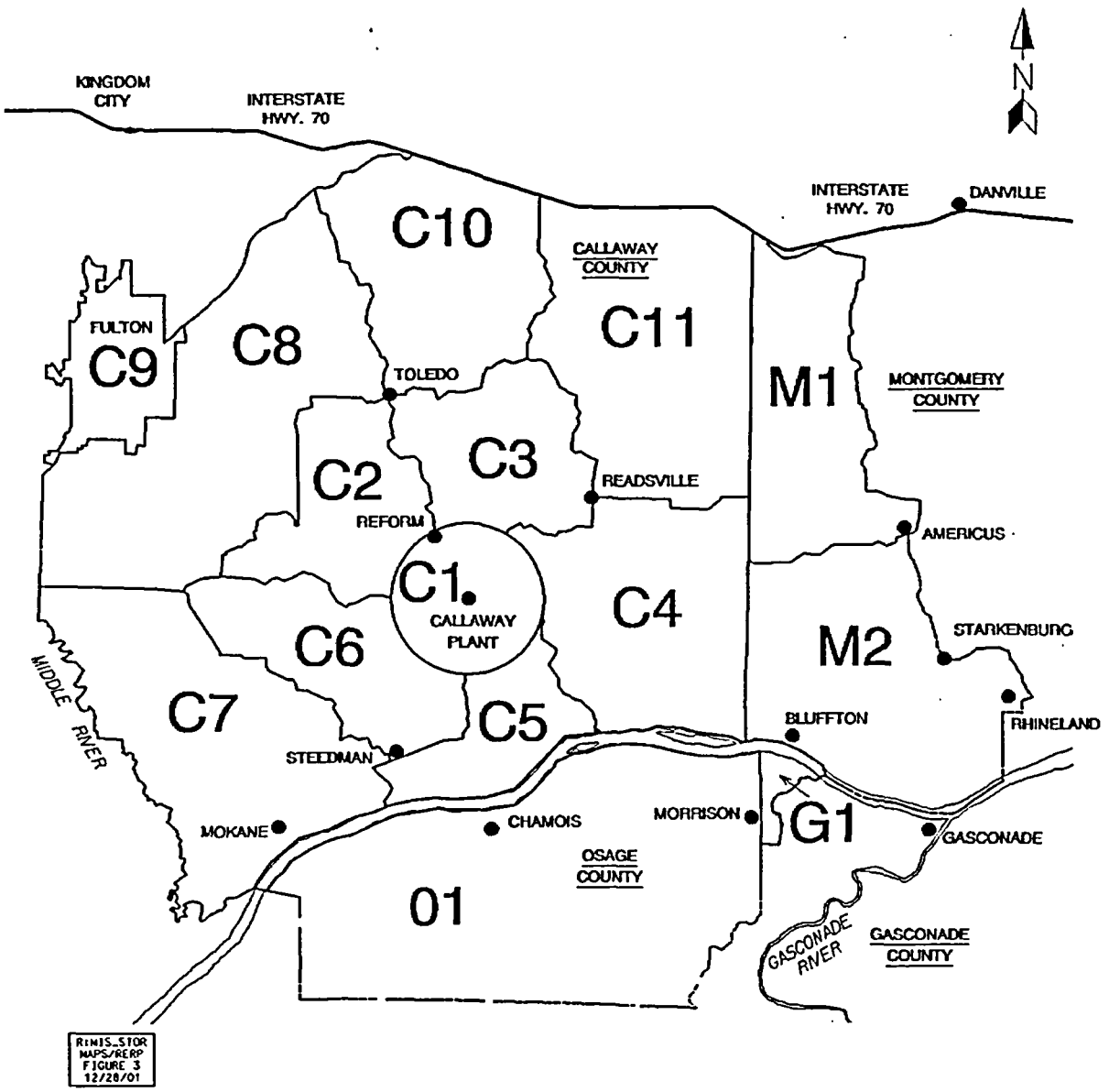


FIGURE 3
EPZ SUBAREAS

2.0 DEMAND ESTIMATION

In estimating the evacuation time for the Callaway EPZ, three population segments are considered: permanent residents, transients, and residents of special facilities.

2.1 PERMANENT RESIDENTS

Permanent residents include all people residing within the EPZ, but who are not in institutions. The permanent resident population to be evacuated is estimated using 2000 census data. The population distribution of the EPZ is broken down by county in Table 1.

TABLE 1

PERMANENT RESIDENT POPULATION IN THE EPZ

Jurisdiction	Total Population	Urban Population	Rural Population
Callaway County	17,207		5,735
Fulton		11,284	
Mokane		188	
Osage County	943		487
Chamois		456	
Gasconade County	123		0
Morrison		123	
Montgomery County	677		501
Rhineland	___	176	___
Total	18,950	12,227	6,723

This population can be further divided into two groups:

- Auto-owning- That part of the population which has an automobile available for evacuation from the EPZ.
- Non-auto-owning- That part of the population which does not have an auto available for evacuation from the EPZ and, therefore, must be transported by other means.

For purposes of evacuation, vehicles are associated with residences (housing units) rather than individuals, and are summarized in Table 4.

2.2 TRANSIENTS

Transients are all non-residents of the EPZ who are temporarily located within it. This category includes tourists and other groups that may visit the area. Table 2 is a compilation of the transient population in the EPZ.

TABLE 2

TRANSIENT POPULATION IN THE EPZ

Location	Population	Subarea
Wildwood Campground[2]	300	C3
Harmony Hill Youth Camp[2]	250	C2
Katy Trail State Park[4]	200	C7,C5,C4,M2
Callaway Plant[3]	340	C1
Reform Wildlife Management Area[2]	85	C1,C5,C6
Churchill Memorial[2]	82	C9
Amerihost Motel[1]	62	C9
Travelier Motel[1]	32	C9
Budget Host Westwoods Motel[1]	21	C9
76 Motel[1]	20	C9
Total	1,392	

[1] The transient population in motels is figured by assuming 2 people per room and a 50% occupancy factor.
[2] Estimates of peak transient population provided by the facility operators (summer).
[3] Non-essential personnel who may be evacuated from the site during an emergency.
[4] Katy Trail State Park peak trail use per day in the EPZ, Mokane east to McKittrick, based on trail counter data supplied by DNR(Mo).

2.3 SPECIAL FACILITY RESIDENTS

Special facility residents include those confined to institutions such as hospitals, nursing homes, schools, and jails. The location of these facilities are shown in Figure 4, and their residents are summarized in Table 3.

Not all special facility residents will be evacuated. The residents of schools, pre-schools, and day care facilities will evacuate while other special facilities such as nursing homes, hospitals, and jails will shelter according to their special facility plans.

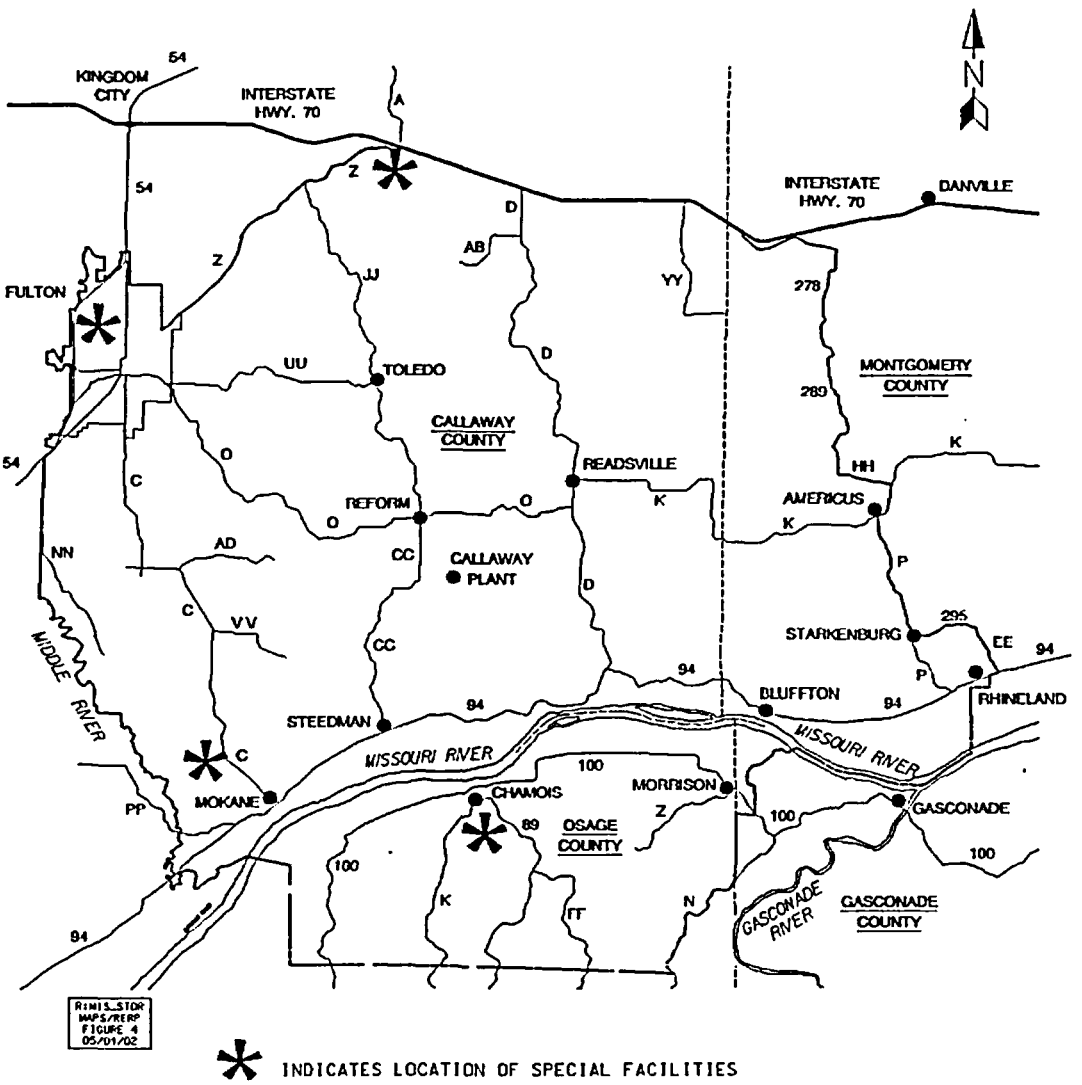


FIGURE 4
SPECIAL FACILITY LOCATIONS

TABLE 3
SPECIAL FACILITY POPULATION IN THE EPZ

School	Students & Staff	Subarea
Fulton Public Schools	2,727	C9
Fulton High School		
Fulton Middle School		
Fulton Elementary Schools		
Bartley		
Bush		
McIntire		
Osage R-I (Chamois)	287	O1
Callaway R-II (Mokane)	1,097	C7
St. Peter's Parochial School	174	C9
Missouri School for the Deaf	340	C9
Total	4,625	

