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Revision 9
Effective Date 12/17/03

PALISADES NUCLEAR PLANT
SITE EMERGENCY PLAN

TITLE: SITE EMERGENCY PLAN

Approved: NKBrott / 12/16/03
Procedure Sponsor **Date**

New Procedure/Revision Summary:

Revision 9

Specific Changes

This revision is the result of the annual review of the SEP completed in November 2003. In addition, the evacuation time estimate for the year 2000 census data was completed which results in a complete change to Appendix C "Population Distribution and Evacuation Time Estimates." The annual review identified several editorial type changes as follows: changing the Plant Manager title to Site Director, correcting Table 4-1, "Guidelines for Plant, State, and Local Action," to include the Alert description and actions, Table 4-2, "Emergency Action Levels," was revised to align with EI-1, "Emergency Classifications and Actions," and some other minor editorial changes.

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SOURCES AND REFERENCES

SOURCE DOCUMENTS

NUREG-0654, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Procedures in Support of Nuclear Power Plants" (November 1980)

Title 10 of the Code of Federal Regulations, Part 50

Engineering Analysis, EA-JBB-01-04, "Failed Fuel Dose Rates on NSSS Piping"

REFERENCE DOCUMENTS

Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants"

Palisades Emergency Implementing Procedures

10 CFR 50, "Domestic Licensing of Production and Utilization Facilities"

10 CFR 100, "Reactor Site Criteria"

Palisades Final Safety Analysis Report

NUREG-0696, "Functional Criteria for Emergency Response Facilities" (February 1981)

Palisades Safeguards Contingency Procedures

Palisades Health Physics Procedures

Palisades Emergency Operation Procedures

Palisades Nuclear Plant Emergency Public Information Policies and Procedures

Palisades Fire Protection Plan

EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"

Palisades Administrative Procedure 4.00, "Operations Organization, Responsibilities and Conduct"

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10 CFR 20, "Standards for Protection Against Radiation"

Oil and Hazardous Materials Spill Prevention Plan

Off Normal Procedure ONP-23.1, "Primary Coolant Leak"

Off Normal Procedure ONP-23.2, "Steam Generator Tube Leak"

Palisades Technical Specifications

Act 390, Michigan Public Acts of 1976

Act 368, Michigan Public Acts of 1978

Michigan Emergency Management Plan

Van Buren County Emergency Plan

Allegan County Emergency Plan

Berrien County Emergency Plan

Palisades Administrative Procedure 3.07, " 10 CFR 50.59 and 72.48 Reviews"

Palisades Meteorological Monitoring Plan

Palisades Administrative Procedure 9.14, "Control of Computer Software"

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USER ALERT
INFORMATION USE PROCEDURE

The activities covered by this procedure may be performed from memory.

1.0 INTRODUCTION

The purpose of the Palisades Site Emergency Plan (SEP) is to aid in protecting members of the general public, persons temporarily visiting the site, and site employees.

Information submitted in this plan was developed using the guidance provided in NUREG-0654, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Procedures in Support of Nuclear Power Plants," published in November 1980 and with Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," dated September 1975.

Detailed procedures concerning the implementation of the Site Emergency Plan are not included here, but are included in the Site Emergency Plan Implementing Procedures. These procedures describe the step-by-step duties and actions of individuals and groups in the event of an emergency and also serve as an interface of the Site Emergency Plan with Plant operations, security, and radiological controls procedures.

1.1 DEFINITIONS

1.1.1 Accident

Any unexpected or unintentional event resulting in radiological exposure, contamination, or physical injury to individuals requiring offsite medical treatment, and/or physical damage to safety-related components.

1.1.2 Activation

Process by which an Emergency Response Facility is staffed and prepared for operation.

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1.1.3 Affected Persons

Individuals who have been radiologically exposed or physically injured as a result of an accident to a degree requiring special attention, eg, decontamination, first aid, or medical services.

1.1.4 Alarm

An indication of abnormal Plant conditions and/or equipment status.

1.1.5 Alert

Events are in process or which have occurred which involve an actual or potential substantial degradation of the level of safety of the Plant.

1.1.6 Annunciation

An alarm or indication of normal or abnormal conditions.

1.1.7 Assessment Actions

Those actions taken during or after an accident to provide data to make decisions.

1.1.8 Command and Control

Resides with the Shift Manager, Site Emergency Director, or EOF Director following assumption of overall authority for Nuclear Management Company emergency response. At minimum, this individual will assume responsibility for event classification, dose assessment, protective action recommendations, and notification of offsite authorities.

1.1.9 Control Room

The location at Palisades Plant from which the Reactor and its auxiliary systems are controlled. The assembly area for Control Room personnel.

1.1.10 Control Room Personnel

Shift Manager, Control Room Operators, Auxiliary Operators, Shift Engineer/Shift Technical Advisor, and Control Room Supervisor.

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1.1.11 Corrective Actions

Those emergency measures taken to lessen or terminate an emergency situation at, or near, the source of the problem.

1.1.12 Decontamination

The removal of radioactive material from individuals, equipment, surfaces, foodstuffs, etc.

1.1.13 Emergency

Any occurrence at the Palisades Nuclear Power Plant that may result in undue risk to the health and safety of the onsite personnel or the public.

1.1.14 Emergency Action Levels (EAL)

Used to describe each of the four levels of emergency. These levels are comprised of a combination of Plant parameters that can be used to give quick indication of the severity of an accident situation.

1.1.15 Emergency Operations Facility (EOF)

An offsite emergency center from which the offsite emergency support actions of Nuclear Management Company are controlled and coordinated with state, local, and federal authorities to mitigate the consequences of an emergency.

1.1.16 Emergency Implementing Procedures

Specific procedures providing step-by-step actions to implement the Site Emergency Plan in order to mitigate or terminate an emergency situation.

1.1.17 Emergency Planning Zones (EPZ)

Two zones that encircle the Palisades Plant. The primary EPZ plume exposure pathway, with a radius of 10 miles, has been established to prevent excessive airborne exposure, and the secondary EPZ, ingestion exposure pathway, with a radius of 50 miles, has been established to prevent excessive ingestion of contaminated food. Within these two zones, protective actions are described for the protection of the public.

1.1.18 Fitness For Duty

Provide reasonable assurance that personnel who maintain unescorted access will perform their tasks in a reliable and trustworthy manner and are not under the influence of any substance, legal or illegal, or mentally or physically impaired from any cause, which in any way adversely affects their ability to safely and competently perform their duties.

1.1.19 Fully Operational

Status of an Emergency Response Facility following assumption of all responsibilities.

1.1.20 General Emergency

Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.

1.1.21 Ingestion Exposure Pathway

The path affected by fallout from a radioactive plume. Of major concern is the contamination of food and water within the emergency planning zones.

1.1.22 Offsite

All land and water areas outside the owner-controlled area.

1.1.23 Onsite

All land and water areas within the owner-controlled area, use of which must be authorized by Consumers Energy.

1.1.24 Operational/Facility

Status of an Emergency Response Facility following assumption of command and control.

1.1.25 Operational/Support Team or Manager

Status of support team following assumption of responsibilities.

1.1.26 Operations Support Center (OSC)

The onsite area in which onsite support personnel can assemble for subsequent assignment to duties in support of emergency operations. Support personnel assigned to the OSC normally consist of Chemistry, Radiation Protection, and repairpersons from I&C, Electrical, and Mechanical Maintenance.

1.1.27 Owner Controlled Area

The area surrounding the Plant in which the reactor licensee has the authority to determine all activities including exclusion or removal of persons and property from the area during accident conditions.

1.1.28 Plume Exposure Pathway

The path by which a radioactive cloud (plume) can expose the population-at-risk and/or onsite personnel to radiation. The principle exposure sources for this pathway are:

a. Whole body external exposure to gamma radiation from the radioactive plume and from deposited material.

b. Inhalation exposure from the passing radioactive plume.

1.1.29 Population at Risk

Those persons for whom protective actions are or would be taken.

1.1.30 Protective Actions

Those emergency measures taken for the purpose of preventing or minimizing radiological exposures to individuals that would be likely to occur if the actions were not taken.

1.1.31 Protective Action Guides (PAG)

Projected radiological dose or dose commitment values to individuals in the general population that warrant protective action following a release of radioactive material. Protective actions would be warranted provided the reduction in individual dose expected to be achieved by carrying out the protective action is not offset by excessive risks to individual safety in taking the protective action.

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1.1.32 Protected Area

The fenced area immediately surrounding the nuclear Plant, access to which is controlled in accordance with the Safeguards Contingency Procedures.

1.1.33 Radiological Emergency

An emergency involving radioactive material.

1.1.34 Recovery Actions

Those actions taken after the emergency to restore the Plant as nearly as possible to its pre-emergency condition.

1.1.35 Site Area Emergency

Events are in process or have occurred which involve actual or likely major failures of Plant functions needed for the protection of the public. This class would include accidents which have a substantial potential for the release of radioactive material.

1.1.36 Site Emergency Director

The Site Director or designated alternate; the person responsible for all onsite actions during an emergency condition.

1.1.37 State

The State of Michigan.

1.1.38 Technical Support Center (TSC)

An area which accommodates personnel which will provide management and technical support to Plant Operations personnel during emergency conditions from a location outside the Control Room.

1.1.39 Unusual Event

Events are in process or have occurred which indicate a potential degradation of the level of safety of the Plant.

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2.0 SCOPE AND APPLICABILITY

2.1 GENERAL INFORMATION AND SITE DESCRIPTION

The Palisades Nuclear Power Plant is owned by Consumers Energy and operated by the Nuclear Management Company. An area map showing the location of the facility is provided in Figure 2-1.

The design of the Palisades Nuclear Plant is that of a pressurized water-type nuclear steam supply system supplied and manufactured by Combustion Engineering. The system uses chemical shim and control rods for reactivity control and U-tube steam generators. Maps identifying Palisades Plant facilities are provided in Figures 2-2 and 2-3.

The Palisades Plant is located in Covert Township, Van Buren County, Michigan. The Plant is bordered to the north by the Van Buren State Park and to the west by Lake Michigan. The south and east are sparsely populated, underdeveloped, or used for farming. Interstate I-96 and the Blue Star Highway lie within one mile east of the site. Much of the area around the site is devoted to recreation and tourism, which produces a fluctuating and seasonal population. Most of the year, a population of 40 reside within 1 mile of the site and 6,300 within 5 miles.

Highway access to the Plant is provided from the Blue Star Highway (A-2) via the Plant access road.

2.2 POPULATION DISTRIBUTION AND EVACUATION TIMES

The area within a 10-mile radius surrounding the Palisades Plant is designated as the plume exposure Emergency Planning Zone (EPZ). A comprehensive population study was conducted in 2003 for the primary EPZ by TOM COD Data Systems, as part of an Evacuation Time Study which TOM COD Data was conducting for Nuclear Management Company. The Population Distribution and Evacuation Time estimates for the plume EPZ are discussed in Appendix C. The 2003 update of this study has been included.

2.3 EMERGENCY PLANNING ZONES

EPZs are areas designated for which planning is recommended to assure that prompt and effective actions are taken to protect the public in the event of an accident.

Two EPZs have been identified for the purpose of development and implementation of emergency planning. The plume exposure emergency planning zone has a 10 mile radius. Within this zone, shelter and/or evacuation is the immediate protective action to be recommended for the general public. The principal concern with the plume exposure pathway is that of Total Effective Dose Equivalent (TEDE) exposure and/or exposure to the adult thyroid Committed Dose Equivalent (CDE) due to inhalation and ingestion.

The ingestion exposure EPZ extends to a 50-mile radius. Once exceeding the 10-mile radius, the plume exposure pathway is no longer of significant concern. At this point, the ingestion pathway is of greatest concern. Due to Iodine-131 particulate fallout, this would necessitate close monitoring of the food chain.

2.4 PURPOSES AND OBJECTIVES

Effective emergency preparedness needs to incorporate not only the emergency response for systems, but must also include response for people. Engineering safety systems at the Plant are designed to ensure that the consequences of a major malfunction will be mitigated prior to any adverse effect to the general public or facility. The basis for emergency planning is to provide human emergency response in much the same way as safety systems do for design.

It is imperative that all plans, programs, and procedures be well coordinated with the Emergency Plan. Only when they are well coordinated can the response to emergencies be initiated in a timely and effective manner.

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2.4.1 Regulatory Requirements

Section 50.34, "Contents of Applications; Technical Information," 10 CFR 50, Licensing of Production and Utilization Facilities, requires that each application for a license to operate a facility include in a Final Safety Analysis Report (FSAR), along with other information, the applicant's plans for coping with emergencies, including the items specified in Appendix E, "Emergency Plan for Production and Utilization Facilities," 10 CFR 50. Section 100.3, 10 CFR 100, "Reactor Site Criteria," in the definitions of exclusion area and low population zone, establishes additional criteria for plans to cope with emergencies and serious accidents. 10 CFR 50.47, "Emergency Plans," requires that adequate protective measures can and will be taken in the event of a radiological emergency.

Supplemental guidance has been provided by the Nuclear Regulatory Commission (NRC) by the following documents:

a. NUREG-0654, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plant" (November 1980).

b. NUREG-0696, "Functional Criteria for Emergency Response Facilities" (February 1981).

These documents describe methods acceptable to the NRC staff for compliance with the Commission's regulations in regard to the content of emergency plans for nuclear power plants including provisions for the periodic review and revision of the Emergency Plans.

2.4.2 Purpose of Emergency Preparedness

The purpose of emergency preparedness is to provide a mechanism that would be used in making decisions in the event of an emergency, and to assure that the necessary equipment, supplies, and essential services are available to protect the health and safety of the public.

2.4.3 Objectives of the Palisades Site Emergency Plan

The objectives of the Site Emergency Plan are to:

a. Establish criteria for classifying emergencies, performing notifications, activating emergency facilities, and activating portions of the emergency organization.

b. Establish an emergency organization and assign responsibilities in the emergency organization for classifying emergencies, performing notifications, performing onsite protective actions, performing dose assessments, and making recommendations to offsite authorities.

c. Identify the support that will be provided to the onsite emergency organization by the Nuclear Management Company headquarters and offsite organizations (ie, fire, ambulance, medical).

d. Identify the offsite authorities that are responsible for taking protective actions on behalf of members of the general public or that interface with this Emergency Plan.

e. Identify emergency facilities and available communication systems to be used by the emergency organization.

f. Identify training for personnel in the emergency organization.

g. Provide for drills and exercises of the emergency organization.

h. Provide for periodic review and update of the plan.

2.5 SUMMARY OF EMERGENCY PLAN INTERRELATIONSHIPS

This Emergency Plan should not, in itself, be considered the sole working document to be used during an emergency. The purpose of the Emergency Plan is to classify emergencies according to their severity, to assign responsibilities for actions, and to clearly outline the most effective course of action required to safeguard the public and Plant personnel in the event of an emergency. Detailed instructions and guidelines for emergency actions are included in other plans, programs, and procedures as described below.

2.5.1 Emergency Implementing Procedures

Detailed Emergency Implementing Procedures required to implement the plan have been developed. An index of the Emergency Implementing Procedures is included in Appendix D.

Detailed implementing procedures for emergencies considered to be special events, such as civil disturbances, bomb threats, and breaches in security are included as part of the Safeguards Contingency Procedures.

Separate emergency procedures are not provided for activities already covered by Plant or section Operating Procedures (ie, calibration of survey instruments). The plan incorporates certain aspects of the Plant's operating procedures, radiation protection procedures, and security procedures, where they are required for clarification.

2.5.2 Related Plans, Programs, and Procedures

Several plans, programs, and procedures have been developed to assure the safe operation of the Plant. The Site Emergency Plan and Emergency Implementing Procedures have been written to coordinate these plans with other programs and procedures. During emergency situations, the coordination and utilization of all plans and procedures are essential.

The Safeguards Contingency Procedures have been coordinated with the Site Emergency Plan and Emergency Implementing Procedures to minimize the consequences of an emergency situation. Security procedures contain an explanation of the duties and responsibilities for security personnel in the event of an emergency.

Provisions for radiological control at the Plant have been covered in Radiation Protection Procedures. These procedures establish controls and protective measures to be placed on work being conducted in radiation areas. Inclusive within the area of radiation control are the procedures that Radiation Protection establishes for determining exposure through surveys, analysis, and various other avenues.

The Palisades Emergency Operating Procedures have been developed to control Plant operation during emergency situations. These emergency procedures work in conjunction with the Emergency Plan Implementing Procedures.

The Nuclear Plant Emergency Public Information Policies and Procedures contain the information necessary to establish a flow of emergency information to the public.

The Palisades Fire Protection Plan has been developed to assure the safe operation of the Plant during a fire.