Institution	Residents/ Patients	Staff	Total	Subarea
Reception & Diagnostic Center	1680	75	1755 (sheltering)	C9
Callaway Co Correctional Center	90	4	94 (sheltering)	C9
Fulton State Hospital	508	220	628 (sheltering)	C9
Callaway Memorial Hospital	53	50	103 (sheltering)	C9
Fulton Manor Care Center	52	20	72 (sheltering)	C9
Presbyterian Manor at Fulton	81	25	106 (sheltering)	C9
Riverview (Mokane)	60	30	90 (sheltering)	C7
Fulton Nursing and Rehabilitation	100	32	132 (sheltering)	C9
Missouri Girls Town[1]	49	14	63	C10,C9
Care A Lot Learning Center	49	7	56	C9
Fulton Preschool	15	2	17	C9
Growing Years Day Care Center	40	7	47	
Central Missouri HDC-CDC	20	5	26	C9
		Total	3188	
		Grand Total	7813	

[1] Missouri Girls Town has two campuses, one inside and one outside of the City of Fulton.

NOTES:

- All facilities are in Fulton unless otherwise noted.
- Staff populations include maximum staff normally present at any one time, but not second and third shifts.
- Student populations are also included in resident population figures elsewhere.
- These figures are based on facility population according to the most current special facility plans.

2.4 POPULATION AND VEHICLE ESTIMATES BY SUBAREA AND SECTOR

In the case of evacuating only part of the EPZ, evacuation time estimates are needed for each subarea. Consequently, the population of each subarea is needed. Figures 5, 6, and 7 show the population breakdown by subarea and Figures 5a, 6a, and 7a show the population breakdown by 22½° sectors at a distance of 2, 5, and 10 miles from the plant for the permanent residents, transients, and special facility residents, respectively.

The 2000 Census also indicates the number of available automobiles per housing unit in the four counties within the EPZ. These statistics were used to determine the number of housing units in the EPZ with 0, 1, 2, and 3 or more autos. The assumption was then made that if a housing unit had one auto, it would be used in an evacuation. If two were available, half of the families would use one and half would use two, yielding an average of 1.5 autos per housing unit. For those housing units with three or more autos available, it was assumed that an average of two would be used for an evacuation. By dividing the total number of cars to be used in an evacuation by the total number of housing units, it is found that an average of 1.25 cars per household will be used in an evacuation. Table 4 summarizes this set of data.

TABLE 4
PERMANENT RESIDENT VEHICLES

Available Autos	EPZ Housing Units	Average Autos Used in Evacuation	EPZ Autos Used in Evacuation
0	935	0.0	0
1	2,004	1.0	2,004
2	2,271	1.5	3,406
3 or more	1,469	2.0	2,938
	6,679		8,348

Autos Used per Housing Unit = 1.25

By using the following formula and the number of Autos Used per Housing Unit found in Table 4, the number of vehicles to be used in evacuating a given subarea or sector can be determined:

$V = N * Y$

V = number of vehicles
N = number of housing units in the subarea or sector being examined
Y = Autos Used per Housing Unit

Figures 8 through 10 show the distribution of vehicles to be used in an evacuation by 22½° sector for each of the three population segments. For the transient population, it was assumed there would be an average of 3 people per vehicle except for those transients lodging in motels and those working at the Callaway Plant, for whom an average of 2 people per vehicle was assumed. Thus, to determine the number of transient autos, the transient population was divided by 3 (or 2 when considering motel patrons and plant workers). Since the special facilities that evacuate will be using buses, the number of buses necessary was taken from the special facility plans.

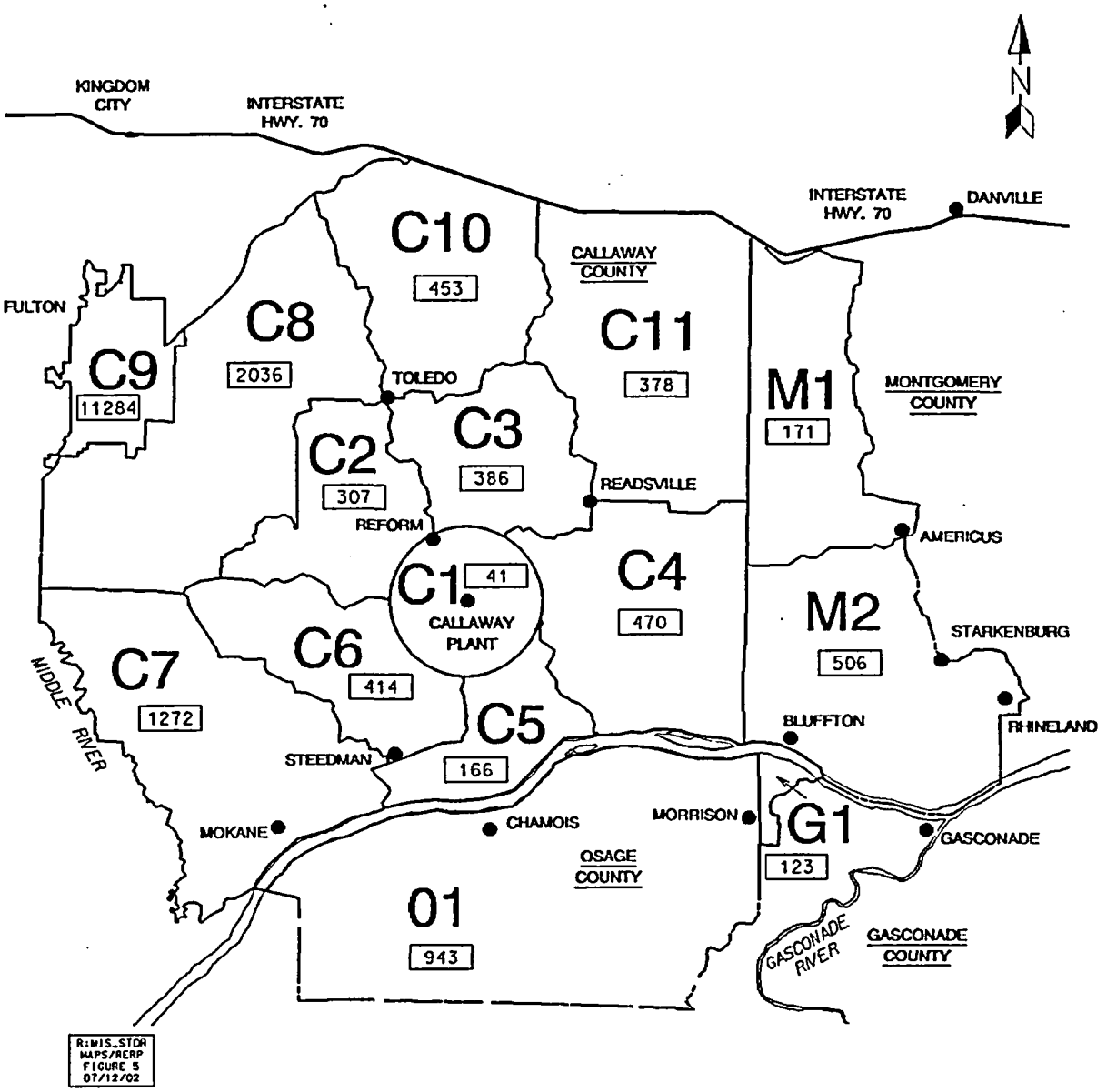
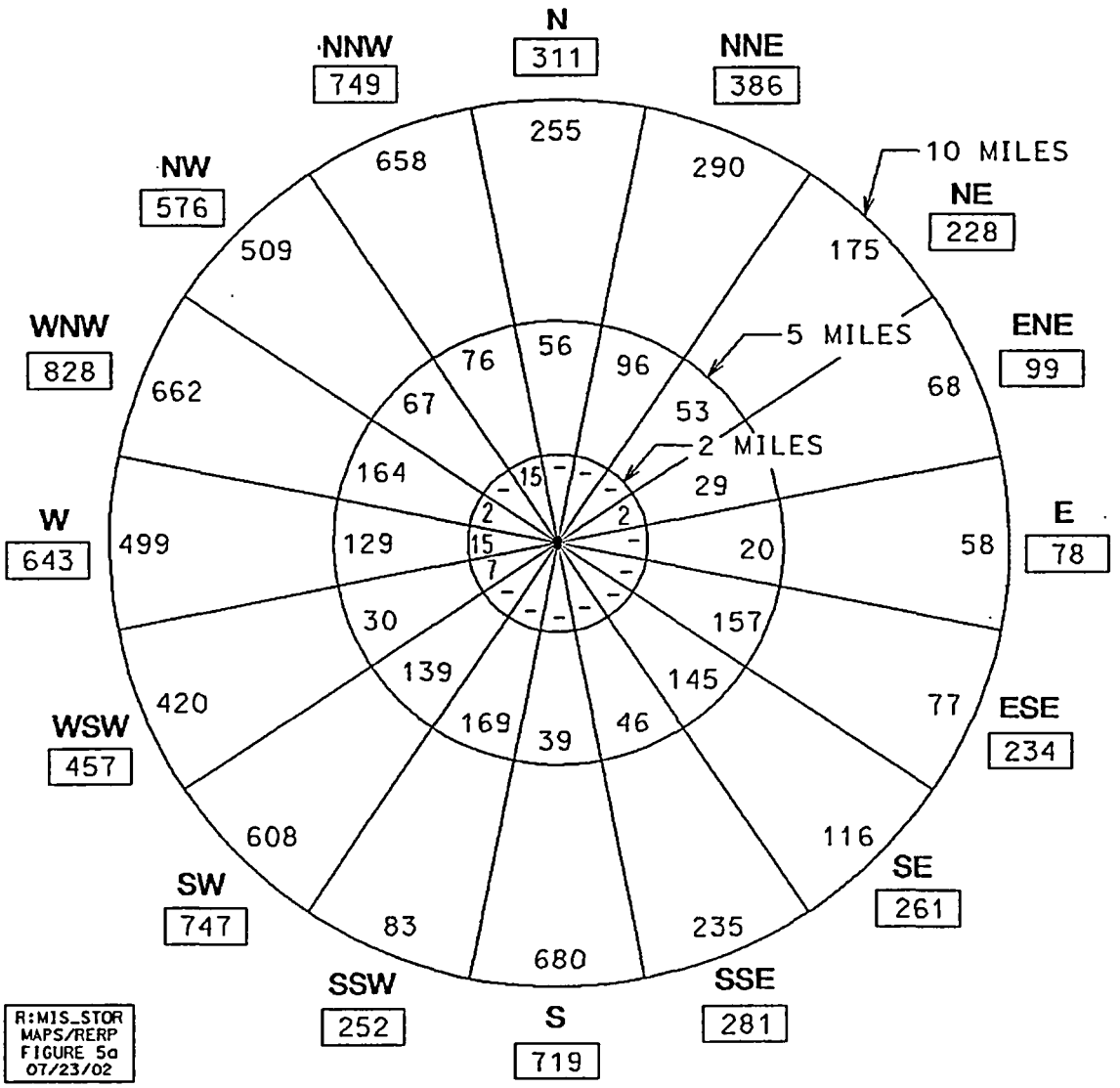


FIGURE 5
GENERAL POPULATION BY SUBAREA

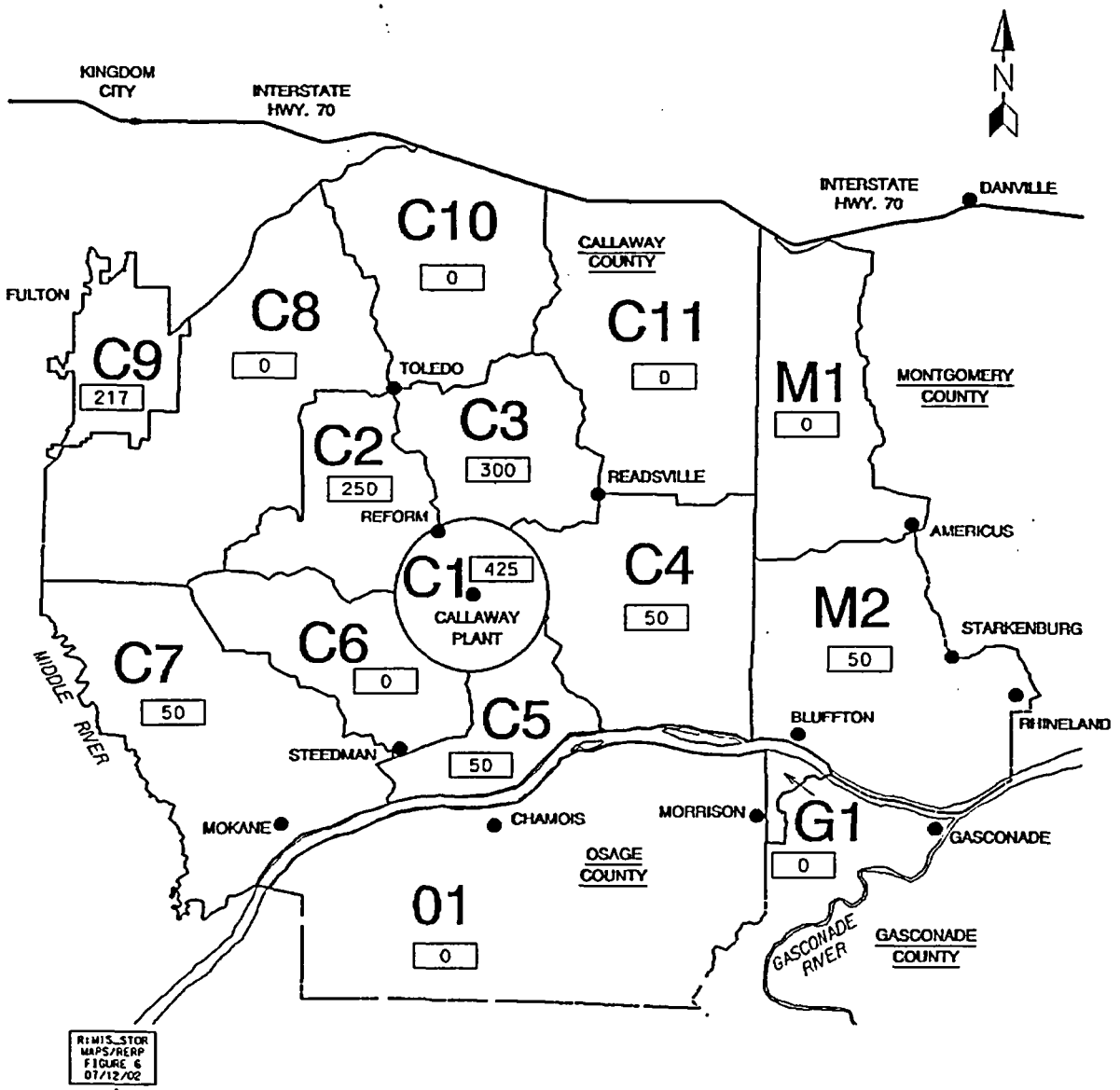


POPULATION TOTALS			
RING MILES	RING POPULATION	TOTAL MILES	CUMULATIVE POPULATION
0-2	41	0-2	41
2-5	1415	0-5	1456
5-10	5393	0-10	6849

NOTE: FULTON AND RHINELAND ARE OUTSIDE THE 10 MILE RING AND COMPRISE THE REMAINING EPZ POPULATION.

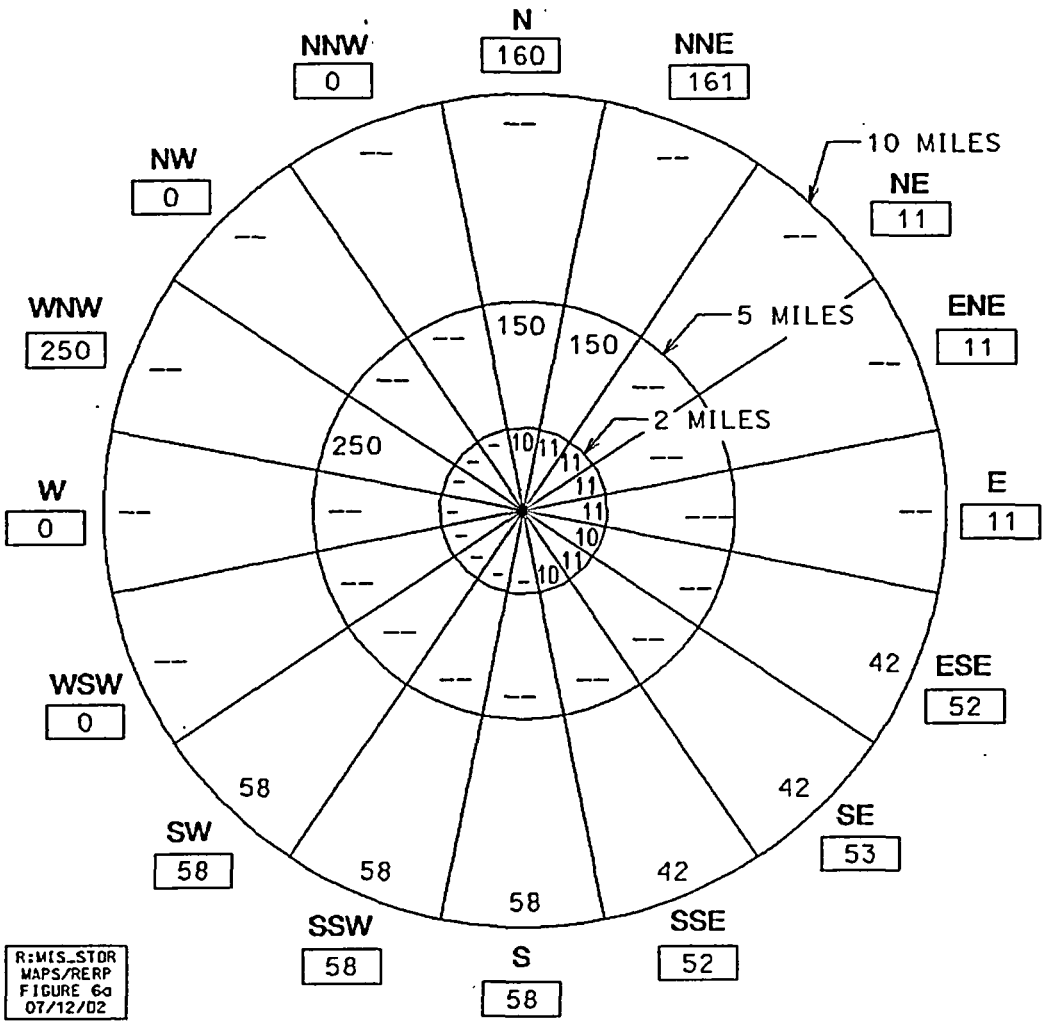
6849 TOTAL SEGMENT POPULATION 0-10 MILES

FIGURE 5a
GENERAL POPULATION BY SECTOR



NOTE: **The Transient population for the Reform Wildlife Management Area and the Callaway Plant is contained in the total for Subarea C1.**
The Transient population for the Katy Trail State Park is divided into subarea C7, C5, C4 and M2.