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FIGURE 2-1
PALISADES PLANT GENERAL LOCATION

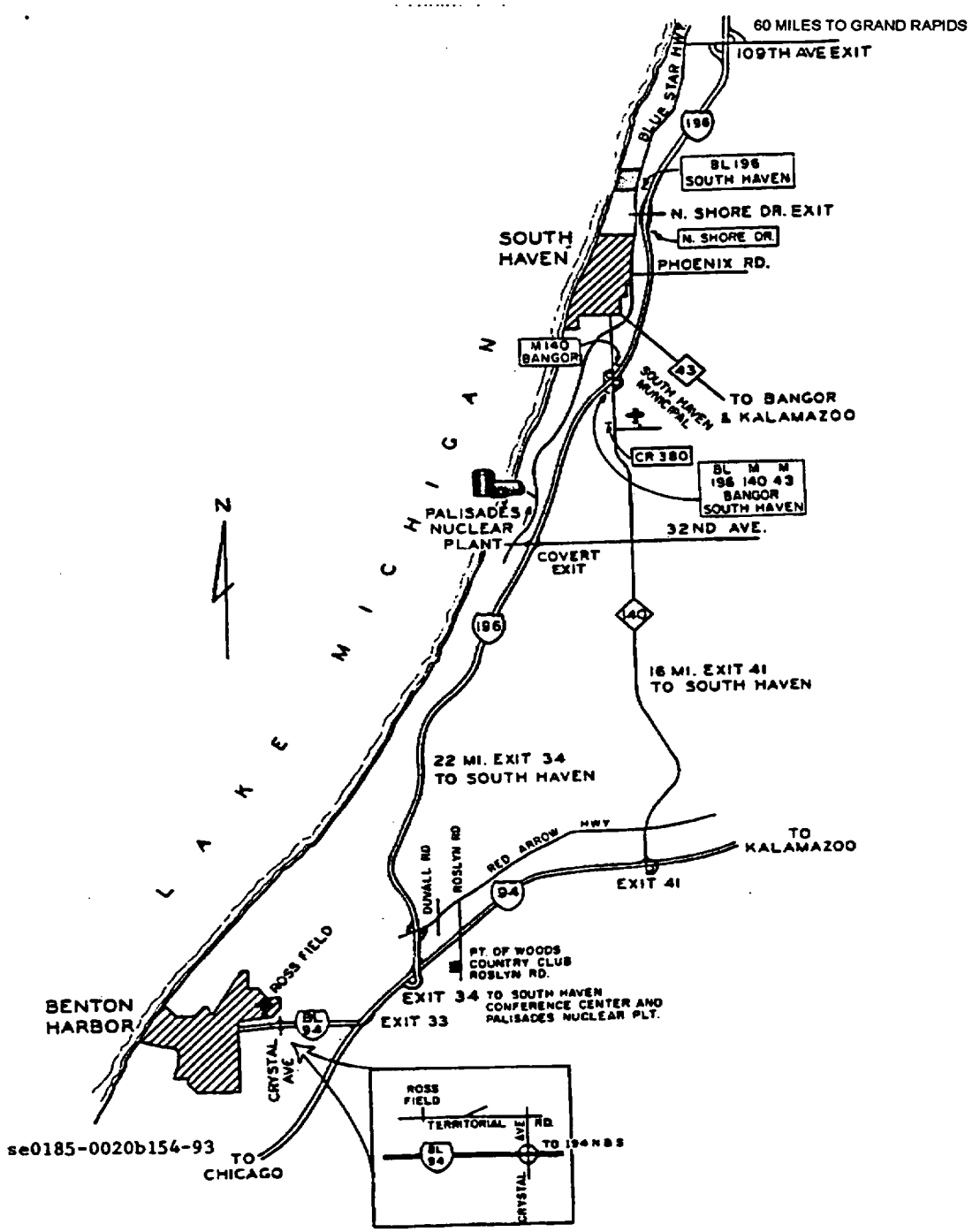

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FIGURE 2-2
PALISADES FACILITIES

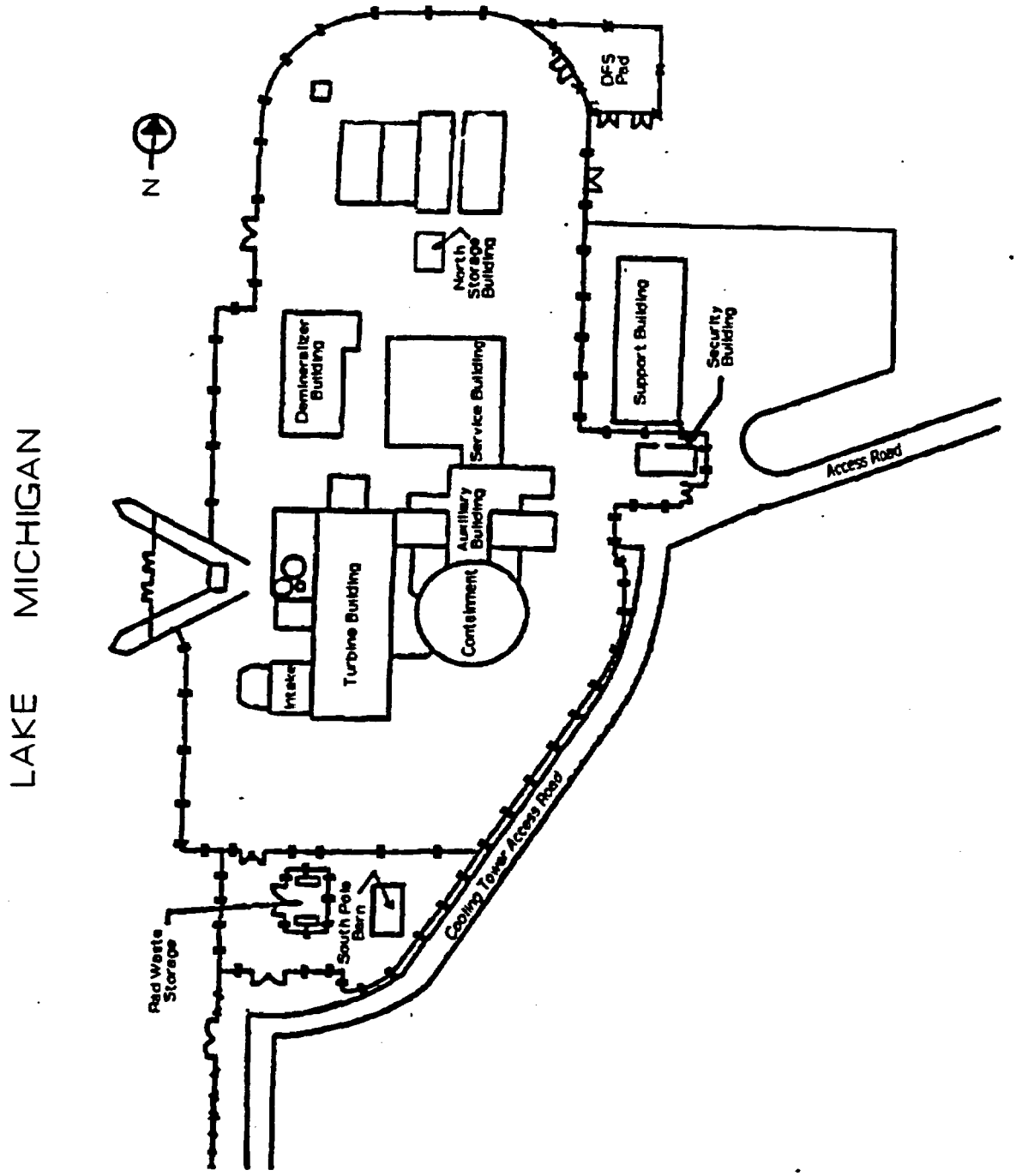

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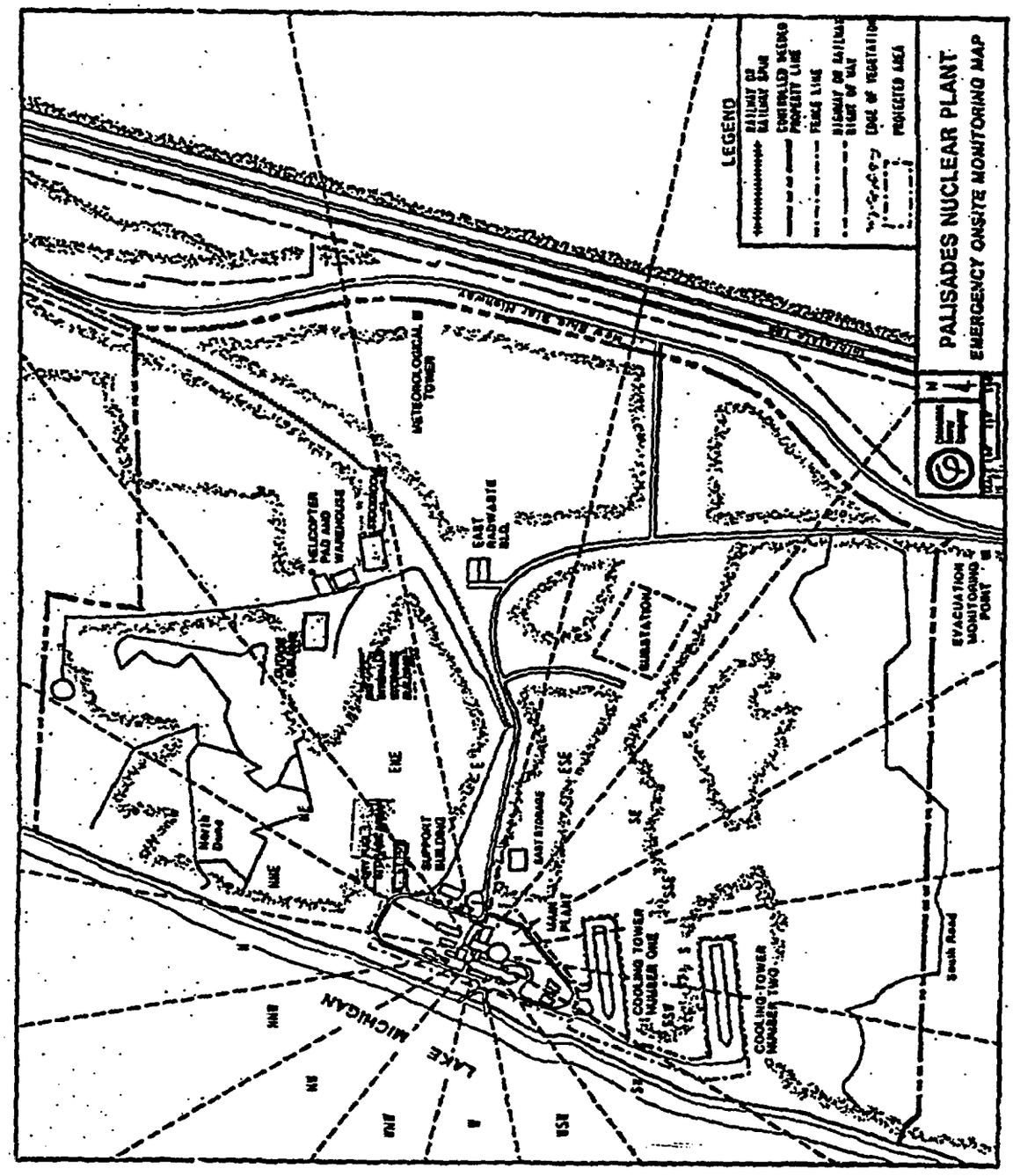
FIGURE 2-3
PALISADES NUCLEAR PLANT SITE



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3.0 SITE EMERGENCY PLAN SUMMARY

The Emergency Plan establishes the basic steps that will be used to determine the response of the emergency organization for each of four emergency classes. The emergency classes are as follows: Unusual Event, Alert, Site Area Emergency, and General Emergency. The conditions that must exist for the declaration of a specific emergency class are presented in Emergency Implementing Procedure EI-1, "Emergency Classification and Actions."

The declaration of each class will lead to specific notification of offsite authorities. Emergency facilities shall be activated as described in Table 3-1, "Emergency Classifications and the Level of Response by Participating Groups," and staffed as presented in Section 5 of the Palisades Site Emergency Plan. In response to a particular event, certain protective actions may be initiated or certain offsite agencies may be activated. These actions are detailed in Section 6 of the Palisades Site Emergency Plan.

For emergencies which result in (1) the release of radioactive materials greater than specified levels, or (2) the degradation of barriers to the release of radioactive materials, assessments of the offsite consequences or the projected offsite consequences shall be made. These assessments will be transmitted to the offsite authorities responsible for taking protective actions on behalf of the general public. Recommendations to these offsite authorities will be based on the protective actions identified in Table 6-2 from the Palisades Site Emergency Plan.

3.1 EMERGENCY PLAN STEPS

In general, the Emergency Plan encompasses the following basic steps:

a. Detection of the emergency

b. Classification of the emergency

c. Notification of offsite agencies

d. Activation of the responding organization(s)

e. Assessment of the situation

f. Initiation of protective actions

g. Initiation of corrective actions

h. Aid to affected persons

i. Reentry and recovery

3.2 NUCLEAR MANAGEMENT COMPANY EMERGENCY ORGANIZATION

This Emergency Plan establishes an organization capable of responding to the complete spectrum of incidents covered by this Emergency Plan. Provisions are made for rapid notification of appropriate portions of the response organization, and for expanding the response organization if the situation dictates.

An individual having the authority and responsibility to initiate any emergency actions within the provisions of this Emergency Plan, including the exchange of information with authorities responsible for coordinating offsite emergency measures, is onsite at all times. This individual is the Shift Manager (who assumes the role of Site Emergency Director), until relieved by Plant upper management.

The operating shift crew is responsible for implementing emergency action(s) in accordance with assigned response functions. Emergency response functions are also assigned to additional Plant staff personnel who are rapidly alerted and mobilized to augment or relieve the operating shift personnel of emergency duties as deemed appropriate by the Site Emergency Director, and in accordance with the implementing procedures of this Plan.

In addition, this Plan includes offsite agencies and organizations who have signed letters of agreement with Palisades Nuclear Power Plant (see Appendix A). Their designated response functions include implementation of offsite protective actions, transportation and treatment of personnel requiring medical treatment, control of access to the station, fire-fighting support, radiological sampling and assessment, technical consultation, and testing.

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3.3 EMERGENCY CLASSIFICATIONS

Emergencies are grouped into four classifications listed below in order of severity:

a. Unusual Event

Events are in process or have occurred which indicate a potential degradation of the level of safety of the Plant. Unusual Events involve minor situations that have the potential to escalate to more serious emergencies.

b. Alert

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the Plant. The consideration is, as in an Unusual Event, to prepare to cope with potentially more serious emergencies. Alerts may involve releases of radioactivity limited to small fractions of the EPA Protective Guidelines.

c. Site Area Emergency

Events are in process or have occurred which involve actual or likely major failures of Plant functions needed for protection of the public. The potential for a situation hazardous to the general public is the major concern during a Site Area Emergency. Any releases are not expected to exceed EPA Protective Action Guidelines except near site boundary.

d. General Emergency

Events are in process or have occurred which involve actual or imminent core degradation with the potential for loss of containment integrity. Releases can reasonably be expected to exceed EPA Protective Action Guidelines exposure levels offsite for more than the immediate site area.

Section 4 from the Palisades Nuclear Plant Site Emergency Plan contains a more detailed discussion of the classifications of emergencies. Table 3-1, "Emergency Classifications and the Level of Response by Participating Groups," shows, in column form, the emergency classifications, and the degrees of involvement of onsite and offsite organizations.

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3.4 EMERGENCY ACTIONS

In all instances, when one of the classifications of the above emergencies occurs in the Plant, the Shift Manager is responsible for taking immediate action to safeguard personnel and equipment. Utilizing the Site Emergency Plan Implementing Procedures, the Shift Manager shall activate the necessary portions of the Site Emergency Plan. The basic considerations for safe operation of the Plant, and for action in the event of an emergency in the Plant, are summarized as follows:

a. In any event, protection of Plant personnel and the public is the highest priority. Plant system and equipment protection is secondary.

b. When there is doubt as to the classification of the emergency condition, the more conservative case is considered.

c. The instrumentation is assumed to be providing correct information unless it is clearly identified that an instrument is erroneous or out of service.

d. All alarms are promptly acknowledged, any required response action is taken, and an immediate investigation of the cause which initiated the alarm is made.