FIGURE 6
TRANSIENT POPULATION BY SUBAREA
(From Table 2)



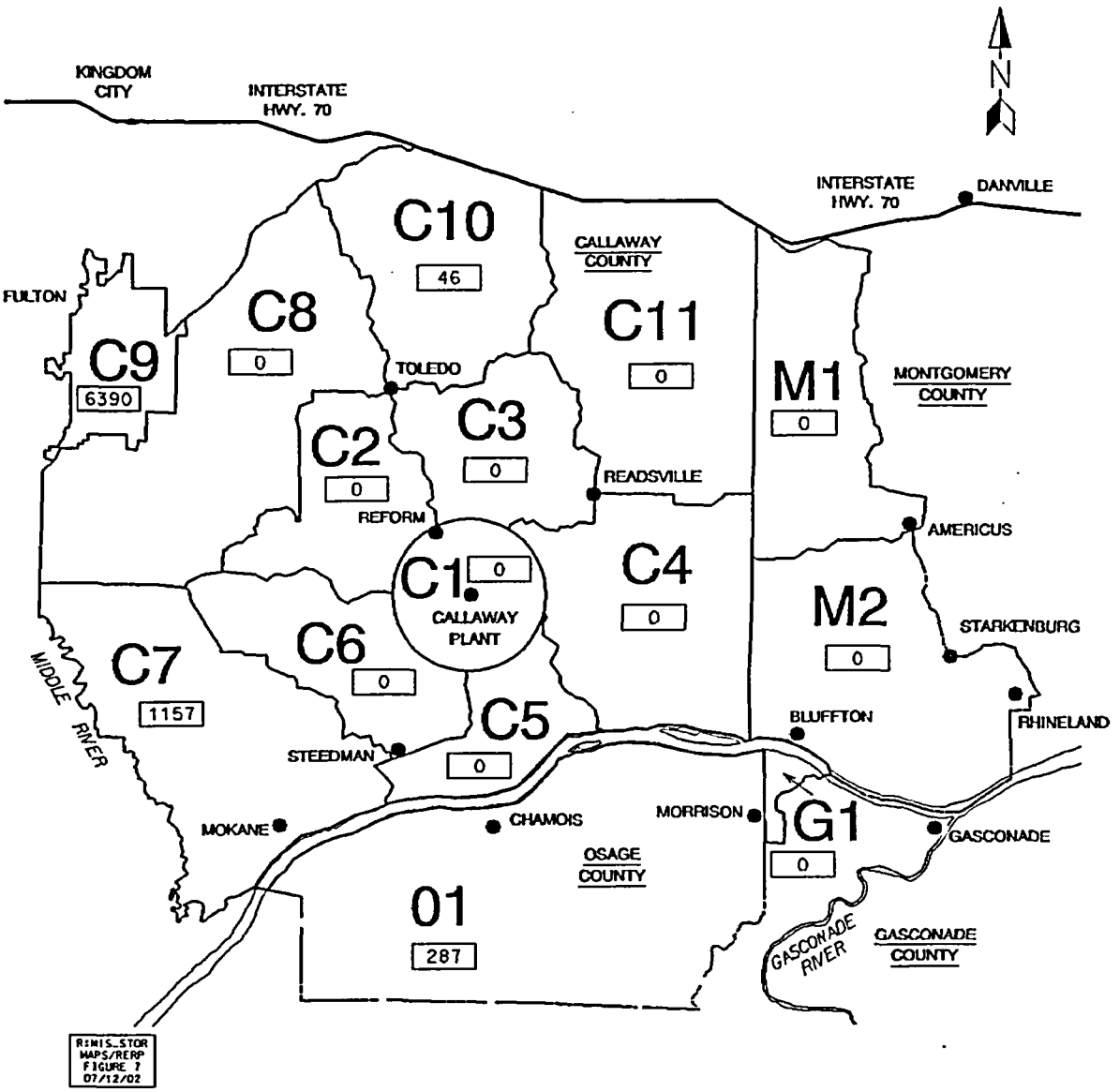
POPULATION TOTALS			
RING MILES	RING POPULATION	TOTAL MILES	CUMULATIVE POPULATION
0-2 *	425	0-2	425
2-5	550	0-5	975
5-10	300	0-10	1275

* THERE ARE 340 TRANSIENT WORKERS AT THE CALLAWAY PLANT.

NOTE: THE TRANSIENT POPULATION IN FULTON (C9) LIES OUTSIDE OF 10 MILES.

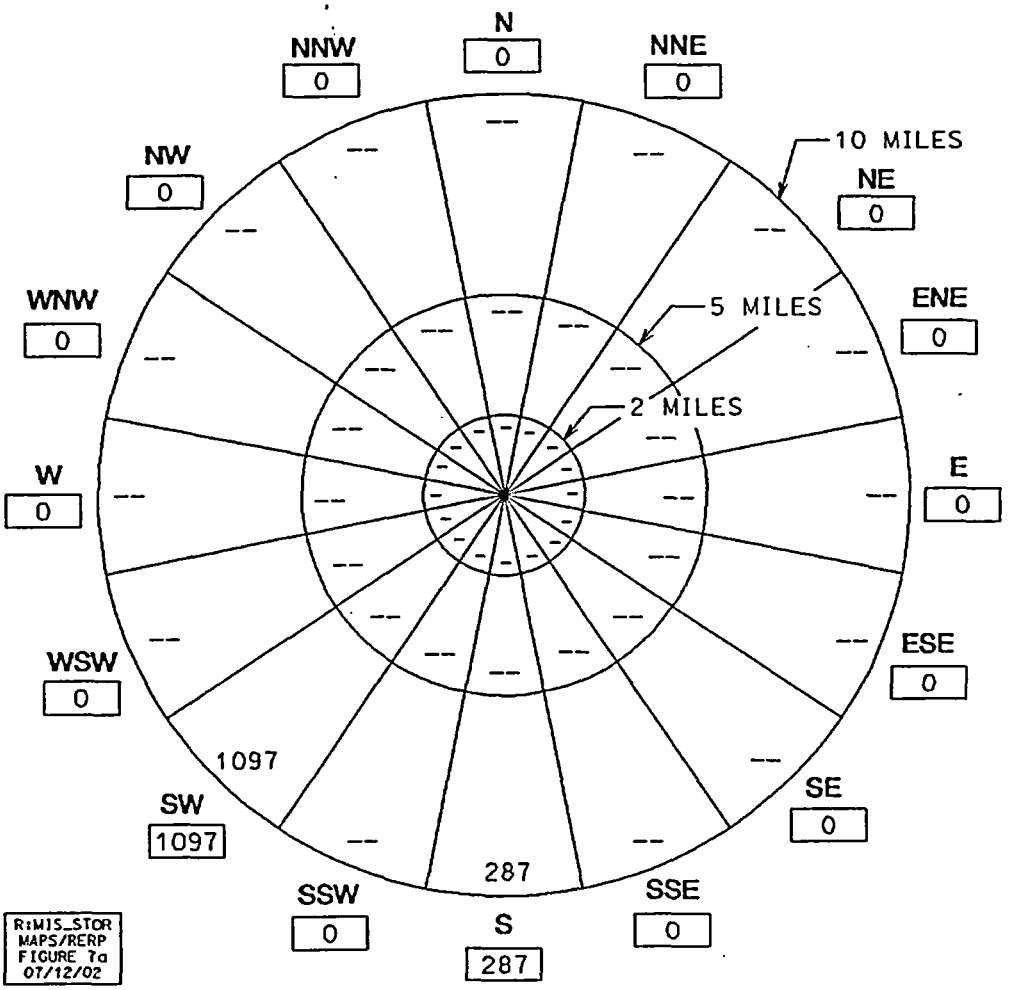
[1275] TOTAL SEGMENT POPULATION
0-10 MILES

FIGURE 6a
TRANSIENT POPULATION BY SECTOR



NOTE: **The Missouri Girls Town population is divided between Subareas C10 (46) and C9 (17). Of the 6,390 people in Special Facilities in Subarea C9, 4,645 are sheltered.**

FIGURE 7
SPECIAL FACILITY POPULATION BY SUBAREA
(From Table 3)



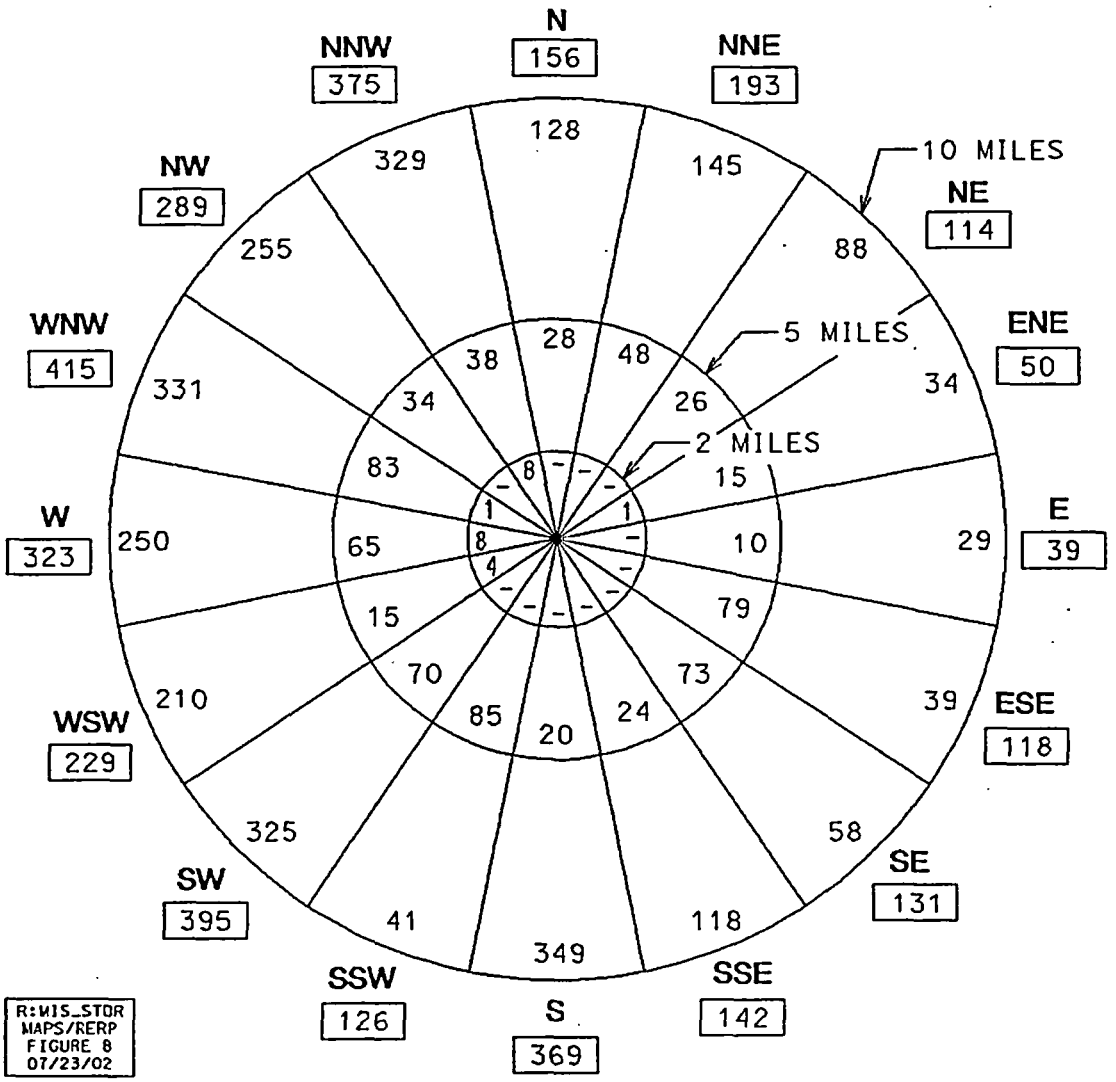
POPULATION TOTALS			
RING MILES	RING POPULATION	TOTAL MILES	CUMULATIVE POPULATION
0-2	0	0-2	0
2-5	0	0-5	0
5-10	1384	0-10	1384