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TABLE 3-1
EMERGENCY CLASSIFICATIONS AND THE LEVEL OF RESPONSE BY PARTICIPATING GROUPS

EMERGENCY	SHIFT RESPONSE	NOTIFICATION	PLANT STAFF RESPONSE	SUPPORT RESPONSE
Unusual Event	Investigate. Shift Manager activates appropriate emergency team(s).	Duty and Call Superintendent, Van Buren County, State, and NRC.	Supplement on-shift resources as needed.	None
Alert	Investigate. Shift Manager activates appropriate emergency teams. Required in-plant protective actions performed.	Duty and Call Superintendent, Van Buren County, State, NRC, and staff augmentation.	TSC/OSC/EOF activation. Supplement activated emergency teams. Investigate event, assist shift personnel in controlling Plant response. Assess radiological consequences.	Site Emergency Director determines need for offsite support.
Site Area Emergency	Investigate. Shift Manager activates teams. Required in-plant protective actions performed.	Duty and Call Superintendent, Van Buren County, State, NRC, and staff augmentation.	TSC/OSC/EOF activation. Supplement activated emergency teams. Investigate event, assist shift personnel in controlling Plant response. Assess radiological consequences.	Determine need for further support. Acquire offsite support as required.
General Emergency	Investigate. Shift Manager activates appropriate teams. Required Plant protective actions performed.	Duty and Call Superintendent, Van Buren County, State, NRC, and staff augmentation.	TSC/OSC/EOF activation. Supplement activated emergency teams. Investigate event, assist shift personnel in controlling Plant response. Assess radiological consequences. Site Emergency Director/EOF Director provides protective action recommendations to offsite authorities.	Determine need for further offsite support. Acquire offsite support as required.

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4.0 EMERGENCY CONDITIONS

4.1 EMERGENCY CLASSIFICATION SYSTEM

This Site Emergency Plan provides four mutually exclusive classifications covering the postulated spectrum of emergency situations. For each classification, a particular set of immediate actions to be taken is established as described in Section 6, of the Site Emergency Plan. Actions for each of the four mutually exclusive classifications are defined in Emergency Implementing Procedure EI-1, "Emergency Classification and Actions," Attachment 2, "Emergency Actions."

The various classifications of accidents represent a hierarchy of accidents based on potential or actual hazards presented to the general public. Accidents may be classified in a lower category at first and then escalated to another higher classification if the situation deteriorates. Accident classification may be downgraded as conditions improve. The four classes that comprise the Emergency Classification System are:

a. Unusual Event

b. Alert

c. Site Area Emergency

d. General Emergency

All emergency measures begin with the notification of the Shift Manager that a situation exists which presents a real or potential hazard. This is followed by assessment and evaluation by the Shift Manager, classification of the emergency, notifications, and activation and/or mobilization of the applicable emergency organizations. Section 6 summarizes the emergency measures to be taken by both the onsite and offsite emergency organizations.

Emergency Action Levels (EALs) are used to describe each of the four emergency classes. These levels are composed of a combination of Plant parameters (such as instrument readings and system status) that can be used to give relatively quick indication to the Plant operating staff of the severity of the accident situation.

The purpose of the EAL is to provide the earliest possible identification of actual or potential accident situations. In most cases, further assessment action will be conducted both onsite and offsite before actual protective actions are initiated. EALs associated with radioactive releases are related to the Environmental Protection Agency's Protective Actions Guides (PAG) summarized in EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents." An assessment by the Plant emergency organization along with state support agencies of the potential of reaching or exceeding the PAG will be performed following the declaration of an emergency class.

When EALs are observed in conjunction with Plant or equipment status due to planned maintenance or testing activities, an emergency condition does not exist.

A conservative philosophy for classification shall be used to declare the highest classification for which an EAL has been exceeded. For example, a Site Area Emergency would be declared directly if a Site Area Emergency level is exceeded without having previously been declared in a lower Alert classification.

The Emergency Action Levels are not necessarily all inclusive. The Site Emergency Director shall declare an appropriate emergency classification whenever, in his personal judgment, the Plant status warrants such a declaration.

Palisades Emergency Action Levels can be found in Table 4-2 of this section. The current revision of the EALs are in Emergency Implementing Procedure EI-1, "Emergency Classification and Actions."

4.1.1 Unusual Event

The Unusual Event is the least severe of the four emergency classifications. For the purposes of this plan, an Unusual Event is defined as that situation where events are in process or have occurred which indicate a potential degradation of the level of safety of the Plant.

The purpose of the Unusual Event declaration is to:

a. Assure that the first step in any response later found to be necessary has been carried out.

b. Bring the Plant operations staff to a state of readiness.

c. Provide systematic handling of Unusual Events information and decision making.

Guidelines for Plant, State, and local actions are listed in Table 4-1. An incident shall be classified as an Unusual Event if the event is minor in nature, involves no releases of radioactive material requiring offsite response or monitoring, and presents no immediate hazard to the public. Events in this classification are selected based upon a potential to degenerate to a more severe situation rather than an actual public hazard.

4.1.2 Alert

An Alert is defined as that situation where events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the Plant. The Alert class involves relatively minor emergency situations that have a direct effect on the Plant safety-related systems. The Alert shall set into motion personnel onsite and offsite who would be required to perform actions up to and including the evacuation of near-site areas. The Alert class also addresses limited releases of radioactive material and, therefore, might require some assessment actions by the emergency organizations.

The purpose of the Alert declaration is to:

a. Assure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required.

b. Provide offsite authorities current status information.

Guidelines for Plant, State, and local actions are listed in Table 4-1. An incident shall be classified as an Alert if there is real or potential limited releases of radioactive material to the environment. A situation shall be classified at the Alert level only if EALs for higher classification have not been exceeded or are not expected to be exceeded in the near term.

4.1.3 Site Area Emergency

A Site Area Emergency is defined as that situation where events are in process or have occurred which involve actual or likely major failure of Plant functions needed for protection of the public.

The purpose of the Site Area Emergency declaration is to:

a. Assure that emergency response facilities are manned.

b. Assure that radiation monitoring teams are dispatched both onsite and offsite.

c. Assure that personnel required for evacuation of near-site areas are at their duty stations if the situation becomes more serious.

d. Provide consultation with offsite authorities.

e. Provide updates for the public through offsite authorities.

Guidelines for Plant, State, and local actions are listed in Table 4-1. Although immediate protective actions are not automatically required, declaration of a Site Area Emergency shall set into motion all personnel onsite and offsite who would be required to perform actions up to and including the evacuation of near-site areas. Dispatched radiation monitoring teams will make continuing assessments to provide officials with information to decide protective actions. The Site Area Emergency classification includes accidents which have significant radiation release potential.

Unlike the Unusual Event and Alert classifications of emergencies, the Site Area Emergency classification may involve some radiation exposure to the near-site public. Many of the accidents included in this classification have the potential for degradation to the General Emergency classification. Although the EALs for this classification have been selected at values well below the EPA PAGs, offsite monitoring team reports and continuing assessment actions shall lead to any final decision on protective actions to be taken.

Accidents which have significant potential for the release of radioactive material shall be classified as a Site Area Emergency.

4.1.4 General Emergency

The General Emergency is the most severe classification of emergency. The General Emergency classification is defined as that situation where events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment such that releases can be reasonably expected to exceed EPA PAGs offsite for more than the immediate site area.

The purpose of the General Emergency declaration is to:

a. Initiate predetermined protective actions for the public.

b. Provide continuous assessment of information from Palisades Plant, and offsite monitoring groups.

c. Initiate additional measures as indicated by event releases or potential releases.

d. Provide consultation with offsite authorities.

e. Provide updates for the public through offsite authorities.

Guidelines for Plant, State, and local actions are listed in Table 4-1. Some protective actions may be recommended upon declaration of the General Emergency since the lower limits of the EPA PAGs are likely to be exceeded. Emergency Action Levels (EAL) have been selected so that time should be available to make some confirmatory measurements in the field prior to implementation of the more extensive (ie, evacuation) protective action. Some of the General Emergency action levels require a dose projection calculation using actual meteorology. This differs from the adverse meteorology assumptions used in the Site Emergency action levels in order to remove this built-in conservatism and to preclude declaring a General Emergency when actual conditions do not warrant the higher classification. Declaration of a General Emergency requires a recommendation to the State for protective actions for the local population.

4.2 CLASSIFICATION OF POSTULATED ACCIDENTS

The events postulated in Section 14, Palisades Plant Final Safety Analysis Report (FSAR), may be categorized into one or more of the four emergency classifications. A complete discussion of these events may be found in the FSAR.

TITLE: SITE EMERGENCY PLAN

TABLE 4-1
GUIDELINES FOR PLANT, STATE AND LOCAL ACTIONS

CLASS	LICENSEE ACTIONS	STATE AND/OR LOCAL OFFSITE AUTHORITY ACTIONS
UNUSUAL EVENT **Class Description** Events are in process or have occurred which indicate a potential degradation of the level of safety of the Plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs. **Purpose** Purpose of offsite notification is to: (1) assure that the first step in any response later found to be necessary has been carried out, (2) bring the operating staff to a state of readiness, and (3) provide systematic handling of Unusual Events information and decision making.	1. Promptly inform state and local offsite authorities of nature of unusual condition as soon as discovered. 2. Augment on-shift resources as needed. 3. Assess and respond. 4. Escalate to a more severe class, if appropriate, or 5. Close out with verbal summary to offsite authorities; followed by written summary.	1. Provide fire or security assistance if requested. 2. Escalate to a more severe class, if appropriate. 3. Stand by until verbal closeout.

TITLE: SITE EMERGENCY PLAN

TABLE 4-1
GUIDELINES FOR PLANT, STATE AND LOCAL ACTIONS

CLASS	LICENSEE ACTIONS	STATE AND/OR LOCAL OFFSITE AUTHORITY ACTIONS
ALERT **Class Description** Events are in process or have occurred which involve an actual or potential substantial degradation of the level o safety of the plant. Any releases expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. **Purpose** Purpose of the Alert is to (1) assure that emergency personnel are readily available to respond if situation becomes more serious or to perform confirmatory radiation monitoring if required, and (2) provide offsite authorities current status information.	1. Promptly inform state and local offsite authorities of Alert status and reason for emergency as soon as discovered. 2. Augment resources by activating onsite Technical Support Center, onsite Operational Support Center, and near-site Emergency Operations Facility (EOF). 3. Assess and respond. 4. Dispatch onsite monitoring teams and associated communications. 5. Designate an individual for Plant status updates to offsite authorities. 6. Provide meteorological assessments to offsite authorities, and if any releases are occurring, dose estimates for actual releases. 7. Escalate to a more severe class, if appropriate or 8. Close out or recommend reduction in emergency class by briefing of offsite authorities at EOF and by phone followed by written summary.	1. Provide fire or security assistance if requested. 2. Augment resources and bring primary response centers and Emergency Alert System to standby status. 3. Alert to standby status key emergency personnel including monitoring teams and associated communications. 4. Provide confirmatory off-site radiation monitoring and ingestion pathway dose projections if actual releases substantially exceed Technical Specification limits. 5. Escalate to a more severe class, if appropriate. 6. Maintain Alert status until verbal closeout or reduction of emergency class.

TITLE: SITE EMERGENCY PLAN

TABLE 4-1
GUIDELINES FOR PLANT, STATE AND LOCAL ACTIONS

CLASS	LICENSEE ACTIONS	STATE AND/OR LOCAL OFFSITE AUTHORITY ACTIONS
SITE AREA EMERGENCY **Class Description** Events are in process or 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 site boundary. **Purpose** Purpose of the Site Area Emergency declaration is 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 duty stations if situation becomes more serious, (4) provide consultation with offsite authorities, and (5) provide updates for the public through offsite authorities.	1. Promptly inform state and local offsite authorities of Site Area Emergency status and reason for emergency as soon as discovered. 2. Augment resources by activating onsite Technical Support Center, onsite Operational Support Center, and near-site Emergency Operations Facility (EOF). 3. Assess and respond. 4. Dispatch onsite and offsite monitoring teams and associated communications. 5. Designate an individual for Plant status updates to offsite authorities and periodic press briefings (perhaps joint with offsite authorities). 6. Make senior technical and management staff onsite available for consultation with NRC and state on a periodic basis. 7. Provide meteorological and dose estimates to offsite authorities for actual releases via a designated individual or automated data transmission. Cont'd on next page.	1. Provide any assistance requested. 2. If sheltering near the site is desirable, activate public notification system within at least two miles of the Plant. 3. Provide public within at least about 10 miles periodic updates on emergency status. 4. Augment resources by activating primary response centers. 5. Dispatch key emergency personnel including monitoring teams and associated communications. 6. Alert to standby status other emergency personnel (eg, those needed for evacuation) and dispatch personnel to near-site duty stations. 7. Provide off-site monitoring results to licensee, DOE, and others and jointly assess them. Cont'd on next page.

TITLE: SITE EMERGENCY PLAN

TABLE 4-1
GUIDELINES FOR PLANT, STATE AND LOCAL ACTIONS

CLASS	LICENSEE ACTIONS	STATE AND/OR LOCAL OFFSITE AUTHORITY ACTIONS
SITE AREA EMERGENCY *(cont)*	8. Provide release and dose projections based on available Plant condition information and foreseeable contingencies. 9. Escalate to a General Emergency class, if appropriate. or 10. Close out or recommend reduction in emergency class by briefing of offsite authorities at EOF and by phone followed by written summary	8. Continuously assess information from licensee and offsite monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources. 9. Recommend placing milk animals within 10 miles on stored feed and assess need to extend distance. 10. Provide press briefings with licensee. 11. Escalate to General Emergency class, if appropriate. 12. Maintain General Emergency status until closeout or reduction of emergency class.

TITLE: SITE EMERGENCY PLAN

TABLE 4-1
GUIDELINES FOR PLANT, STATE AND LOCAL ACTIONS

CLASS	LICENSEE ACTIONS	STATE AND/OR LOCAL OFFSITE AUTHORITY ACTIONS
GENERAL EMERGENCY **Class Description** Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area. **Purpose** Purpose of the General Emergency declaration is to: (1) initiate predetermined protective actions for the public, (2) provide continuous assessment of information from licensee and offsite organization measurement, (3) initiate additional measures as indicated by actual or potential releases, (4) provide consultation with offsite authorities, and (5) provide updates for the public through offsite authorities.	1. Promptly inform state and local offsite authorities of General Emergency status and reason for emergency as soon as discovered (parallel notification of state/local). 2. Augment resources by activating onsite Technical Support Center, and onsite Operational Support Center and near-site Emergency Operations Facility (EOF). 3. Assess and respond. 4. Dispatch onsite and offsite monitoring teams and associated communications. 5. Designate an individual for Plant status updates to offsite authorities and periodic press briefings (perhaps joint offsite authorities). 6. Make senior technical and management staff onsite available for consultation with NRC and state on a periodic basis. 7. Provide meteorological and dose estimates to offsite authorities for actual releases via a designated individual or automated data transmission.	1. Provide any assistance requested. 2. Activate immediate public notification of Emergency status and provide public periodic updates. 3. For actual or projected severe core damage accidents or loss of control of facility, recommend evacuation for 2 mile radius and 5 miles downwind (unless conditions make evacuation dangerous) and assess need to extend distances. Advise the remainder of plume EPZ to go indoors and listen to Emergency Alert System (EAS) messages. 4. Augment resources by activating primary response centers. 5. Dispatch key emergency personnel including monitoring teams and associated communications. 6. Dispatch other emergency personnel to duty stations within five-mile radius and alert all others to standby status. 7. Provide offsite monitoring results to licensee, DOE, and others and jointly assess them.

Cont'd on next page.

TITLE: SITE EMERGENCY PLAN

TABLE 4-1
GUIDELINES FOR PLANT, STATE AND LOCAL ACTIONS

CLASS	LICENSEE ACTIONS	STATE AND/OR LOCAL OFFSITE AUTHORITY ACTIONS
GENERAL EMERGENCY (cont)	8. Provide release and dose projections based on available Plant condition information and foreseeable contingencies. 9. Close out or recommend reduction in emergency class by briefing of offsite authorities at EOF and by phone followed by written summary.	8. Continuously assess information from licensee and offsite monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources. 9. Recommend placing milk animals within 10 miles on stored feed and assess need to extend distance. 10. Provide press briefings with licensee. 11. Maintain General Emergency status until closeout or reduction of emergency class.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
ALARMS/ANNUNCIATORS

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
ALERT	Loss of most or all alarms (annunciators) in Control Room.	Observation - Modes 3, 4, 5, and 6. Example - loss of DC Panel D21-2 Ref: ONP-2.3
SITE AREA EMERGENCY	Loss of most or all alarms (annunciators) in Control Room AND Plant transient initiated or in progress.	Observation - Modes 1 and 2 OR Modes 3, 4, 5, and 6 with transient in progress. Example - loss of DC Panel D21-2 Ref: ONP-2.3

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

COMMUNICATION/ LOSS

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Significant loss of offsite communication capability. **NOTE:** For failures of the Palisades Public Warning System, see Palisades Administrative Procedure 4.00, "Operations Organization, Responsibilities and Conduct," Section 5.5.	Loss of the Emergency Notification System (ENS), and all other phones including satellite phones, that could be used to make notifications to Van Buren County, the State of Michigan and the NRC. **NOTE:** The availability of one phone is sufficient to inform offsite authorities of plant problems.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
DRY FUEL STORAGE CASK-ISFSI

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Incident involving a loaded fuel storage cask **OUTSIDE** the Auxiliary Building.	Radiation level ≥ 1 rem/hr at 1 ft from a Dry Fuel Storage Cask. OR Radioactive contamination level 10^5 dpm/100cm^2 beta-gamma or 10^3 dpm/100cm^2 alpha from a Dry Fuel Storage Cask. OR Airborne radioactivity analysis indicating ≥ 10 times the Effluent Concentration levels from a Dry Fuel Storage Cask. (10CFR20, Appendix B, Table 2) OR SED opinion based on direct observation that containment/shielding of a Dry Fuel Storage Cask has been degraded due to an operational event (cask drop, missile impact, etc).