NOTE: SPECIAL FACILITY POPULATIONS IN C9 AND C10 LIE OUTSIDE 10 MI.

1384 TOTAL SEGMENT POPULATION 0-10 MILES

NOTE: Special facility populations in C8, C9, and C10 lie outside 10 mi.

FIGURE 7a
SPECIAL FACILITY POPULATION BY SECTOR

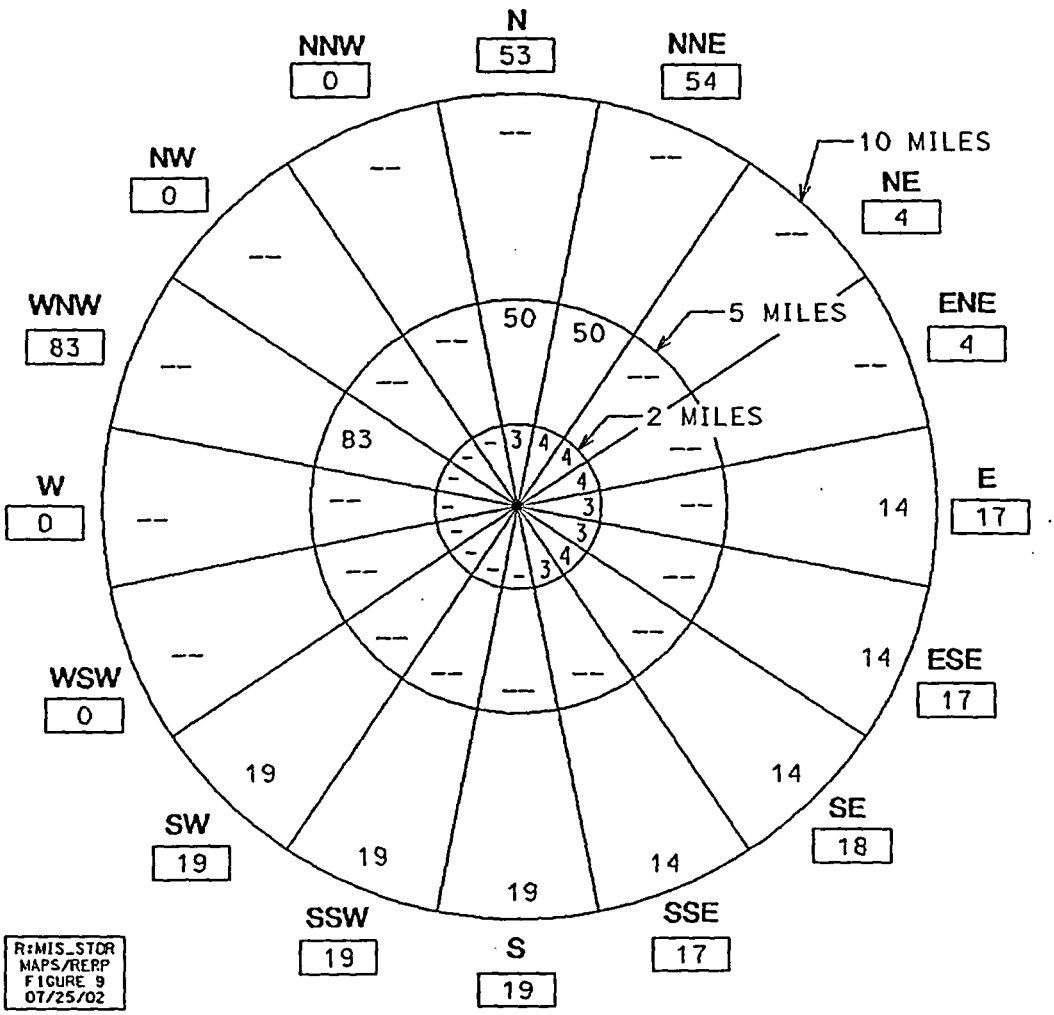


VEHICLES TOTALS			
RING MILES	RING VEHICLES	TOTAL MILES	CUMULATIVE VEHICLES
0-2	22	0-2	22
2-5	713	0-5	735
5-10	2729	0-10	3464

NOTE: THE PERMANENT POPULATION IN FULTON AND RHINELAND LIES OUTSIDE OF 10 MILES.

3464 TOTAL SEGMENT VEHICLES 0-10 MILES

FIGURE 8
PERMANENT RESIDENT VEHICLES WITHIN 10 MILES

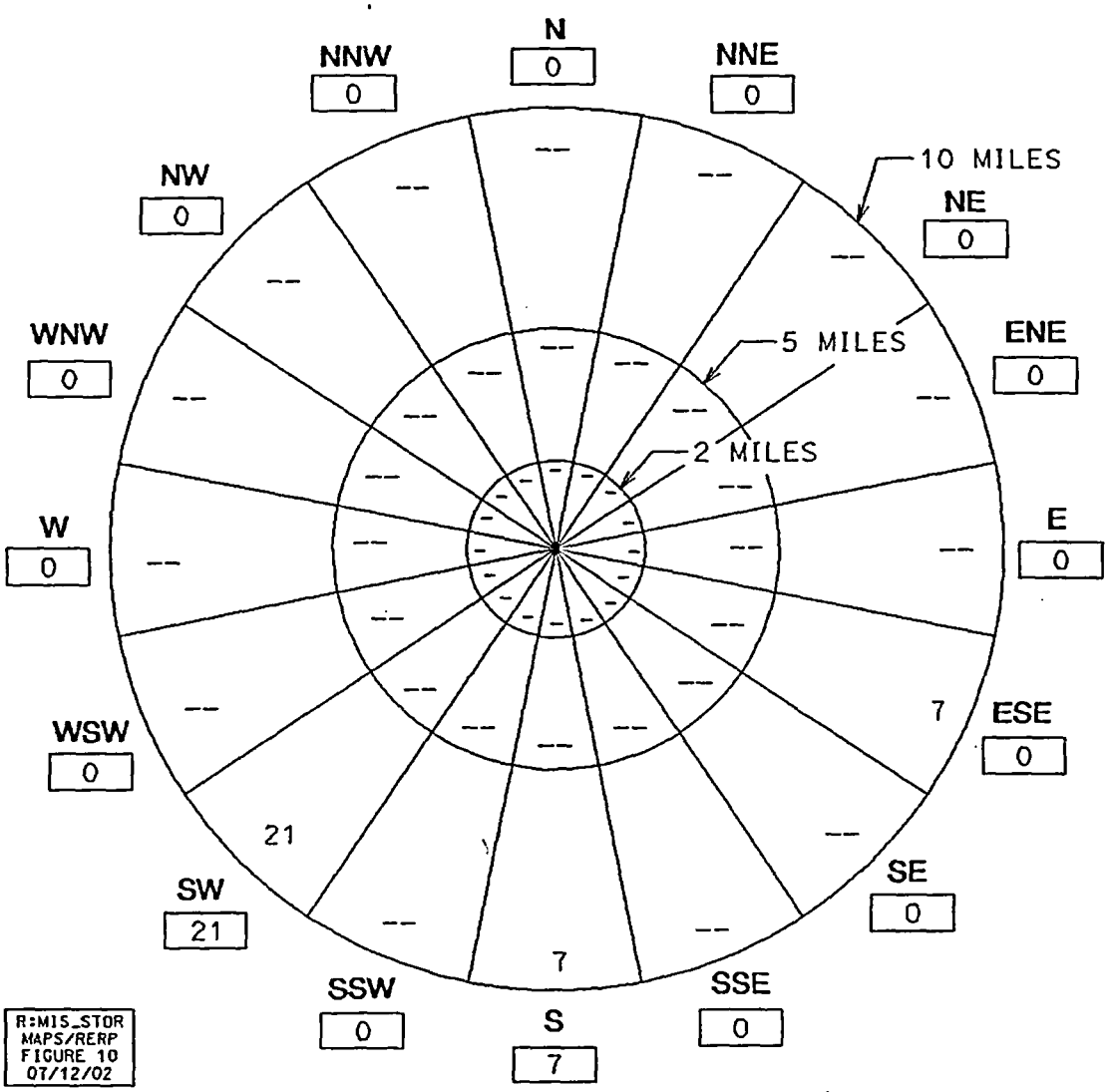


VEHICLES TOTALS			
RING MILES	RING VEHICLES	TOTAL MILES	CUMULATIVE VEHICLES
0-2	198*	0-2	198*
2-5	183	0-5	381
5-10	113	0-10	494

NOTE: THE TRANSIENT POPULATION IN FULTON (C9) LIES OUTSIDE OF 10 MI.
* 170 VEHICLES WITHIN THE 0-2 MILE RING ARE ATTRIBUTED TO THE CALLAWAY PLANT TRANSIENT POPULATION.