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

ENGINEERED SAFETY FEATURES

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Inability to reach a required mode within Technical Specification limits.	Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Limit.
ALERT	Failure of the Reactor Protection System (RPS) Instrumentation to complete or initiate an AUTOMATIC Reactor Scram once a Reactor Protection System Setpoint has been exceeded AND a Manual Scram was successful.	The Reactor Protection System (RPS) Setpoint exceeded AND the Automatic RPS actuation did NOT OCCUR AND Manual Reactor Trip from CO-2 or CO-6 was successful.
	Complete loss of any functions needed for Mode 5.	Both S/Gs are not available for PCS heat removal AND uncontrolled PCS heatup is in progress AND PCS temperature will exceed 200°F in the next hour (use actual heatup rate if available). Ref: ONP-17
SITE AREA EMERGENCY	Complete loss of heat removal capability.	Loss of Primary Coolant System and Core Heat Removal. (EOP-9.0 Heat Removal (HR-3) Safety Function NOT Met.)
	Failure of the RPS Instrumentation to complete or initiate an AUTOMATIC Reactor Scram and a RPS Setpoint has been exceeded AND a Manual Scram was NOT successful.	An RPS Setpoint(s) exceeded AND Automatic RPS actuation did NOT occur AND manual reactor trip from CO-2 and CO-6 was NOT successful.
GENERAL EMERGENCY	Failure of the RPS to complete an AUTOMATIC SCRAM AND Manual Scram was NOT successful AND there is indication of an extreme challenge to the ability to cool the core.	Failure of RPS to complete an AUTOMATIC Reactor Trip AND the Manual Reactor Trip from CO-2 and CO-6 was NOT successful AND there are indications of extreme challenge to the Primary Coolant System AND Core Heat Removal. (EOP-9.0 Heat Removal (HR-3) Safety Function NOT Met)

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

EVACUATION, CONTROL ROOM

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
ALERT	Evacuation of Control Room anticipated or required with control of shutdown systems established at local stations.	Observation. Ref: ONP-25.2
SITE AREA EMERGENCY	Evacuation of Control Room and control of shutdown systems not established at local stations within 15 minutes.	Observation. Ref: ONP-25.2

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

FIRE

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Fire within the Plant lasting more than 10 minutes.	Observation OR Fire detection alarm, confirmed by observation.
ALERT	Fire potentially affecting safety systems.	Fire can potentially disable equipment which will result in jeopardizing safety function(s) OR SED opinion. Ref: ONP-25.1
SITE AREA EMERGENCY	Fire compromising the function of safety systems.	Fire has disabled equipment resulting in jeopardized safety function(s). Ref: ONP-25.1

NOTE: See General Emergency classification under the Miscellaneous category for a fire which could cause massive damage to the Plant systems

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
FISSION PRODUCT BARRIERS/FUEL DAMAGE

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Loss or Potential Loss of **CONTAINMENT BARRIER**	SEE TABLE 1
ALERT	Loss or Potential Loss of **EITHER** **FUEL CLAD BARRIER** OR **PCS BARRIER**	SEE TABLE 1
	Fuel damage/handling accident with release of radioactivity to Containment or Auxiliary Building.* ***Note:** For incidents involving Dry Fuel Storage Casks outside the Auxiliary Building. See Dry Fuel Storage Cask-ISFSI classification, page 34.	Failed fuel as indicated by abnormally High Area or Process Radiation Monitors in Containment and/or Auxiliary Building; confirmed by sample analysis OR SED's opinion.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
FISSION PRODUCT BARRIERS/FUEL DAMAGE

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
SITE AREA EMERGENCY	Loss or Potential Loss of any **TWO BARRIERS**	SEE TABLE 1
	Major damage to irradiated fuel in Fuel Handling Building	Large object damages fuel or water loss below fuel level as indicated by abnormally High Area Monitors in the Auxiliary Building.
GENERAL EMERGENCY	Loss of any **TWO BARRIERS** AND Potential Loss of **THIRD BARRIER**	SEE TABLE 1

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

FISSION PRODUCT BARRIERS/FUEL DAMAGE TABLE 1

FUEL CLAD BARRIER	Potential Loss	**PCS Inventory** Reactor water level indicates < 11 inches above the bottom of the fuel alignment plate	**CETs** CETs indicate > 700°F		
	Loss	**PCS Activity** Coolant Activity > 32 µCi/gm Dose Equivalent Iodine See EI-7.0	**CETs** CETs indicate > 1200°F		**Containment Activity** Containment Gamma Monitor (RIA-2321 OR RIA-2322) reading > 4.0 E3 R/hr. See EI-11
PCS BARRIER	Potential Loss	**PCS Inventory** Unisolable leak exceeding the capacity of one charging pump (40 gpm)			
	Loss	**PCS Inventory** Leak greater than available makeup capacity as indicated by < 25°F of PCS subcooling	**PCS Inventory** SGTR that results in an SIAS		
CONTAINMENT BARRIER	Potential Loss	**Containment Atmosphere** Pressure > 70 psia **OR** H_2 conc > 4.0% **OR** Pressure > 4.0 psig with less than one full train of Containment Cooling Equipment operating (EOP-9.0 CA-3 safety function not met)	**CETs** CETs > 1200°F for more than 15 minutes **OR** CETs > 700°F with reactor vessel level < 11 inches above the bottom of the fuel alignment plate for more than 15 minutes	**Containment Isolation** A steam leak that cannot or will not be isolated by EOP Supplements 17 and 18.	**Containment Activity** Containment Gamma Monitor (RIA-2321 or RIA-2322) reading > 2.5 E4 R/hr
	Loss	**Containment Atmosphere** Rapid unexplained pressure drop following initial rise **OR** Containment pressure or sump level response not consistent with LOCA conditions	**SGTR** Primary to Secondary leakrate greater than 10 gpm with a steam leak that cannot or will not be isolated by EOP Supplements 12 and 13 on affected Steam Generator	**Containment Isolation** Containment Isolation Valve(s) not closed following completion of EOP Supp. 6 and/or a **DIRECT** pathway to the environment exists. See NOTE 1	

NOTE: **'DIRECT'** pathways to the environment include release pathways through in-line charcoal filters. Pathways through interfacing liquid systems (eg, CCW, PCS Sample, Letdown, Demineralized Water, Clean Waste Receiver Tank Recirculation, Steam Generator Blowdown, Main Steam, Main Feedwater) or releases to the environment (eg; elevated readings on RIA 2326 or 2327 or by radiological monitoring teams) should be evaluated to determine if they represent a **'DIRECT'** pathway to the environment.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
HAZARDS-GENERAL

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Aircraft crash onsite or unusual aircraft activity over facility which could affect Plant operation. **NOTE:** Onsite is defined as the Owner Controlled Area outside of the Protected Area, not including structures.	Observation of event AND SED's opinion.
	Near or onsite explosion which could affect Plant operation.	Observation of event OR notification from offsite authorities AND SED's opinion.
	Near or onsite toxic or flammable gas which could affect Plant operation. **NOTE:** Refer to the Oil and Hazardous Materials Spill Prevention Plan.	Observation of event OR notification from offsite authorities AND SED's opinion.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
HAZARDS-GENERAL

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
ALERT	Aircraft crash on facility. **NOTE:** Facility is defined as nonvital structures inside and outside of the Protected Area.	Observation.
	Missile impact from whatever source on facility.	Observation.
	Known explosion damage to facility affecting Plant operation.	Observation.
	Entry into facility environs of uncontrolled toxic or flammable gas which does affect Plant operation. **NOTE:** Refer to the Oil and Hazardous Materials Spill Prevention Plan.	Observation OR warning from offsite authorities OR detection with portable instrumentation AND SED's opinion.
SITE AREA EMERGENCY	Aircraft crash affecting Vital structures by impact or fire AND Plant not in Mode 5 or 6.	Observation.
	Severe damage to equipment required for safe shutdown from missiles or explosion.	Observation.
	Entry of uncontrolled flammable gas into Vital areas OR entry of uncontrolled toxic gas into Vital areas that constitute a safety problem AND Plant not in Mode 5 or 6.	Observation OR SED's opinion OR detection with portable instrumentation.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

MISCELLANEOUS

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Plant conditions exist that warrant increased awareness on the part of the Plant staff or state and/or local authorities. **NOTE:** For Rx trips from high PCS pressure (initiating event), see "Primary Coolant System Temperature or Pressure" category. For coolant radioactivity exceeding Technical Specifications, see "Fission Product Barriers/Fuel Damage."	SED's opinion.
ALERT	Plant conditions exist that warrant precautionary activation of Technical Support Center and placing Emergency Operations Facility and other emergency personnel on standby.	SED's opinion OR when 10CFR50.54(x) is invoked.
SITE AREA EMERGENCY	Plant conditions warrant the activation of State and County Emergency Operations Centers and monitoring teams or a precautionary notification to the public near the site.	SED's opinion OR continued power operation outside the Plant's licensed basis, when 10CFR50.54(x) is invoked.
GENERAL EMERGENCY	Conditions exist that make release of large amounts of radioactivity in a short time possible (eg, any core melt situation).	SED's opinion.
	Any major internal or external events (eg, fires, earthquakes, substantially beyond design basis) which could cause massive common damage to Plant systems.	SED's opinion.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

NATURAL PHENOMENON

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Any earthquake felt in-Plant or detected on station seismic instrumentation which does NOT cause damage to Plant equipment or structures.	Observation (see Note[1]), or measurement (see Note[2]).
	Abnormal water levels including flood or low water or seiche.	Flood, seiche - observation of water approaching 590' level. Low water - Ultimate Heat Sink level lowers to ≤ 572'0" (216" below Intake Structure floor level; LI-1338)
	Tornado onsite.	Observation
ALERT	Any earthquake that exceeds operating base earthquake surface acceleration levels of 0.1G, but not greater than 0.2G; no damage to equipment required for safe shutdown.	Observation (see Note[1]), or measurement (see Note[2]).
	Flood, low water, or seiche near design basis.	Flood, seiche - observation of water above 590' level. Low water - Ultimate Heat Sink level lowers to 569' (LI-1338).
	Tornado striking facility. **NOTE**: Facility is defined as nonvital structures inside and outside of the Protected Area.	Observation

NOTE[1]: Information on seismic disturbances can be obtained by calling the National Earthquake Information Center, Denver, Colorado, at 1-303-273-8500 (normal hours), or 1-303-273-8428 (off normal hours).

NOTE[2]: Seismic instrumentation is available onsite for post emergency assessment of earthquakes. There are 4 peak recording accelerometers located in Containment on elevations 590', 607', 625', and 649'; these accelerometers require offsite analysis. One strong motion accelerometer is located in the switchyard battery room; this accelerometer is capable of onsite PC analysis. Surveillance checks on these instruments are performed by the I&C Department.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
NATURAL PHENOMENON

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
SITE AREA EMERGENCY	Any earthquake that exceeds safe shutdown earthquake surface acceleration levels or 0.2G.	Measurement. (See Note[2] Page 13)
	Any earthquake that is of sufficient magnitude to cause damage to equipment and structures needed to safely shut down the Plant.	Observation. (See Note[1] Page 13)
	Flood, low water, or seiche greater than design levels OR failure of protection of Vital equipment at lower levels.	Flood, seiche - observation of water above 594' level. Low water - loss of Ultimate Heat Sink resulting in inability to operate any Service Water Pump to provide adequate cooling to vital equipment for greater than 15 minutes. This equates to an Ultimate Heat Sink level of ≤ 565'9" (LI-1338). Others - observation of equipment damage.
	Tornado or sustained winds in excess of design level; ie, of sufficient magnitude to cause damage to equipment and structures needed to safely shut down the Plant.	Observation. Notification by offsite agencies.

NOTE: For earthquakes substantially beyond Design Basis, see "Miscellaneous" category under General Emergency classification.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
PLANT POWER ELECTRICAL

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Both Station Batteries not available.	Both battery breakers open for greater than one hour AND EK-0548 125 DC Bus undervoltage trouble NOT alarming AND PCS temperature greater than 200°F highest T_H/T_C.
	Loss of offsite AC power.	Loss of all qualified circuits from offsite **AND** onsite power is being supplied by diesel generator(s).
	Loss of emergency onsite AC power.	Both Emergency Diesel Generators inoperable for greater than two hours AND PCS temperature is greater than 200°F highest T_H/T_C.
ALERT	Loss of offsite AND onsite AC power for less than 15 minutes.	Bus 1C AND 1D low voltage (C-04).
	Loss of all onsite DC power.	DC Bus D11A AND D21A de-energized OR both DC Bus voltages less than 105V. EVI-27D1 & EVI-27D2 (D-30L/D-30R)
SITE AREA EMERGENCY	Loss of offsite AND onsite AC power for more than 15 minutes.	Bus 1C AND 1D low voltage (C-04).
	Loss of all vital onsite DC power for more than 15 minutes, AND Plant not in Mode 5 or 6.	DC Bus D11A AND D21A deenergized OR both DC Bus voltages less than 105V. EVI-27D1 & EVI-27D2 (D-30L/D-30R)
GENERAL EMERGENCY	Loss of offsite and onsite AC power AND there is indication of extreme challenge to ability to cool the core.	Bus 1C AND 1D low voltage (C-04) AND there are indications of extreme challenge to the Primary Coolant System AND Core Heat Removal. (EOP-9.0 Heat Removal (HR-3) Safety Function NOT met.)

NOTE: The SED should direct the Engineering Support Team and Operations Support Team to evaluate the need to recommend and implement fuel oil conservation measures in the event offsite power has been lost.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
PRIMARY COOLANT SYSTEM INTEGRITY

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Unidentified or pressure boundary leakage >10 gpm.	Calculation, OR implementation of Off Normal Procedure ONP-23.1, "Primary Coolant Leak," OR SED opinion that leak rate indications warrant activation of Emergency Plan. (See NOTE 1)
	Identified leakage >25 gpm.	
	Steam Generator secondary water activity > 0.1 μCi/gm dose equivalent I-131.	S/G sample analysis.
	Primary to secondary leakage through any one SG ≥432 gallons per day (0.3 gpm) but <40 gpm.	Calculation, OR implementation of Off Normal Procedure ONP-23.2, "Steam Generator Tube Leak."
ALERT	**NOTE:** Refer to Fission Product Barrier/Fuel Damage	
SITE AREA EMERGENCY	**NOTE:** Refer to Fission Product Barrier/Fuel Damage	
GENERAL EMERGENCY	**NOTE:** Refer to Fission Product Barrier/Fuel Damage	

NOTE: 1. Lifting of RV-2006 (Letdown Relief) as expected for plant conditions or evolutions does not require activating the emergency plan.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
PRIMARY COOLANT SYSTEM - TEMPERATURE OR PRESSURE

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Any challenge to Over-Pressure Protection System (LTOP). **NOTE:** Momentary PORV activations which occur during PORV Isolation Valve opening shall not be considered as a challenge to the LTOP System.	Annunciation of PORV operation. EK-1373 (SV and/or PORV OPEN)
	Reactor high-pressure trip. (Initiating event)	Annunciator (RPS alarms) OR event recorder.
	Pressurizer code safety valve operation.	Observation.
ALERT	PCS temperature < 25°F subcooled.	Observation, AND Plant above Mode 5. • SMM 0114/0124 with PCP • CETs without PCP • PPC point TCETMAR

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
RADIATION LEVELS

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
ALERT	Radiation levels or airborne contamination indicates a severe degradation in control of radioactive materials.	Radiation monitors increase by a factor of 1000, confirmed OR unexpected Plant area iodine or particulate airborne concentrations > 1000 DAC (per 10CFR20, Appendix B Table 1).

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
RELEASES

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Short term radiological effluent ODCM limits exceeded.	The stack monitor (RIA-2326) reaches Alert alarm setpoint for greater than one hour, confirmed by sample analysis, OR Liquid Waste Discharge Monitor (RIA-1049) reaches alarm setpoint and automatic discharge trip function fails. Confirmed by sample analysis.
	Significant solid or liquid waste spill outside restricted areas with threatened offsite release.	Observation confirmed by survey results OR SED's opinion.
ALERT	Radiological effluent > 10 times the ODCM instantaneous release rate limit.	A valid stack monitor (RIA-2326) reading of ≥ 1.6E+5 cpm above background for longer than one hour, OR Liquid Waste Discharge Monitor (RIA-1049) reaches 10 times alarm setpoint and automatic discharge trip function fails, confirmed by sample analysis.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
RELEASES

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
SITE AREA EMERGENCY	Effluent monitors detect levels corresponding to > 50 mrem/hr TEDE for ½ hour or > 500 mrem/hr TEDE for 2 minutes (or 5 times these levels to the Adult Thyroid CDE) at the site boundary for adverse meteorological conditions. These levels are projected based on other Plant parameters (eg, radiation level in Containment with leak rate appropriate for existing Containment pressure) or are measured in the environs. EPA Protective Action Guidelines (see Emergency Implementing Procedure EI-6.13, "Protective Action Recommendations for Offsite Populations") are projected to be exceeded outside the site boundary.	1. Any of the following valid Radiation Monitor readings for greater than 30 mins: (a) RIA-2326 ≥ 1.3E+6 CPM above background. (b) RIA-2323/RIA-2324 ≥ 215 CPM above background AND steam release in progress. (c) RIA-2321/RIA-2322 ≥ 5.1E+4 rem/hr above background AND Containment integrity intact; OR 2. Any of the following valid Radiation Monitor readings for greater than 2 minutes: (a) RIA-2327 ≥ 11 mrem/hr above background. (b) RIA-2323/RIA-2324 ≥ 630 CPM above background AND steam release in progress. (c) RIA-2321/RIA-2322 ≥ 5.1E+5 rem/hr above background AND Containment integrity intact; OR

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
RELEASES

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
SITE AREA EMERGENCY (Cont'd)		3. Measured radiation levels at site boundary indicate any of the following: (a) TEDE Rate > 50 mrem/hr for 30 minutes. (b) TEDE Rate > 500 mrem/hr for 2 minutes. (c) Adult Thyroid CDE Rate > 250 mrem/hr for 30 minutes. (d) Adult Thyroid CDE Rate > 2500 mrem/hr for 2 minutes.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS

RELEASES

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
GENERAL EMERGENCY	Effluent monitors detect levels corresponding to 1 rem/hr TEDE or 5 rem/hr Adult Thyroid CDE Rate at the site boundary under actual meteorological conditions. These levels are projected based on other Plant parameters (eg, radiation levels in Containment with leak rate appropriate for existing Containment pressure) or are measured in the environs. **NOTE:** Refer to Emergency Implementing Procedure EI-6.13, "Protective Action Recommendations for Offsite Populations."	1. Any of the following Radiation Monitor readings may indicate a General Emergency: (a) RIA-2327 ≥ 22 mrem/hr above background. (b) RIA-2323/RIA-2324 ≥ 1260 CPM above background AND main steam release occurring. (c) RIA-2321/RIA-2322 ≥ 1.OE+6 rem/hr above background AND Containment leakage within design limits; OR 2. Dose Projection from Emergency Implementing Procedure EI-6.0, "Offsite Dose Calculation and Recommendations for Protective Actions," indicate any of the following with Existing Meteorological Conditions, at or beyond the site boundary: (a) TEDE Rate ≥ 1 rem integrated over a period of one hour. (b) Adult Thyroid CDE Rate ≥ 5 rem integrated over a period of one hour. 3. Measured radiation levels at or beyond the site boundary indicate any of the following: (a) TEDE Rate ≥ 1 rem integrated over a period of one hour. (b) Adult Thyroid CDE Rate ≥ 5 rem integrated over a period of one hour.

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
SAFETY INJECTION SYSTEM

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Safety Injection initiated AND discharged to vessel **NOTE:** Applies to HPSI, LPSI, or SIT Injection only. For injections solely from charging pumps/BA pumps to PCS due to SIS, include as part of one hour (or four hours) nonemergency report per Palisades Administrative Procedure 4.00, "Operations Organization, Responsibilities and Conduct."	Annunciation AND flow verification. (Ref EOP Supplement 4) • FI-0307A to FI-0314A

TITLE: SITE EMERGENCY PLAN

TABLE 4-2
EMERGENCY ACTION LEVELS
SECONDARY SIDE

CLASSIFICATION	EMERGENCY ACTION LEVEL	METHOD OF DETECTION
UNUSUAL EVENT	Failure of a safety or relief valve in a safety-related system to close following reduction of applicable pressure.	Annunciation AND pressure indications, OR observation.
	Main Steam Line/Main Feedwater Line break outside Containment which is isolated by Main Steam isolation signal (manually or auto).	Observation of isolated excess Steam Demand Event conditions.
	Turbine rotating component failure causing turbine trip.	Turbine trip (other than required for normal Plant shutdown) AND observation of turbine malfunction or failure.
ALERT	Main Steam Line/Main Feedwater Line break inside or outside Containment which is not isolated.	Observation of excess Steam Demand Event conditions.
	Turbine failure causing casing penetration.	Observation AND turbine trip.

NOTE: For accidents involving Main Steam Line/Main Feedwater Line breaks and failed Fuel/Steam Generator tube leaks, see "Primary Coolant System Integrity."

NOTE: For accidents involving primary to secondary leakage, see "Primary Coolant System Integrity."

TITLE: SITE EMERGENCY PLAN

TABLE 4-2 EMERGENCY ACTION LEVELS SECURITY		
CLASSIFICATION	**EMERGENCY ACTION LEVEL**	**METHOD OF DETECTION**
UNUSUAL EVENT	Credible Security threat or attempted entry or attempted sabotage.	Security alarms OR observation AND activation of Safeguards Contingency Procedures. **NOTE**: Refer to Emergency Implementing Procedure EI-1.1, "Emergency Response To Credible Security Threats," for direction regarding declaration of, and response to, "credible" security threats as determined by the NMC Director of Security, Palisades Security Manager, or the Palisades Security Shift Leader.
ALERT	Security threat exists that results in adversaries commandeering an area of the Plant, but not control over shutdown capability or of any Vital areas.	Security Alarms OR observation AND activation of Safeguards Contingency Procedures. **NOTE**: Refer to Emergency Implementing Procedure EI-1.1, "Emergency Response To Credible Security Threats," for direction regarding declaration of, and response to, "credible" security threats as determined by the NMC Director of Security, Palisades Security Manager, or the Palisades Security Shift Leader.
SITE AREA EMERGENCY	Physical attack on the Plant involving imminent occupancy of the Control Room, auxiliary shutdown panels, or other Vital areas.	Security alarms OR observation AND activation of Safeguards Contingency Procedures.
GENERAL EMERGENCY	Physical attack on the Plant has resulted in unauthorized personnel occupying the Control Room or any other Vital areas.	Security alarms OR observation AND activation of Safeguards Contingency Procedures.

TITLE: SITE EMERGENCY PLAN

5.0 ORGANIZATIONAL CONTROL OF EMERGENCIES

Emergency planning must consider the capabilities of the normally present operating staff, augmented by support from other utility personnel and local and distant support. The initial phases of an emergency situation at an operating nuclear power plant will involve a relatively small number of individuals. These individuals must be capable of: (1) determining that an emergency exists, (2) providing initial classification and assessment, and (3) promptly notifying other groups and individuals in the emergency organization.

The Palisades Plant Organization has complete capability, at all times, to perform the detection, classification, and notification functions required in the early phases of an emergency. These capabilities are augmented, as required, by the Palisades Emergency Response Organization (ERO).

This section of the Site Emergency Plan addresses the assignment of personnel and the establishment of responsibilities and authority for the:

a. Palisades Plant Organization

b. Palisades Emergency Response Organization

Figure 5-1 shows the interfaces between these organizations, governmental agencies, and the general public.

5.1 PALISADES PLANT ORGANIZATION

The Palisades Nuclear Plant operating and engineering activities are under the control of the Site Vice President. The operating and engineering activities at the Plant are conducted by operating crews on eight-hour shifts. Each eight-hour shift is responsible for continuous operation of the Plant.

5.2 OPERATING AND ENGINEERING ORGANIZATION

The Palisades Plant organization includes personnel encompassing both the management and operation of the unit. Per Palisades Technical Specifications, the minimum operating shift staffing shall consist of a Shift Manager, Shift Engineer/Shift Technical Advisor, two Control Room Operators, and two Auxiliary Operators. Chemical and Radiation Safety Technicians are available to the Shift Manager to perform any special or emergency radiation monitoring, surveillance, decontamination, water chemistry, or radiochemical analysis that may be necessary. The minimum on-shift staffing is indicated in Figure 5-2.

TITLE: SITE EMERGENCY PLAN

5.2.1 SITE DIRECTOR

The Site Director is responsible for the technical and administrative management of the day-to-day physical operation of the Plant, this includes Operations, Chemistry and Radiological Services, Maintenance, and Planning and Scheduling.

5.2.2 Director - Engineering

The Director - Engineering is responsible for system and design engineering, nuclear engineering, engineering programs, dry fuel services, and nuclear fuel supply.

5.2.3 Director - Business Support

The Director - Business Support is responsible for emergency planning.

5.2.4 Duty and Call Superintendent

This is a rotating position among qualified Plant upper management (as defined by the Site Director). The Duty and Call Superintendent functions as the Site Director on backshifts and weekends.

5.2.5 Shift Manager

The Shift Manager, one of whom is on duty at all times, is responsible for the safe and efficient operation of the Plant during his assigned shift. He maintains control over Plant operations as the Senior Licensed Operator unless he is properly relieved by another member of the Plant staff who holds a valid Senior Operator's License. In an emergency condition, the Shift Manager initially assumes the role of Site Emergency Director (SED).

5.2.6 Shift Engineers/Shift Technical Advisors (SE/STA)

Shift Engineers/Shift Technical Advisors function in an oversight role for accident assessment and evaluation of operating conditions. While on duty, SE/STAs diagnose abnormal events and report to the Shift Manager. In an emergency condition, the SE/STA provides SEP oversight and may assist the Shift Manager in his role as SED.

TITLE: SITE EMERGENCY PLAN

5.3 PALISADES EMERGENCY RESPONSE ORGANIZATION

In the event of an emergency in which one of the classification levels is declared (Unusual Event, Alert, Site Area Emergency, or General Emergency), all or a portion of the Site Emergency Plan will be activated. The assignment of responsibilities in the Emergency Response Organization (ERO) is ultimately the responsibility of the Site Vice President. However, the ERO is predefined and alternate assignments to various positions are specified to provide for automatic, unambiguous manning of the emergency organization within the time necessary to respond to the emergency.

In general, the emergency organization will be housed in five emergency response centers:

a. Control Room

b. Technical Support Center

c. Operational Support Center

d. Emergency Operations Facility

e. Joint Public Information Center

5.3.1 Control Room

The Control Room is designed to be habitable under accident conditions and shall serve as the on-site Emergency Control Center. Emergency lighting, power, air filtration-ventilation system, and shielded walls enable the operators to remain in the Control Room to ensure that the reactor remains in a safe condition.

The following is a list of Plant personnel who will occupy the Control Room during an emergency:

a. Minimum On-Shift Personnel

1. Shift Manager (SRO)

2. Shift Engineer/Shift Technical Advisor (SRO)

3. Control Operators - Two (CO)

4. Auxiliary Operators - Two (AO)

TITLE: SITE EMERGENCY PLAN

5.3.2 Technical Support Center

The Technical Support Center (TSC) will provide Plant management and technical support to Operations personnel during emergency conditions and guidance to Control Room operating personnel to mitigate the effects of the emergency condition. The TSC will provide off-site protective action recommendations and be the primary communications contact with off-site emergency organizations until the Emergency Operations Facility (EOF) is activated and manned, at which time the EOF will assume this responsibility. In addition, the TSC shall provide on-site protective action recommendations, as appropriate.

The TSC organization can be found in Emergency Implementing Procedure EI-4.1, "Technical Support Center Activation."

5.3.3 Operational Support Center

The Operational Support Center (OSC) will coordinate Emergency Maintenance, Radiation Protection, and Chemistry activities of Plant personnel. The Control Room or TSC (when activated) will direct the priorities for the OSC. The OSC organization can be found in Emergency Implementing Procedure EI-4.2, "Operational Support Center Activation."

5.3.4 Emergency Operations Facility (EOF)

The Emergency Operations Facility (EOF) is located at the South Haven Conference Center, approximately 9.1 miles north-east of the Plant. The EOF staff is responsible for overall management of an emergency and for communicating with external agencies upon transfer of responsibility from the TSC.

Activation of the EOF is mandatory at the Alert, Site Area, and General Emergency Classifications. Activation of the EOF at an Unusual Event will be at the request of the Site Emergency Director. The EOF will be staffed by Plant personnel. The initial staff can be supplemented by federal, state, and local officials.

Once activated and fully staffed, the EOF Director will be responsible for management of overall emergency response. The EOF will coordinate emergency response activities with federal, state, and local agencies to mitigate the consequences of an emergency. The EOF organization can be found in Emergency Implementing Procedure EI-4.3, "Emergency Operations Facility Activation."

The design features of the EOF are discussed in Palisades Site Emergency Plan, Section 7.0, "Emergency Facilities and Equipment."

5.3.5 Joint Public Information Center (JPIC)

The Plant Public Affairs Director shall be responsible for maintenance of the Plant Emergency Public Information Policies and Procedures. These provide for disseminating information to the public via the media and establishing a system for rumor control during an emergency. Public Affairs personnel shall coordinate the activation and management of the Joint Public Information Center (JPIC) in cooperation with the Corporate Public Affairs Department. He shall prepare and issue press releases in cooperation with state and local agencies. Reference Consumers Energy Nuclear Plant Emergency Public Information Policies and Procedures for details.

5.4 EMERGENCY STAFFING

Normal Plant staffing provides sufficient personnel for continuous protracted emergency operation. The extent to which the emergency organization is activated is dependent upon the classification of the emergency. A method for emergency staff augmentation is available to the Site Emergency Director. Figure 5-2 provides a guideline for minimum additional staffing and approximate arrival times. Details of emergency staff augmentation are available in Emergency Implementing Procedure EI-2.2, "Emergency Staff Augmentation."

5.4.1 Site Emergency Director

The Site Emergency Director (SED) is responsible for the overall assessment of emergency conditions, especially where emergency conditions present a real or potential hazard to off-site persons or property. The SED will have the overall responsibility for operational decisions involving the safety of the Plant and its personnel, and for making recommendations based on technical information supplied by support personnel regarding the general public during an emergency situation. He will also implement the Palisades Site Emergency Plan through the use of specific Emergency Plan Implementing Procedures. The SED is responsible for ensuring the capability for continuous operation of emergency response centers, including personnel and material resources. In addition, the SED is responsible for providing off-site officials with pertinent information regarding the conditions at the Plant.

NOTE: Any conflicts that should arise between the SED and the EOF Director will be resolved by the Site Vice President.

The SED may not delegate the decision to evacuate the site or the decision to authorize exposures that exceed the 10 CFR 20 regulatory exposure limits for emergency workers. The exception being: immediate lifesaving actions are required, the OSC Radiation Protection Supervisor is notified prior to taking action and the individual making the decision in the field is Radiation Protection Qualified (ie, Radiation Protection Technician or Supervisory personnel). Prior to the activation of the EOF, the decision to recommend protective actions to off-site organizations also cannot be delegated. The EOF Director, in consultation with the SED, will assume this responsibility after the EOF is activated.

The line of succession for the SED shall be established by the Site Director. For backshifts and weekends, the Duty and Call Superintendent assumes the role of the Plant General Manager.

NOTE: The Shift Manager assumes the role of the SED until relieved by upper Plant Management.

The SED shall be assigned to the Technical Support Center once it is activated.

5.5 RECOVERY ORGANIZATION

Recovery after an emergency condition will be handled by the emergency organization unless conditions indicate that recovery will be complicated or will take a long period of time. At the discretion of the SED, in concurrence with the Emergency Operations Facility Director, the Plant will shift from an emergency organization structure to a Recovery Organization. Guidelines that will be employed for determining this shift are explained in Palisades Site Emergency Plan, Section 9.0, "Recovery."

The Recovery Organization will depend upon the nature of the accident and the situations preceding the accident.

The EOF Engineering Support Team Leader will also support the EOF RP Support Team in determining how much radioactivity potentially can be released to the atmosphere based on the nature and extent of core damage.

5.6 OFF-SITE EMERGENCY RESPONSE SERVICES

The potential consequences of some emergencies may require the support services of off-site individuals, organizations, and agencies. Support services encompass such areas as medical assistance, fire control, evacuation, ambulance services, and law enforcement. Written agreements are entered into to assure these individuals'/agencies'/organizations' availability and capabilities. In the written agreements, the agencies have outlined their responsibilities or have agreed to their responsibilities as outlined in this section. A listing of the letters of agreement, contracts, or signature pages have been included in Appendix A. In those cases where agency assistance is mandated by law (ie, the State of Michigan), a letter of agreement may be excluded from the plan. The services provided by local support groups are listed in the following sections.