494 TOTAL SEGMENT VEHICLES 0-10 MILES

FIGURE 9
TRANSIENT VEHICLES WITHIN 10 MILES



VEHICLES TOTALS			
RING MILES	RING VEHICLES	TOTAL MILES	CUMULATIVE VEHICLES
0-2	0	0-2	0
2-5	0	0-5	0
5-10	35	0-10	35

NOTE: SPECIAL FACILITY POPULATIONS IN C8, C9, AND C10 LIE OUTSIDE 10 MI.

[35] TOTAL SEGMENT VEHICLES 0-10 MILES

FIGURE 10

3.0 TRAFFIC CAPACITY

The location, types, and capacities of the local roadways should be examined in order to estimate an evacuation time. Although a series of routes out of the area have been designated for EPZ evacuation, all roads out of the EPZ are potentially available. Designated routes lead as directly as possible out of the EPZ. In almost all instances, the designated evacuation route is normally the fastest way out of the EPZ for the area served by that particular route. The routes do not require special traffic control measures, such as one-way operation on normally two-way roads, contra-flow on freeways, etc. These evacuation routes are indicated in Figure 11, and each is designated by a letter. Under exceptional or unusual conditions such as flooding of Highway 94 or Highway 100, alternate evacuation routes will be identified by county authorities if necessary. Potential areas of concern are identified in county plans and procedures dealing with evacuation impediments.

When assigning traffic to the evacuation routes, the travel shed of each route needs to be considered. The travelshed of a particular route is the area of population for which that route is the fastest means of exit from the EPZ. The travelsheds for the evacuation routes in the Callaway EPZ are determined by extending the major evacuation routes, as identified in Figure 11, so that all of the population areas in the EPZ are attached to one or another of the evacuation routes. This process is simple for those population areas immediately adjacent to the major evacuation routes, where it is obvious which population areas feed any given evacuation route. For population areas more distant from the major evacuation routes, the evacuation path is not as clear, and routings are made on the basis of travel time estimates. Some population areas are midway between evacuation routes and are equally well served by two different routes. In such cases, a line equidistant between the evacuation routes represents the boundary between the travelshed areas for the different evacuation routes.

After establishing the travelshed of each route, the vehicles to be used in an evacuation (see Section 2.4) are assigned to the appropriate evacuation route. Table 5 summarizes this data. If the number of vehicles in Figures 8, 9, and 10 are totaled, the number of autos differs from the number in Table 5 because the majority of the population of Fulton is outside the 10-mile radius.

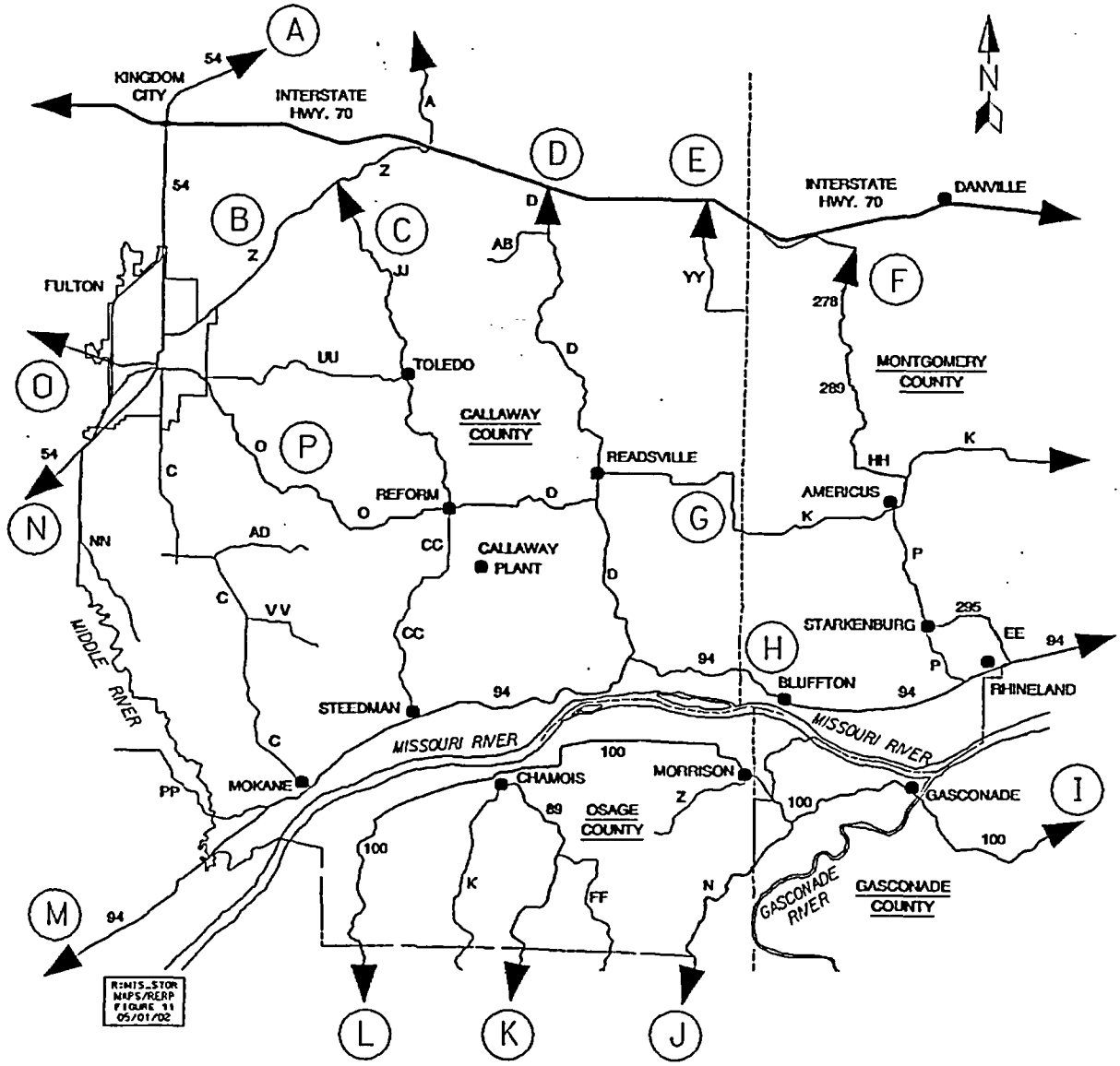


FIGURE 11
EVACUATION ROUTES

TABLE 5

TRAFFIC ASSIGNED TO PRIMARY EVACUATION ROUTES

Evacuation Route	Route Number	Vehicles Using Evacuation Route
A	U.S. Highway 54 East	1254
B	Route Z	715
C	Route JJ	336
D	Route D	112
E	Route YY	75
F	Route P	96
G	Route K	118
H	State Route 94 East	382
I	State Route 100 East	156
J	Route N	34
K	State Route 89	188
L	State Route 100 West	160
M	State Route 94 West	592
N	U.S. Highway 54 West	1190
O	Route F	1077
P	Route O	617
	Total	7102

The capacity of a roadway is the number of cars that can use it in a given amount of time. The main constraint on the capacity of a roadway is a critical intersection or "bottleneck" location. This is a location where the flow of traffic is restricted, which means that the time needed for evacuation will increase.

The capacity of an intersection is based on a maximum hourly vehicular flow of 1400 vehicles per lane, with full assignment of the right-of-way and no cross-traffic (Transportation Research Board. 1985. Highway Capacity Manual. Special Report 209). At the critical intersections which establish the capacity of the evacuation routes, the total capacity is adjusted downward by ~15% of the maximum to reflect this cross-street traffic. The resulting capacity is 1200 vehicles per lane per hour (vph) on the roads.

4.0 ANALYSIS OF EVACUATION TIMES

The purpose of an evacuation is to remove the population of the affected subareas as rapidly as possible in order to minimize possible exposure to radiation. The evacuated population is directed to Reception and Care Centers where they will be registered and monitored.

4.1 ASSUMPTIONS AND METHODOLOGY

To estimate a time for evacuation, several factors must be considered, some of which include: day vs. night, workday vs. weekend, winter vs. summer, notification and preparation times, travel speed, and whether or not adverse conditions are present.

Day time is a more critical period than night time for an evacuation because more families will be working, attending school, or away from home for some other reason, which, in most cases, necessitates a trip home to gather family and belongings. A weekday is a more critical time than the weekend for the same reasons.

Peak transient periods occur during the summer, but children are at home and many people take their vacation during the summer. In comparison, children are in school and not as many people are on vacation during winter which makes it a more difficult time to evacuate. Therefore, winter is taken to be a more critical time than summer. Summarizing, a winter weekday represents the worst case for an evacuation time estimate.

Before an evacuation takes place, people must receive notification that an evacuation is under way. Provisions have been made to notify essentially all of the population of an evacuation within 15 minutes. It is assumed that the population will begin preparations to evacuate immediately. This assumption applies to the general population, which is composed of the permanent residents and transients, and also to special facilities.

Transient populations have only to board their vehicles and exit the EPZ, which will be faster than for permanent residents of the EPZ, especially those who must first go home. Therefore, permanent residents are used as the basis for evacuation, since their evacuation time will be longer.

There are two segments of this population group: auto-owning, and non-auto-owning. Of the auto-owning group, those who are at work will require the most time to evacuate. On the average, these people are assumed to be no further than 20 miles from home and to drive 40 miles per hour. This is the same speed assumed for vehicles leaving the EPZ unless adverse conditions, such as flooding , ice, or snow are present. Under adverse conditions, 30 miles per hour is assumed because of a 25% reduction in speed for such conditions (NUREG/CR-4831). Once at home, it is estimated that most people can be ready to leave within 60 minutes.

For people who do not own vehicles, it will require the same amount of time for notification and preparation for evacuation as it does for the auto-owning population. It is assumed that many of these people will ride with friends or family who do own autos. The annual brochure provides a method for disabled residents to address special needs for transportation.

The non-auto-owning people will be ready to leave the EPZ at the same time as the auto-owning population, but it is assumed that they must wait for a bus to return from transporting special facility residents to a Reception and Care Center.

4.2 CALCULATIONS

To this point, it is assumed that the general population will require 1 hour and 45 minutes to be at the point of leaving the EPZ (1 hour and 55 minutes under adverse conditions). The remaining tasks are to calculate the amount of time needed for the general population to leave the EPZ and to determine the time requirements of the evacuating special facilities.