5.6.1 Medical Services

The primary hospital facility for the treatment of serious medical emergencies occurring at the Plant is South Haven Community Hospital, located in South Haven, Michigan, approximately 6 miles from the Plant. South Haven Community Hospital is equipped to receive and treat all types of accident victims, including those with radioactive contamination. The backup medical facility is Lakeland Regional Health System, located approximately 20 miles from the Plant in St Joseph, Michigan. The hospital shall be notified of incoming accident victims at the direction of the Site Emergency Director. The hospital may contact the Plant by telephone in the event information is required in the treatment of a victim.

Ambulance service for the transportation of accident victims, including radioactively contaminated victims, is provided by the Covert Fire Department, with backup services provided by South Haven Ambulance Service and Medic I of Benton Harbor.

The ambulance units and Emergency Medical Technicians are trained and equipped to respond to any medical emergency at the Plant. The Shift Manager/SED is responsible for the decision to request off-site medical support. The ambulance service shall be notified at the direction of the Shift Manager/ SED. Contact with the ambulance may be maintained through the respective medical service dispatcher.

5.6.2 Fire-Fighting Services

When it is determined by the Site Emergency Director that off-site fire support is necessary, fire protection response will be by the Covert Fire Department with mutual aid provided by the Van Buren County Mutual Aid Pact. Contact may be made using the telephone system. Fire Department personnel will be trained in handling emergency situations for nuclear facilities.

In addition to their fire suppression capabilities, the fire departments will provide specially equipped vehicles and personnel trained for emergency rescue and other contingencies.

5.6.3 Law Enforcement Agencies

In the event of a civil disturbance or criminal act, the Michigan State Police, Van Buren County Sheriff Department, and the Covert Township Police Department may provide law enforcement assistance.

An Auto-Dial line to the Michigan State Police Operations in Lansing, Michigan from the Plant exists along with Auto-Dial lines from the Plant to the State Police Post in South Haven, Michigan and the Van Buren County Sheriff Department in Paw Paw, Michigan.

5.6.4 Van Buren County Office of Emergency Preparedness

The Van Buren County Office of Emergency Preparedness is located in the County Sheriff's Courthouse Annex, Paw Paw, Michigan. In the event of an emergency, Van Buren County Sheriff's Department will disseminate information and recommendations initially supplied by Nuclear Management Company to the Chairman of the Van Buren County Board of Commissioners, Van Buren County Emergency Preparedness Coordinator, and the Emergency Operations Center (EOC), if activated. Section 7.0, "Emergency Facilities and Equipment," summarizes communications.

The Chairman of the Van Buren County Board of Commissioners is responsible for activation of the county's Emergency Operations Plan. The Van Buren County Emergency Management Coordinator is responsible for overall coordination and planning of emergency response activities within the county. The Emergency Preparedness Coordinator will implement the activation and operational aspects of the EOC and alert key officials and agencies. The Emergency Preparedness Coordinator will coordinate efforts with other agencies to inform the public in affected portions of the county to take protective actions when conditions warrant.

5.6.5 Berrien County Emergency Management

The Berrien County Emergency Management is located in the Berrien County Sheriff's Department, St Joseph, Michigan. In the event of an emergency, Berrien County Sheriff's Department will disseminate information and recommendations initially supplied by Nuclear Management Company to the Chairman of the Board of Commissioners, Berrien County Emergency Management Coordinator, and the Emergency Operations Center (EOC), if activated. Site Emergency Plan, Section 7.0, "Emergency Facilities and Equipment," summarizes communications.

The Chairman of the Berrien County Board of Commissioners is responsible for activation of the County's Emergency Operations Plan. The Berrien County Emergency Management Coordinator is responsible for overall coordination and planning of emergency operations with Van Buren County Emergency Management Coordinator during a disaster. The Emergency Preparedness Coordinator is responsible for initiating the manning of the EOC which is located in the County Sheriff's Department. By prior agreement between counties, communications between the Plant and Berrien County will normally be directed through Van Buren County.

5.6.6 Allegan County Office of Emergency Preparedness

The Allegan County Office of Emergency Preparedness is located at the Allegan County Office Complex, Allegan, Michigan. In the event of an emergency, Allegan County Sheriff's Department will disseminate information and recommendations initially supplied by Nuclear Management Company to the Chairperson of the Allegan County Board of Commissioners, Allegan County Emergency Management Coordinator, and the Emergency Operations Center (EOC), if activated. By prior agreement between the counties, communications between the Plant and Allegan County will normally be directed through Van Buren County. Palisades Site Emergency Plan, Section 7.0, "Emergency Facilities and Equipment," summarizes communications.

The Chairperson of the Allegan County Board of Commissioners is responsible for the activation of the County's Emergency Operations Plan. The Allegan County Emergency Management Coordinator is responsible for overall coordination and planning of emergency response activities within the county. The Emergency Management Coordinator will implement activation of the EOC and alert key officials and agencies.

TITLE: SITE EMERGENCY PLAN

5.7 COORDINATION WITH GOVERNMENTAL AGENCIES

The coordination between the state, county, and federal emergency plans and the Palisades Site Emergency Plan serves to ensure the safety and health of the public. The coordination of the emergency plans enables all organizations to participate without confusion or hesitation in regard to their responsibilities. All participating agencies should have a clear picture of the roles they play during an emergency situation. As a part of the coordination effort, each participating agency is assigned specific responsibilities and authority in regard to both emergency planning and emergency response. Written agreements with governmental agencies are included in Appendix A, "Agreement With Offsite Individuals, Agencies, and Organizations."

5.7.1 State of Michigan Agencies

State agencies are under the direction of the Governor of the State of Michigan.

a. Michigan Department of State Police Emergency Management Division (MSP)

The Department of State Police Emergency Management Division is the leading state agency for emergency response planning and operations. This agency is under the direction of the State Director of Emergency Management. Responsibilities of this group include:

1. Development and maintenance of the Michigan Emergency Management Plan and assistance to the counties in developing their individual emergency operations plans.

2. Recommendations to the Governor of the State of Michigan regarding emergency measures.

3. Arranging training programs for state and local agencies designed to promote effective response to radiological incidents.

4. Providing communications, radiological monitoring, and other available support to affected local governments.

5. Coordinating the support of other state agencies or political subdivisions near the affected area and obtaining the assistance of federal agencies as required.

The normal point of contact for the Palisades Plant is through the Operations Division of the Michigan State Police in East Lansing.

The Palisades Plant will support the State Police by providing specific information pertaining to the nature of the incident, recommendations on protective actions, and other available information and technical guidance.

b. Michigan Department of State Police - South Haven Post

Michigan Department of State Police (MSP) is responsible for providing emergency traffic control and other available assistance. The MSPs nearest post is located in South Haven, Michigan with direct radio communications to Van Buren, Allegan, and Berrien Counties. Communications are detailed in Palisades Site Emergency Plan, Section 7.0, "Emergency Facilities and Equipment."

c. Michigan Department of Transportation

Michigan Department of Transportation (MDOT) assists in emergency traffic regulation coordination with the Michigan State Police, the Sheriff, and the County Road Commission of the affected county.

d. Michigan Department of Environmental Quality (DEQ)

The Michigan Department of Environmental Quality, Radiological Protection Section located in Lansing is responsible for administering and directing radiation control programs and activities within the state. Their Radcon Field Team provides direct radiological emergency response capability during emergency conditions. The team's responsibilities include:

1. Moving immediately to the affected area and performing radiological monitoring, as appropriate.

2. Determining and reporting the nature and scope of the hazard.

3. Providing state government with technical guidance, recommending appropriate emergency countermeasures and recovery actions, and otherwise assisting the affected community.

   The Department of Environmental Quality, Radiological Protection Section is responsible for providing the public with health hazard evaluation, guidance, or protective actions and other pertinent information concerning radiological incidents.

e. Michigan Department of Community Health

The Michigan Department of Community Health is responsible for coordinating emergency medical support of radiological incidents, as requested by DEQ, Radiological Protection Section, or local health authorities.

f. Michigan Department of Agriculture

The Michigan Department of Agriculture acts on advice from the State Health Director for controlling agricultural products and production for the purpose of radiation health hazard abatement. Protective actions initiated by the Department of Agriculture may include any or all of the protective actions recommended by the Environmental Protection Agency.

5.7.2 Federal Agencies

a. Nuclear Regulatory Commission (NRC)

The Office of Inspection and Enforcement, Region III, NRC may dispatch Federal Radiological Monitoring and Assessment Center (FRMAC) personnel to the scene in the event of an emergency and will lend support in the areas of observation and accident evaluation. The Site Emergency Director has the authority to request NRC assistance. The office may also furnish advice and assistance to the Plant as deemed necessary. The NRC shall be notified within an hour, anytime all or part of the Site Emergency Plan is activated. Means of communications are described in the Site Emergency Plan, Section 7.0, "Emergency Facilities and Equipment."

Facilities for the NRC are available in the Technical Support Center and the Emergency Operations Facility, including work space and telephones. The Emergency Operations Facility provides space for trailers for long term support capabilities.

b. US Department of Energy (DOE)

The Department of Energy will assist during radiological emergencies by furnishing advice, consultation, and assistance regarding the protection of personnel, treatment of injured and/or exposed persons, minimization of further exposure and contamination, and the determination of existence and extent of contamination. The DOE will respond to the FRMAC in support of the state and local monitoring operations, but may receive requests for assistance directly from the Plant as authorized by the Site Emergency Director.

Contact with the DOE may be established using telephone lines. The Emergency Operations Facility provides space for trailers in support of DOE activities.

c. Federal Emergency Management Agency (FEMA)

The Federal Emergency Management Agency will assist the utility in real events with consultation and expertise in controlling an actual emergency. FEMA also evaluates Local and State Emergency Plans to ensure adequacy.

d. Federal Radiological Monitoring and Assessment Center

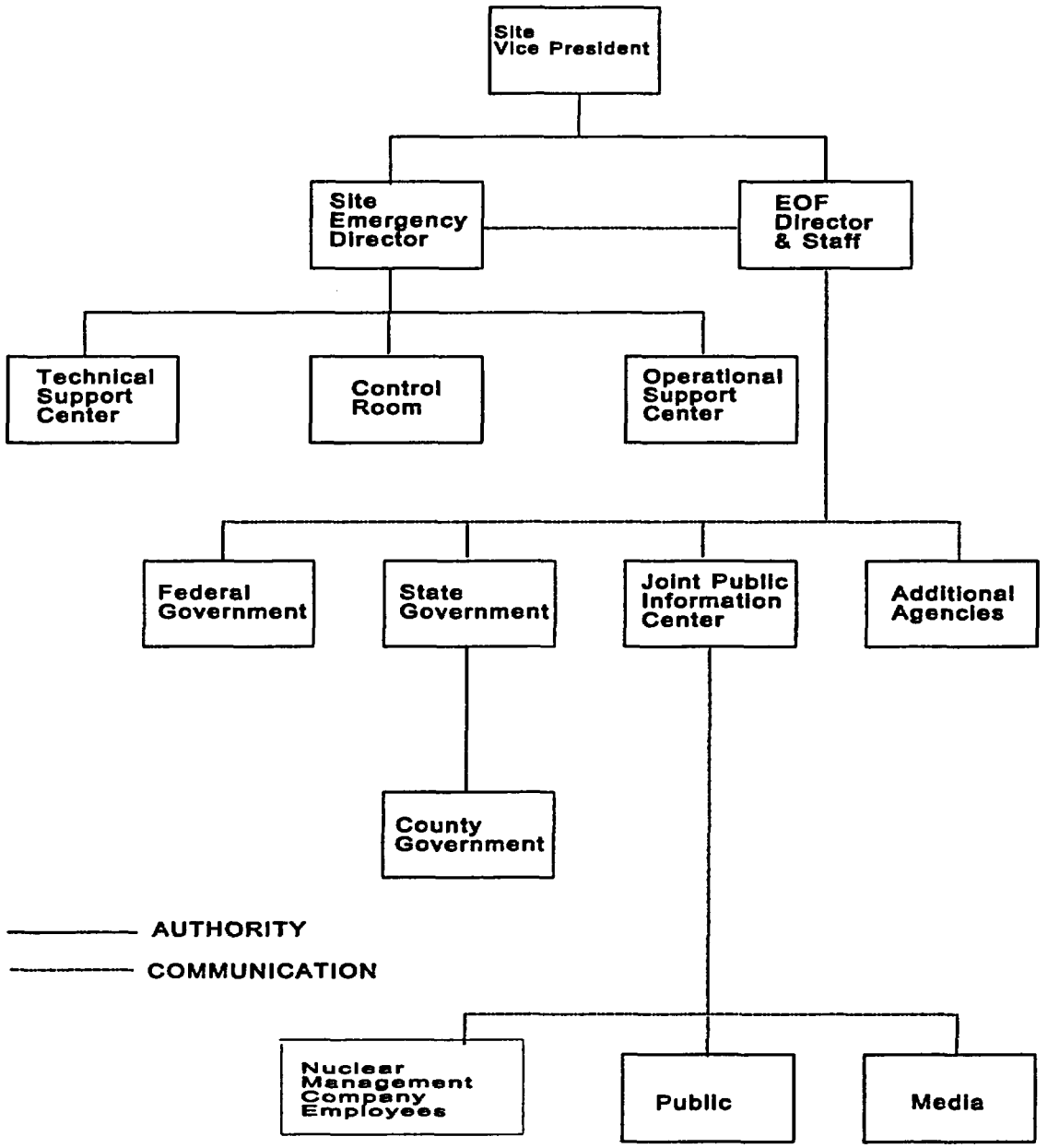
The Federal Radiological Monitoring and Assessment Center is a joint facility for all federal agencies involved in evaluating and mitigating radiological events. The NRC is the Lead Federal Agency (LFA) for the FRMAC and will coordinate the efforts of all federal agencies involved. The FRMAC will supply information and support to state and local governments concerning radiological conditions.

5.8 INSTITUTE OF NUCLEAR POWER OPERATIONS (INPO)

The Institute of Nuclear Power Operations will provide emergency response as requested by Nuclear Management Company. INPO can provide assistance locating sources of emergency manpower and equipment, analyzing operational aspects of the event, and organizing industrial experts who could advise Nuclear Management Company on technical matters. INPO will be contacted by means of its 24-hour telephone number in the event of a radiological emergency. The EOF Director shall be responsible for requesting assistance from INPO.

TITLE: SITE EMERGENCY PLAN

FIGURE 5-1
EMERGENCY RESPONSE INTERFACES



TITLE: SITE EMERGENCY PLAN

FIGURE 5-2
PLANT STAFFING AND AUGMENTATION GUIDELINES

MAJOR FUNCTIONAL AREA	MAJOR TASKS	POSITION TITLE OR EXPERTISE	ON SHIFT	STAFF AUGMENTATION CAPABILITY AND APPROXIMATE RESPONSE TIMES	
				30 Min	60 Min
Plant Operations and Assessment of Operational Aspects		Shift Engineer/Shift Technical Advisor (SRO) Shift Manager (SRO) Control Room Operators Auxiliary Operators	1 -- 1 2 4	-- --	-- --
Site Emergency Director		Shift Manager	1*	--	--
Notification/ Communication	Notify licensee, state, local, and federal personnel and maintain communication		1*	1	2
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Operations Facility (EOF) Director Offsite Dose Assessment	Senior Manager Senior Radiation Protection (RP) Expertise	-- 	 1	1 --
	Offsite Surveys Onsite (Out--of-Plant) In-Plant Surveys Chemistry/Radiochemistry	 Rad Protection Technicians Chem Technicians	-- -- 1 1	2 1 1	2 1 1 1

NOTES: * May be provided by shift personnel

TITLE: SITE EMERGENCY PLAN

FIGURE 5-2
PLANT STAFFING AND AUGMENTATION GUIDELINES

MAJOR FUNCTIONAL AREA	MAJOR TASKS	POSITION TITLE OR EXPERTISE	ON SHIFT	STAFF AUGMENTATION CAPABILITY AND APPROXIMATE RESPONSE TIMES	
				30 Min	60 Min
Plant System Engineering, Repair, and Corrective Actions	Technical Support	Core/Thermal Hydraulics Electrical Mechanical	1* -- --	1 -- --	-- 1 1
	Repair and Corrective Actions	Mechanical Maintenance Radwaste Operator Electrical Maintenance/ Instrument and Control (I&C) Technician	1* 1* --	 1 1	1 1 1 --
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. RP Coverage c. Personnel monitoring d. Dosimetry	RP Technicians	2*	2	2
Fire Fighting	--	--	Fire Brigade per Technical Specifications	Local Support	

NOTES: * May be provided by shift personnel assigned other functions.