In each special facility plan, the time required for that facility to assemble and load the buses and to exit the EPZ is provided. Those times are summarized in Table 6. When the 15 minute notification time is added, the worst case time for the last special facility to depart the EPZ is 1 hour and 35 minutes (1 hour and 55 minutes under adverse conditions).

Some of the buses used to transport special facility residents may have to come back to the EPZ to evacuate part of the non-auto-owning population. The longest amount of time that it will take for a bus to make a round trip from the EPZ boundary to a Reception and Care Center is 70 minutes (88 minutes under adverse conditions).

TABLE 6

RESPONSE TIMES FOR EVACUATING SPECIAL FACILITIES

Special Facility	Time to Assemble Buses (min) (best-worst case)	Time to Load Buses (min)	Time to Leave (min)
Fulton Public Schools	15 - 45	15	5
Missouri Girls Town	____	10 - 15	5
Missouri School for the Deaf	45	15	5
Osage R-I (Chamois)	15 - 30	10	10
St. Peter's Parochial School	15 - 45	15	5
Callaway R-II (Mokane)	15 - 60	15	5
Care A Lot Learning Center	60 - 80	15	5
Central Missouri HDC-CDC	60 - 80	15	5
Fulton Preschool	60 - 80	15	5
The Growing Years Day Care Center	60 - 80	15	5

The capacity of the local roadways is more than adequate for the local population, and no time delays due to traffic back-up are anticipated. The following formula was used to calculate the time to enter/leave the EPZ to/from a given subarea:

$$T = \frac{\left(60\frac{\text{min}}{hr}\right) * D}{S}$$

T = elapsed time (in minutes) to enter/leave the EPZ to/from a given subarea

D = for a given subarea, the distance to be traveled from the point nearest to the plant to the EPZ boundary. When more than one evacuation route is available for a subarea, the longest direct route is used.

S = the speed of the evacuating vehicles (40 mph in normal conditions and 30 mph in adverse conditions)

The times calculated above should be multiplied by 2, since the buses must enter and then exit the EPZ. The general population requires 1 hour and 45 minutes to be at the point of leaving the EPZ, but the special facilities, whose buses may come back to the EPZ for the non-auto-owning population, only require 1 hour and 35 minutes. Therefore, the 1 hour and 35 minutes will be used as the notification and preparation time since the extra 10 minutes required by the general population can be made up while the buses are en route to a Reception and Care Center.

By adding the notification and preparation time to the travel times inside and outside of the EPZ, the total time it will take to evacuate the EPZ from a given subarea is obtained for the general population. These times, with population totals, are summarized in Table 7.

4.3 CONCLUSION

The maximum time that it takes for the general population to evacuate the EPZ is 3 hours and 30 minutes under normal conditions and 4 hours and 23 minutes under adverse conditions.

5.0 CONFIRMATION OF EVACUATION

Emergency workers at access control points will be able to observe the beginning and end of the traffic flow out of an evacuation area. Access control personnel should be able to confirm the cessation of traffic flow for each of the evacuation routes. Emergency workers within the evacuation area (such as transportation providers, field monitoring teams, traffic control personnel, etc.) will be able to provide information on the progress of the evacuation, people who need assistance, or observed problems. Individuals having special notification or transportation needs are identified in a data file, and are provided individual assistance during an evacuation in accordance with their needs. All evacuating special facilities go to Reception and Care Centers (RCCs). Their plans indicate that they will contact emergency officials upon departure from the facility and upon arrival at the RCC. As the longest special facility evacuation time is 1 hour and 55 minutes, confirmation of arrival at the RCCs should be completed within 180 minutes, depending upon the travel time from the EPZ boundary to the RCC.

SUMMARY OF EVACUATION TIME ESTIMATES

TABLE 7

SUBAREA	PERMANENT POPULATION	OCCUPIED HOUSING UNITS	PERMANENT POPULATION VEHICLES	VEHICLES USED IN EVACUATION	DISTANCE TO EXIT EPZ	TRANSIENT POPULATION	TRANSIENT POPULATION VEHICLES	EVACUATION CAPACITY PER HOUR	GENERAL POPULATION EVACUATION TIME -- NORMAL CONDITIONS	GENERAL POPULATION EVACUATION TIME -- ADVERSE CONDITIONS	SPECIAL POPULATION EVACUATION TIME -- NORMAL CONDITIONS	SPECIAL POPULATION EVACUATION TIME -- ADVERSE CONDITIONS
	WITHIN TWO MILES (NOMINALLY)											
C1	41	13	21	16	15	494	28	7,200	3:30	4:23	a	a
	FROM TWO TO FIVE MILES (NOMINALLY)											
C2	307	89	178	110	13	250	83	3,600	3:25	4:16	a	a
C3	386	83	160	103	13	300	100	3,600	3:25	4:16	a	a
C4	470	157	314	196	13	50	16	3,600	3:25	4:16*	a	a
C5	166	47	94	59	10	50	16	2,400	3:15	4:03*	a	a
C6	414	131	263	164	14	0	0	3,600	3:27	4:19	a	a
SUBTOTAL	1,743	507	1,009	632		650	243	16,800				
	FROM FIVE TO TEN MILES (NOMINALLY)											
C7	1,272	395	968	442	8	50	16	3,600	3:09	3:55*	0:50	1:35
C8	2,036	680	1,666	708	7	0	0	4,800	3:07	3:52	a	a
C9	11,284	3,700	5,106	4,144	4	217	72	4,800	2:57	3:39	1:35	1:55
C10	453	181	226	203	9	0	0	2,400	3:13	4:01	0:30	0:35
C11	378	93	228	116	10	0	0	2,400	3:15	4:03	a	a
M1	171	63	95	79	6	0	0	3,600	3:03	3:47	a	a
M2	506	175	264	219	8	50	16	2,400	3:09	3:55*	a	a
G1	123	71	133	88	2	0	0	1,200	2:51	3:31	a	a
O1	943	362	543	453	8	0	0	3,600	3:09	3:55*	0:50	1:05
Subtotal	17,166	5,720	9,229	6,452		317	104	28,800				
TOTAL EPZ	18,950	6,240	10,259	7,100		1,461	375	52,800				

a. No special facilities in this area.

* An additional 1-2 hours may be required during severe flooding to mobilize additional State and county resources.

REFERENCES

Callaway County/Fulton Radiological Emergency Response Plan.

Callaway County/Fulton Radiological Emergency Response Implementing Procedures.

Missouri Nuclear Accident Plan - Callaway - Fulton Reception and Diagnostic Center.

Missouri Nuclear Accident Plan - Callaway - Fulton State Hospital.

Gasconade County Radiological Emergency Response Plan.

Gasconade County Radiological Emergency Response Implementing Procedures.

Montgomery County Radiological Emergency Response Plan.

Montgomery County Radiological Emergency Response Implementing Procedures.

Osage County Radiological Emergency Response Plan.

Osage County Radiological Emergency Response Implementing Procedures.

PRC Engineering. 1984. *Study Report for the Callaway Plant: Evacuation Time Estimates.*

Special Facilities Radiological Emergency Response Plans.

Transportation Research Board. 1985. *Highway Capacity Manual.* Special Report 209, Transportation Research Board. Washington DC.

Urbanik, T., J. D. Jamison. 1992. *State of the Art in Evacuation Time Estimate Studies for Nuclear Power Plants.* NUREG/CR-4831, U.S. Nuclear Regulatory Commission. Washington DC.

U.S. Nuclear Regulatory Commission (NRC). 1980b. *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.* NUREG-0654, Rev. 1. U.S. Nuclear Regulatory Commission. Washington DC.

Missouri Census Data/US Bureau of the Census 2000 Decennial Census

APPENDIX H

PUBLIC ALERT SYSTEM

The public alert system consists of fixed sirens and tone alert receivers and provides notification to approximately 100 percent of the population within the Callaway Plant Plume Exposure Pathway Emergency Planning Zone (EPZ). The fixed sirens are located in various populated areas (see Figure H-1) and tone alert receivers are utilized for coverage of sparsely populated areas. Tone alert receivers are also used to augment coverage of special facilities located within the EPZ.

The sirens have a rated output power of approximately 125DB at 100 ft. and each siren has a coverage radius of 6000 to 7000 ft.

The fixed sirens within each risk county are activated from the communications center for that county except Osage County, which only activates Siren O-1. Callaway County activates Sirens O-2 and O-3. The tone alert receivers are activated from EAS Common Program Control Station KTXY in Columbia, Missouri.

An automated calling service is available as a backup to the sirens and tone alert receivers. This service can call all listed telephone numbers in the EPZ. Unlisted telephone numbers provided by the owners are also included. This system is activated by a call from Callaway County to the vendor.

POPULATION AT SCHOOLS AND OTHER INSTITUTIONS

Due to expected mobilization time requirements to institutional populations and the resources needed for their evacuation, all special facilities are notified by their county's Emergency Operations Center (EOC) at an emergency classification of SITE EMERGENCY or greater. These facilities are notified of a protective action situation via the public alert system and by telephone from the county EOC.

Although some schools, located in the EPZ, are within the range of the fixed outdoor warning system, notification of each school administration that protective action is called for is made via both the tone alert receiver system and direct telephone call. The schools can then effect the alerting of students and staff through their existing internal communications systems.

Populations located in selected institutions, such as medical, convalescent, or geriatric facilities are also notified both through the tone alert receiver system and by telephone from the EOC.

POPULATION IN TRANSIT

During an emergency condition, it can be expected that a number of persons would be traveling on the road system within the EPZ. These travelers may be local residents or persons from other areas traveling through or to areas within the EPZ.

Local trips within the EPZ are, of course, short trips with an average travel time of approximately 10 minutes. These local travelers can, therefore, be expected to be advised of the emergency condition at their trip destination if they are not in an area covered by a fixed outdoor warning siren at the time the warning is issued. They should, therefore, be notified within or near the required 15-minute notification period.

Non-local travelers will need to be diverted from entering the EPZ at the earliest possible time, not only for their own protection but also to provide maximum available road capacity in event of the evacuation of area residents. Major roadway access control points are identified for the Callaway Plant EPZ (See Figure H-2). These access points are to be controlled by local law enforcement personnel within each risk county. These access control points may be manned to preclude entry to any subarea of the EPZ or to preclude entry to the EPZ as a whole. Non-local travelers are notified of an emergency condition at these control points prior to their entry into a controlled access area.