TITLE: SITE EMERGENCY PLAN

FIGURE 5-2
PLANT STAFFING AND AUGMENTATION GUIDELINES

MAJOR FUNCTIONAL AREA	MAJOR TASKS	POSITION TITLE OR EXPERTISE	ON SHIFT	STAFF AUGMENTATION CAPABILITY AND APPROXIMATE RESPONSE TIMES	
				30 Min	60 Min
Rescue Operations and First-Aid	--	--	2*	Local Support	
Site Access Control and Personnel	Security, fire fighting communications, personnel accountability	Security Personnel	All per Security Plan		
		TOTAL	10	11	15

TITLE: SITE EMERGENCY PLAN

6.0 EMERGENCY MEASURES

a. This section identifies the measure to be used for each type of emergency previously classified in Section 4. The logic presented in this section is used as the basis for the detailed Emergency Plan Implementing Procedures which define the emergency actions to be taken for each emergency classification. Emergency measures begin with the following:

1. Recognition, classification, and declaration of an emergency condition.

2. Notification of the applicable agencies and personnel (Figure 6-1).

3. Mobilization of the appropriate portions of the emergency organization.

b. Emergency measures are additionally organized into the following categories:

1. Assessment actions

2. Corrective actions

3. Protective actions

These measures are described in the following sections for each emergency classification.

6.1 ACTIVATION OF THE EMERGENCY ORGANIZATION

If it appears that an incident or condition may meet or exceed a predetermined value or condition specified as an Emergency Action Level in Emergency Implementing Procedure EI-1, "Emergency Classification and Actions," certain portions of this plan and specific procedures shall require implementation.

The Shift Manager will initially classify the emergency, assume the duties of Site Emergency Director (SED), and ensure required notifications are made. The SED shall ensure that an overall assessment of the emergency is performed in order to determine the most appropriate classification and, based on this determination, activate portions of the emergency organization as necessary. The Shift Engineer/Shift Technical Advisor may assist the SED in performing these functions. The methodology used in activating the emergency organizations during each class of emergency is provided in the following sections:

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6.1.1 Control Room Personnel

a. Should emergency conditions, either real or potential, arise, it is expected that the Control Operators and the Shift Manager will initially be made aware of the situation by alarms, instrument readings, reports, etc. The SED shall ensure that the Site Director or Duty and Call Superintendent on backshift and weekends is immediately informed of any possible emergency situation.

b. The Shift Manager is responsible for ensuring the performance of the initial assessment of the emergency (eg, Plant and reactor status, radiological conditions, etc) in the following manner:

1. Determine the immediate actions necessary to be taken to ensure the safe and proper operation of the Plant. The Shift Engineer will advise and assist the Shift Manager on matters pertaining to the safe and proper operation of the station with regard to nuclear safety.

2. If the situation requires activation of all or part of the Site Emergency Plan, the SED shall:

(a) Initiate the applicable Emergency Plan Implementing Procedures.

(b) Initially classify the emergency.

(c) Ensure the appropriate alarm is sounded.

(d) Announce the location type and classification of the emergency on the Plant public address system.

(e) Notify the following personnel and agencies of the emergency condition(s): (Reference Emergency Implementing Procedure EI-3, "Communications and Notifications.")

(1) Van Buren County

(2) State of Michigan

(3) NRC

(4) The Site Director or designated alternate (Duty and Call Superintendent).

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(f) Initial notification should consist of the following as appropriate:

(1) Name and telephone number (if needed).

(2) Location of incident.

(3) Date and time of incident.

(4) Emergency classification (Emergency Implementing Procedure EI-1, "Emergency Classification and Actions").

(5) Whether a release is taking/has taken place.

(6) The affected/potentially affected population.

(7) Recommended protective actions.

(g) Follow-up notification should consist of the following as appropriate:

(1) Name and telephone number (if needed).

(2) Location of incident.

(3) Date and time of incident.

(4) Emergency classification (EI-1).

(5) Type of actual or projected release (liquid or gaseous) and estimated duration/impact times.

(6) Estimate of amount or radioactive material released, points of release, and height of release (Emergency Implementing Procedure EI-6, "Offsite Dose Calculation and Recommendations for Protective Actions").

(7) Chemical and physical form of released material. Include estimates of the relative quantities and concentration of noble gas, iodine, and particulates (EI-6).

(8) Prevailing meteorological conditions (EI-6).

(9) Actual or projected dose rates of at the site boundary and the integrated dose rate at the site boundary (Emergency Implementing Procedures EI-6 and EI-9, "Offsite Radiological Monitoring").

(10) Projected dose rates and integrated dose rates at the projected peak and at 2, 5, and 10 miles from the site and the sectors affected.

(11) Estimate of surface contamination in Plant, onsite and offsite.

(12) Nuclear Management Company emergency response actions underway.

(13) Recommended emergency actions, including protective measures.

(14) Requests for support from organizations.

(15) Prognosis for worsening or termination of event.

3. Due to the additional responsibilities assigned to the SED/Shift Manager at the beginning of an emergency, the following actions are to be performed in the priority listed below:

(a) Ensure the safe operation of the Plant.

(b) Ensure that immediate notification requirements are met.

(c) Dispatch, in the event of radiological emergencies, Radiation Monitoring Teams, to designated analysis locations onsite and offsite.

(d) Perform additional emergency actions as time and conditions permit including accident assessment beyond that required for emergency classification.

6.1.2 Site Emergency Director

The Shift Manager will continue to act as the Site Emergency Director until relieved by the Site Director, Duty and Call Superintendent, or designated alternate. The Site Emergency Director has overall responsibility of the Plant's emergency activities.

The responsibilities of the Site Emergency Director include the following:

a. Onsite and offsite notifications including:

   1. Plant personnel.

   2. Van Buren County.

   3. Michigan State Police.

   4. The Nuclear Regulatory Commission.

   5. Hospitals that will receive accident victims from the Plant.

b. Reporting to the Technical Support Center and assuming the position of Site Emergency Director in the onsite emergency organization, relieving the Shift Manager who has been acting as the interim Site Emergency Director.

c. Evaluate the information, data, and methods utilized by the Shift Manager in making classification determination to ensure that the proper emergency classification has been made.

d. Determine to what extent the offsite and onsite emergency organization shall be activated within the following guidelines:

   1. For an Unusual Event, all or part of the onsite emergency organization and emergency teams may be activated depending on the circumstances.

   2. For an Alert, the onsite and offsite emergency teams shall be activated.

   3. For a Site Area Emergency, the emergency teams and the onsite and offsite emergency organization shall be activated.

   4. For a General Emergency, all of the onsite and offsite emergency organization shall be activated.

e. Verify correct Control Room response to the emergency conditions.

f. Initiate rescue or emergency repair operations if appropriate measures are not under way.

g. Maintain Plant security.

h. Establish communications with and provide information to those offsite emergency facilities that have been activated.

i. Authority to request assistance from federal agencies including the NRC or DOE as appropriate.

j. Dispatch Palisades Plant liaisons to principal offsite emergency operations centers.

k. Maintain adherence to the fitness for duty policy.

l. Distribution of potassium iodine tablets (KI) to Plant personnel as needed.

6.1.3 Emergency Management Division - Michigan Department of State Police

In emergency situations, the Emergency Management Division is responsible for coordinating the support of other state agencies and political subdivisions and obtaining the assistance of federal agencies as required.

The Emergency Management Division will provide the following emergency support:

a. Activation of the State Emergency Operations Centers, as necessary.

b. Communications, radiological monitoring, and other available support to the affected local government.

c. Liaison with local, state, and federal agencies.

6.1.4 Michigan Department of Environmental Quality, Radiological Protection Section

The Michigan Department of Environmental Quality, Radiological Protection Section is responsible for administering and directing radiation control programs and activities within the State of Michigan.

The Radiological Protection Section has the direct responsibility to provide the technical assistance necessary to evaluate the offsite consequences of a radiological incident, to provide protective action guidance to state and local authorities responsible for public safety, and to oversee offsite decontamination and reentry operations.

The Michigan Department of Community Health is responsible for coordinating emergency medical support as requested by the Michigan Department of Environmental Quality, Radiological Protection Section, or local health authorities.

6.1.5 Affected Counties: Van Buren County, Berrien County, and Allegan County

Emergency responsibilities of County Emergency Management include communication support to the responding county departments, providing warning and notification to the public, and assuring the continuation of vital services during the emergency.

6.2 ASSESSMENT ACTIONS

Effective coordination and direction of all portions of the emergency organization require almost continuous accident assessment during the course of the emergency. Each emergency class will require similar accident assessment methods; however, each classification imposes a different magnitude of assessment effort. In the following steps, the assessment actions to be taken for each emergency classification are outlined.

6.2.1 Assessment Actions for Unusual Events

The detection of an Unusual Event shall arise from exceeding a specific Emergency Action Level for this class. Detection of the event will come as a result of alarms, instrument readings, recognition through experience, or any combination thereof. The continuing assessment actions to be performed for this classification of emergency shall be in accordance with the Emergency Implementing Procedures and shall consist of the normal monitoring of Control Room and other Plant instrumentation and status indication until the situation is resolved. If a fire is the reason for the declaration of an Unusual Event, the Shift Manager will make continuing assessments based on his knowledge and experience on whether offsite fire fighting assistance is needed.

6.2.2 Assessment Actions for Alerts

When an accident has been classified as an Alert by the Site Emergency Director, assessment actions shall be performed in accordance with the Emergency Implementing Procedures for an Alert.

These actions include:

a. Accountability of onsite personnel.

b. Staff augmentation, as needed.

c. Increased surveillance of in-plant instrumentation.

d. Activation of appropriate emergency facilities.

e. Dispatch of shift personnel, if possible, to the identified problem area for confirmation and visual assessment.

f. Dispatch of onsite Radiation Monitoring Teams to monitor for possible release and to provide confirmation of correct accident classification.

g. If a radiological accident is occurring, surveillance of the in-plant instrumentation is necessary to obtain meteorological and radiological data required for calculating or estimating projected doses. This dose assessment activity shall continue until termination of the emergency in order that the updating of initial assessments may be provided to all concerned offsite agencies and to the Site Emergency Director. Emergency Implementing Procedures are provided to aid in a rapid, consistent projection of doses.

6.2.3 Assessment Actions for Site Area Emergencies

The assessment actions for the Site Area Emergency classification are similar to the actions for an Alert; however, due to the increased magnitude of the possible release of radioactive material, a significantly larger assessment will occur. The necessary personnel for this assessment effort shall be provided by mobilization of the onsite and offsite emergency organizations.

Specifically:

a. An increased amount of Plant instrumentation shall be monitored, in particular, indications of core status (eg, in-core thermocouple readings, etc) shall be monitored.

b. Radiological monitoring efforts shall be greatly increased. Onsite and offsite radiological monitoring teams will be dispatched. In addition to beta-gamma field measurements, change out of environmental thermoluminescent dosimeters (TLD), air sampling, and collection of the environmental media for assessment of radioactive material transport and deposition may also be performed.

c. Dose assessment activities will be conducted more frequently with an increased emphasis on dose projections for use as a factor in determining the necessity for protective actions for the public. Radiological and meteorological instrumentation readings shall be used to project the dose rate at predetermined distances from the Plant, and to determine the integrated dose received. In reporting the dose projections to offsite agencies, the dose rate, dose, and the basis for the time used for the dose estimate shall always be provided. Any confirmation of dose rates by offsite Radiation Monitoring Teams shall be reflected in reporting and/or revising the dose estimate information provided to offsite agencies.

   Dose projections shall be considered with respect to the Environmental Protection Agency Protective Action Guides (Table 6-1). Reporting of assessments to offsite authorities shall include the relationship of the dose to these guidelines. Emergency Plan Implementing Procedures will be provided for recording all pertinent information.

6.2.4 Assessment Actions for General Emergencies

Assessment actions for the General Emergency classification shall be the same as for the Site Area Emergency with some possible shift of emphasis to greater offsite radiation monitoring and dose projections extending to distances farther from the site.

6.2.5 Estimation of Offsite Dose

The Emergency Implementing Procedures (reference Emergency Implementing Procedure EI-6, "Offsite Dose Calculation and Recommendations for Protective Actions") contain several methods for calculating offsite dose to population from accidental releases. These methods include:

a. Computer Method - Implements the above method using a personal computer to speed the process.

b. Manual Method - A pencil and paper method for calculating offsite dose using precalculated diffusion factors and a straight line Gaussian methodology.

c. Segmented Gaussian - Variable trajectory Plume model.

The above methods have been developed in cooperation with state agencies and provide methods for rapid, accurate dose estimates.

6.2.6 Data Reporting, Recording, and Analysis

Specially assigned personnel at all designated emergency centers have the responsibility for collecting, recording, and analyzing data transmitted to them. Preplanned emergency logs and procedures are provided to ensure that all necessary information is received and recorded. Included will be:

a. Data from emergency survey teams as available. This will be recorded and plotted on area maps to define the affected environs.

b. Evacuated Plant personnel will be questioned to gather all possible information on observed conditions.

c. In addition to incoming data, a log of events occurring at the emergency centers (TSC, OSC, EOF) and Control Room will be kept. Individual sections of this log will record such items as personnel exposure, contamination levels, communications, and check-off lists.

6.2.7 Interviewing Evacuees or Other Witnesses

Information from personnel evacuating the site may be collected at the evacuation control point as directed by the SED. This information shall be reported to the TSC when possible.

6.2.8 Assessment Results Communications

The Emergency Operations Facility (EOF) Director is notified of assessment results from the site and from offsite support agencies. The EOF Director, in turn, is responsible for communication back to those groups so that emergency measures may be modified as necessary.

6.3 CORRECTIVE ACTIONS

Detailed operating procedures are available to the operators for use during emergencies as well as during normal operations. Specific emergency procedures are provided to assist the operators in placing the Plant in a safe condition and taking the necessary supplemental corrective actions. In addition, operations personnel are trained in the operation of the Plant systems and their associated procedures and are, therefore, capable of taking appropriate corrective actions based on their training, knowledge, and experience.

Corrective actions shall be planned events that are taken to lessen or terminate the emergency situation. Planned radioactive releases or corrective actions that may result in a radioactive release shall be evaluated by the Site Emergency Director, and his staff, as far in advance of the event as is possible. Such events and data pertaining to the release shall be reported to the appropriate offsite emergency response organization and/or agencies.

6.3.1 Fire Control

Provisions for fire fighting and control are described in the Fire Protection Implementing Procedures. Offsite backup fire fighting support is provided by the Covert Township Fire Department and the South Haven Fire Department.

In-plant fire fighting equipment ranges from portable extinguishers to automatic sprinkler control. The Plant emergency organization includes a trained fire brigade for immediate response to any fire situation.

The Van Buren Dispatch, via 911, is first to be called. They are required to dispatch both Cover and South Haven Fire Departments. These departments consist of personnel trained for fire fighting, including situations involving radioactive contamination. Additional support is available from fire departments in nearby Allegan and Berrien Counties through mutual aid agreements. These fire departments are also trained and equipped for rescue work and control of hazardous gas leaks, including chlorine gas.

6.3.2 Repair and Damage Control

The Palisades Plant staff is comprised of technically and vocationally trained personnel capable of improvising necessary repair and control measures for correction of an emergency situation. Wherever possible, corrective measures are anticipated and included in emergency and operating procedures.

6.3.3 System Control

System design is aimed at automatic corrective actions, such as Plant shutdown and system isolation, whenever operating parameters become abnormal. Operating procedures are written for manual control of these same situations, should automatic features fail.

6.4 PROTECTIVE ACTIONS

Protective actions are emergency measures taken during or after an emergency situation that are intended to minimize or eliminate the hazard to the health and safety of the general public and/or Plant personnel. Such actions taken onsite are the responsibility of the Nuclear Management Company, while those offsite actions are the responsibility of the State of Michigan and local political jurisdictions. Protective Action Guides for the Environmental Protection Agency and the State of Michigan are shown on Tables 6-1 and 6-2. All visitors to the site shall be either escorted by an employee knowledgeable as to the Emergency Plan response actions or shall receive training on actions required by them during an emergency.

6.4.1 Sheltering, Evacuation, Personnel Accountability

During an emergency, the relocation of personnel may be required in order to prevent or minimize exposure to radiation and radioactive materials. The following steps present information on policies applicable to such situations:

a. Plant Site

1. Notification

All persons onsite at the time of an Alert, Site Area, or General Emergency shall be notified of the emergency by a two-minute steady siren and an announcement over the public address system in the assembly areas. Notification of an Unusual Event should be over the Plant public address system. Personnel shall be instructed to report to assembly areas for accountability, monitoring, and possible evacuation. Personnel accountability shall be completed in approximately 30 minutes. Specific assembly areas are designated in the Emergency Implementing Procedures. All personnel shall be trained in the locations of the assembly areas, or be escorted by an employee who is so trained. At the assembly area, members of the emergency organization shall direct efforts per the applicable Emergency Implementing Procedure. These procedures shall provide contingency plans for weather, traffic, and radiological impediments to evacuation.