There is a possibility that transients may be located in the Reform Wildlife Area surrounding the Plant, on the Katy Trail State Park, or on the Missouri River. Transients in these locations are alerted by the public alert sirens, and instructional material has been posted at Wildlife Area parking areas and Public Access Points along the river to explain what to do if the fixed sirens are activated.

Table H-1 summarizes the public alert systems that are employed for different population segments in the EPZ.

TABLE H-1

ALERT SYSTEMS FOR SPECIFIC POPULATION SEGMENTS

POPULATION SEGMENT	ALERT SYSTEM
Population at Home	Sirens or Tone Alert Receivers
Population at Work	
At Business Centers	Sirens or Tone Alert Receivers
At Industrial Centers	Sirens or Tone Alert Receivers
At Places Outside the EPZ On Farms	Sirens or Tone Alert Receivers
Population in Transit	
On the Road System	Sirens/Authorities at EPZ access control points.
On the River	Sirens
Population at Business Centers	Sirens or Tone Alert Receivers
Population at Schools	Sirens and Tone Alert Receivers/ Supplemental Notification Methods
Population in Other Institutions	Sirens and Tone Alert Receivers/ Supplemental Notification Methods
Population at Recreational Areas	
Hunting, Fishing, Camping, Hiking, Biking, Jogging, Etc.	Sirens/Possible Supplemental Notification Methods
At Sporting Events	Sirens or Tone Alert Receivers

FIGURE H-1

PUBLIC ALERT SYSTEM SIREN COVERAGE

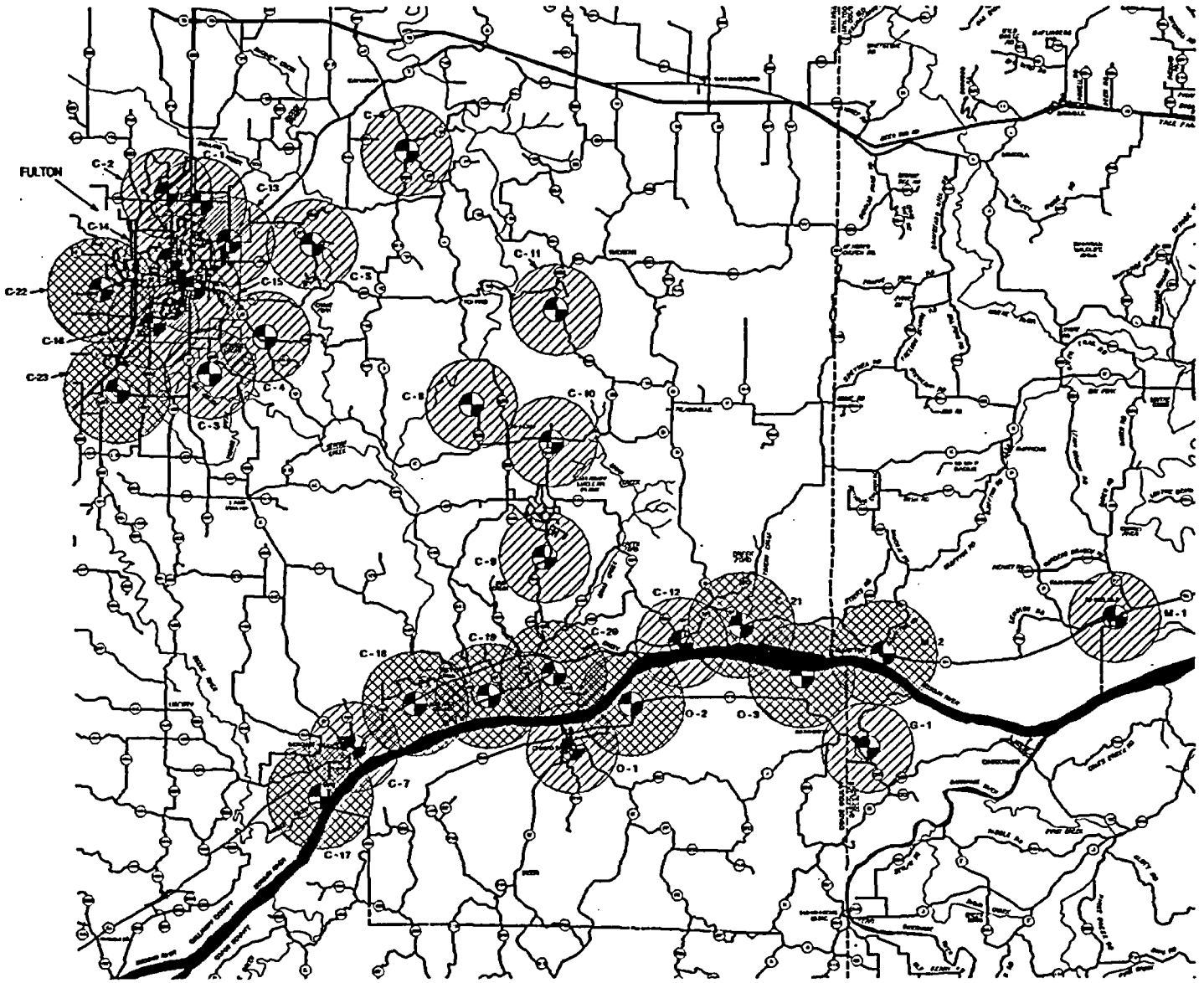
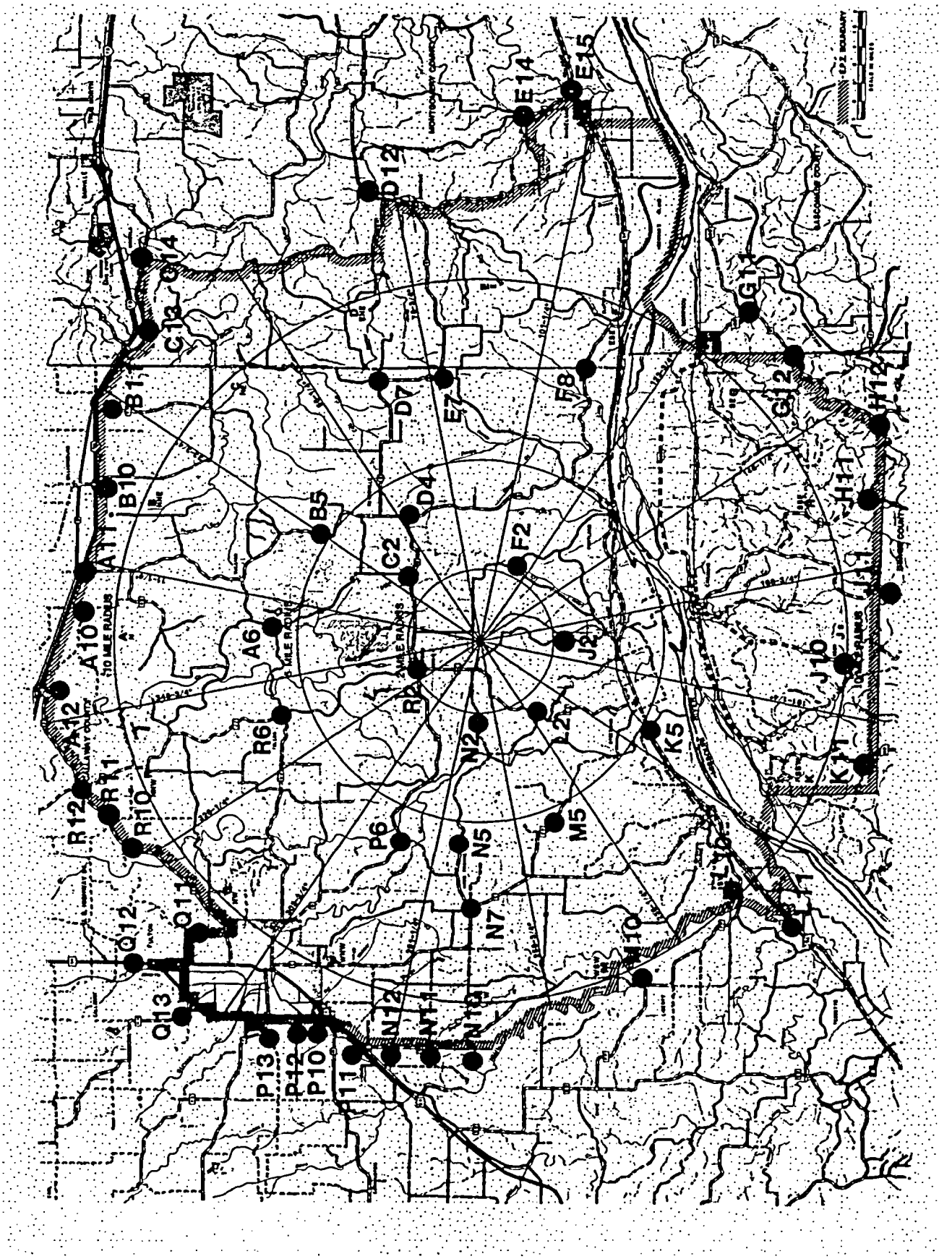


FIGURE H-2

ACCESS CONTROL POINTS



APPENDIX I

LIST OF SUPPORTING RADIOLOGICAL EMERGENCY RESPONSE PLANS

I. CALLAWAY PLANT

- A. Fire Protection Program
- B. Security Plan

II. COUNTY

- A. Callaway County/Fulton Radiological Emergency Response Plan
- B. Osage County Radiological Emergency Response Plan
- C. Montgomery County Radiological Emergency Response Plan
- D. Gasconade County Radiological Emergency Response Plan

III. STATE

- A. Missouri Nuclear Accident Plan - Callaway

IV. FEDERAL

- A. NRC Incident Response Plan - NUREG-0728
  1. Agency Procedures for the NRC Incident Response Plan - NUREG-0845
  2. Region IV Incident Response-Supplement to NUREG-0845
- B. Federal Emergency Management Agency, National Radiological Emergency Response Plan
  1. Federal Emergency Management Agency Region VII Kansas City, Missouri Emergency Response Team Plan