2. Site Access Control

Provisions for control of access to the Palisades site have been included in the Safeguards Contingency Procedures to take care of personnel entering for business purposes and for those who might inadvertently enter. Access to the exclusion areas of the Plant is controlled by the Plant security force. Offsite support is provided by local and/or state law enforcement personnel.

3. Monitoring of Evacuees

A combination of checking electronic dosimeters and questioning of evacuees will be used to initially determine if there were any high external exposures involved in the emergency. For any known or suspected high exposures, the permanent dosimeters will be read as soon as possible and further investigation will be conducted to determine the amount of exposure or necessary actions to be taken.

Monitoring for contamination and internal ingestion at the assembly areas will be accomplished by using portable instrumentation and questioning. Priority for decontamination will be given persons found with the highest levels of contamination. Any persons suspected or known to have ingested radioactivity will be whole-body counted, as soon as conditions permit, to assess their internal exposure. Decontamination supplies for evacuees shall be available.

4. Egress Routes

Three potential routes are available: Plant access road to the east and the beach to the north or south. Unless conditions dictate otherwise, the Plant access road to the east will be the primary evacuation route. An evacuation procedure shall require a personnel accountability check at the appropriate control point/monitoring station. Security guards shall be dispatched by the Site Emergency Director to stop ingress from the access roads and to assist Plant personnel evacuating the site. A control point/monitoring station shall be established along the egress route in an area expected to be outside the path of possible radioactive releases.

b. Offsite Areas

1. Agency Responsibilities

The Palisades Nuclear Plant is located in Van Buren County (Covert Township), and the 10-mile emergency planning zone includes portions of Allegan and Berrien counties, including the city of South Haven. In a radiological emergency, operational control will be from the State Emergency Operations Center (SEOC) in Lansing, with local operation control from the county EOCs. Each county has an Emergency Preparedness Plan which is a legal document in compliance with Act 390 of the Michigan Public Acts of 1976.

The Michigan Department of Environmental Quality is responsible for directing radiation control programs and emergency responses within the state as stated in Act 368, Michigan Public Acts of 1978 and the Michigan Emergency Management Plan (MEMP), and the Governor's Executive Order 1996-1.

The Deputy State Director of Emergency Management of the Michigan Department of State Police provides overall coordination of emergency operations, including the use of all state government resources upon proclamation of a State of Disaster, or State of Emergency by the Governor. The Michigan Department of State Police will coordinate the disaster response activities of all departments of State Government.

2. Notification and Response

The local government will provide notification of the general public involved and define and identify this population. The state government will give detailed directions for protection of this population, including provisions for evacuation of personnel from affected sectors of the environs if necessary.

3. Protective Actions

Protective action procedures are covered in the Michigan Emergency Preparedness Plan and the Van Buren, Allegan, and Berrien County Emergency Plans. In summary, these plans contain the following:

(a) A public warning system composed of two components, alert and notification.

(1) The alert component is comprised of a siren system which provides coverage for a 10 mile radius around the plant, and allows the resident and transient populations to be warned within 15 minutes of the issuance of a protective action.

(2) The notification component consists of several local radio stations which broadcast appropriate initial and follow-up messages on protective actions to be taken.

(3) If a backup means of notification is necessary, other television/radio communications, vehicles with mobile public address systems and other means as necessary can be utilized.

(b) Predesignated areas are based on continuous mile circles from the Palisades Plant. These areas will be used by the responsible authorities in ordering protective actions.

(c) A communication system has been established for emergency notification of offsite agencies having protective response assignments.

(d) Emergency response and evacuation plans for offsite areas have been formulated by state and local agencies. Evacuation clear times for areas near Palisades are shown in Appendix C.

6.4.2 Contamination Control Measures

This section describes the provisions for preventing or minimizing direct or subsequent ingestion exposure to radioactive materials deposited on the ground or other contaminable surfaces.

a. Plant Area

Access to the owner-controlled area shall be controlled. In addition, within the owner-controlled area, there are no areas for producing agricultural products. In-plant contamination control shall be exercised in accordance with approved radiation protection procedures.

b. Offsite Areas

Criteria for preventing or minimizing ingestion of, or exposure to, contaminated materials or areas is contained in the Michigan Emergency Management Plan.

Included are:

1. Isolation or quarantine and area access control.

2. Control of the distribution of affected commercial agricultural crops.

3. Control of public water supplies.

4. Means for providing advisory information regarding the use of affected home food and water supplies.

5. Criteria for permitting return to normal use.

Action levels and responsibilities for execution of these measures are included. Contaminated areas will be barricaded and posted to control access until time allows for decontamination activities. Michigan Department of Environmental Quality representatives will be responsible for these actions and will be assisted by other Michigan State Departments and/or Nuclear Management Company upon request.

6.5 AID TO AFFECTED PERSONNEL

6.5.1 Emergency Personnel Exposure Criteria

Although an emergency situation transcends the normal requirements for limiting exposure, there are suggested levels of exposure acceptable in emergencies. Even under these conditions, every reasonable effort to minimize exposure must be made and personnel must be provided with appropriate monitoring devices. Three categories of risk versus benefit must be considered:

a. Saving of human life and reduction of injury.

b. Protection of health and safety of the public.

c. Protection of property.

In order to avoid restricting actions that may be necessary to save lives, it shall be left to the judgment of the individual to determine the amount of exposure that he will accept to perform an emergency action that will result in the saving of human life. Emergency team members are instructed in radiation effects and the risks involved for emergency doses. Basic guidelines provided to emergency team members are the EPA recommendations contained in Table 6-3. These exposures must be authorized by the Site Emergency Director (with the exception of life-saving efforts) based on the recommendation of the TSC Radiation Protection Group Leader.

The Radiation Protection Procedures shall be followed. In the event emergency exposure limits are approved, the same administrative methods for dose control shall be used with the higher emergency exposure limits.

Once the emergency condition has been mitigated, steps shall be taken to recover from the incident. All actions from this point shall be preplanned in order to limit exposures. Normal exposure limits will be used, areas will be controlled, and exposure of personnel documented.

6.5.2 Decontamination and First Aid

Onsite personnel decontamination facilities for emergency conditions are fully equipped with decontamination material. The decontamination facility at Palisades Plant is located at the access control area of the auxiliary building. The decontamination facility consists of a shower, sink, and first-aid kits. Decontamination supplies such as various decontamination solutions and surgical brushes will be stored in the decontamination facility. Emergency equipment located around the site is available and includes personnel monitoring equipment. There is also additional personnel monitoring equipment located at the access control assembly area including dosimeters, and high and low-range survey instruments. A comprehensive list of materials and equipment available for use can be found in Appendix E.

In an emergency situation, decontamination is the responsibility of the Radiation Monitoring Team. When decontamination of an area or equipment is required, personnel from Operations, Maintenance, and Radiation Protection will work jointly.

Medical first-aid training is provided to designated members of the Plant emergency organization which, as a minimum, includes the Red Cross Multimedia course or equivalent, combined with the American Heart Association Cardiopulmonary Resuscitation course. This training for members of the Plant staff also includes methods of handling contaminated patients and/or injuries. At least one person on each operating shift is required to have this first-aid training.

The Covert Township Fire Department ambulance personnel and the South Haven City ambulance staff are trained in caring for radiologically contaminated victims.

6.5.3 Medical Treatment

In the event of a serious accident at Palisades Plant requiring medical treatment, agreements have been made with the area hospitals. These hospitals are:

a. South Haven Community Hospital, South Haven, Michigan.

b. Lakeland Regional Health System, St Joseph, Michigan.

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TABLE 6-1
ENVIRONMENTAL PROTECTION AGENCY - PROTECTIVE ACTION GUIDES

Protective Action	PAG Projected Dose Which ever is more limiting
Intervention Level *	0.5 rem (CEDE) Whole body or any set of organs OR 5 rem (CDE) any single organ

*NOTE: Specific PAs are not provided due to the wide variety of actions that could be taken.

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TABLE 6-2
PROTECTIVE ACTION GUIDES (PAGS) & OBJECTIVES

Early Plume PAGs (Source -EPA 400-R-92-001)

Protective Action	PAG Projected Dose	Comments
Evacuation (or sheltering)	1-5 rem TEDE 5-25 rem thyroid 50-500 rem skin	Evacuating (or for some situations, sheltering) should normally be initiated at the lower limits.
Administration of stable iodine	25 rem thyroid	Requires approval of State Medical Officials

Relocation PAGs (Source - EPA 400-R-92-001)

Protective Action	PAG Projected 1st Year Dose	Comments
Relocate the general population	≥ 2 rem TEDE > 100 rem beta skin dose	
Apply simple dose reduction techniques	< 2 rem TEDE	These protective actions should be taken to reduce doses to as low as practicable levels

Long Term Objectives (Source - EPA 400-R-92-001)

Long Term Objectives	
Period	Objective
Any single year (2 through 50)	0.5 rem TEDE
50 Years	5 rem TEDE

TABLE 6-3
GUIDANCE ON DOSE LIMITS FOR WORKERS PERFORMING EMERGENCY SERVICES

Dose Limit[a] (rem)	Activity	Condition
5	all	
10	protecting valuable property	lower dose not practicable
25	life saving or protection of large populations	lower dose not practicable
>25	lifesaving or protection of large populations	only on a voluntary basis to persons fully aware of the risks involved

[a]Sum of external effective dose equivalent and committed effective dose equivalent to nonpregnant adults from exposure and intake during an emergency situation. Workers performing services during emergencies should limit dose to the lens of the eye to three times the listed value and doses to any other organ (including skin and body extremities) to ten times the listed value. These limits apply to all doses from an incident, except those received in unrestricted areas by members of the public during the intermediate phase of the incident.

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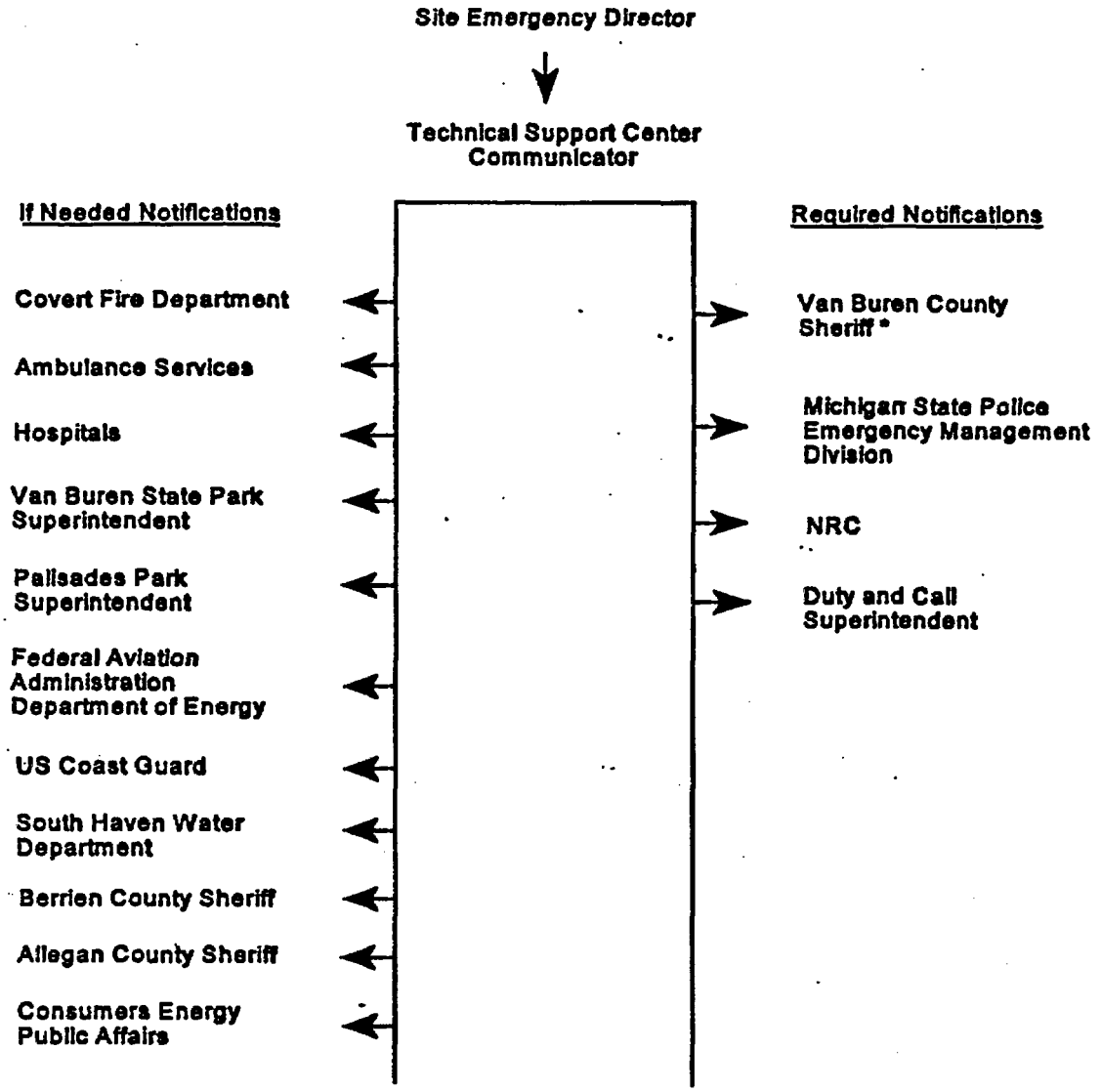
FIGURE 6-1
PALISADES PLANT NORMAL NOTIFICATION CHAIN



* Not a required notification if the State Emergency Operations Center is activated.

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7.0 EMERGENCY FACILITIES AND EQUIPMENT

This section describes the equipment and facilities that are utilized to:

a. Assess the extent of accident hazards.

b. Mobilize the resources required to mitigate the consequences of an accident.

c. Provide protection to Plant personnel.

d. Support accident mitigation operations.

e. Provide immediate care for injured/contaminated personnel.

f. Effect damage control.

7.1 ONSITE EMERGENCY FACILITIES

Onsite emergency support centers include the Control Room and two other areas at Palisades. These areas are designated as the Technical Support Center and the Operations Support Center as described below.

7.1.1 Control Room

The principal emergency control center is the Plant's Control Room. Operations personnel will report to the Control Room and control all evolutions from this central location. Self-Contained Breathing Apparatuses are located in or near the Control Room for personnel protection from inhalation.

7.1.2 Technical Support Center

The Technical Support Center is located in the area immediately adjacent to the Control Room and includes the Shift Manager's office, the viewing gallery hallway, and the adjacent open work area. The TSC will accommodate personnel who will provide technical support to Operations and Control Room personnel during emergency conditions. Complete record keeping and communications capabilities have been installed. All necessary equipment, furnishings, and documents are stored in the immediate area and are readily available for use. The TSC may be activated for Unusual Events, and will be activated for Alert, Site Area Emergency, and General Emergency conditions.

Further details concerning staffing, equipment, furnishings, procedures, and activation are outlined in the Emergency Implementing Procedures.

Habitability of the Control Room and the TSC is assured by the filtered ventilation system which serves this area. In addition, Self-Contained Breathing Apparatus (SCBA) is provided for up to eight individuals. An area radiation monitor in the viewing gallery area reads out in the Control Room to provide external dose rate data. Air sampling and analysis equipment are provided in the emergency equipment kits to monitor airborne radioactivity levels. Personal radiation dosimetry issued to some site personnel and visitors will provide individual radiation dose assessment data. In the event that the Technical Support Center is not habitable, an alternate center can be established at the OSC, Mechanical Maintenance Shop, or other site buildings.

7.1.3 Operational Support Center (OSC)

The Operational Support Center (OSC) is located in the lunchroom and men's locker room in the Service Building which is connected to the rest of the Plant by hallways.

The function of the OSC is to assemble and coordinate necessary personnel from Chemistry, Radiation Protection, Operations (AOs), I&C, Electrical, and Mechanical. These groups will be dispatched for specific jobs as directed from the TSC.

Additional details concerning staffing, equipment, furnishings, procedures, and activation are outlined in the Emergency Implementing Procedures.

Habitability of the OSC is verified using available emergency kit equipment. Equipment is provided for measuring external dose rates and airborne radioactive levels. The OSC ventilation system is independent of the Auxiliary Building system. This minimizes airborne contamination as a result of events in the Auxiliary Building. In the event the OSC should not be habitable, alternate locations such as the Mechanical Maintenance Shop or permanent construction buildings are available for use.

A maintenance kit containing only maintenance supplies is kept in the men's locker room.

7.2 EMERGENCY OPERATIONS FACILITY (EOF)

The Palisades Emergency Operations Facility (EOF) is located at the South Haven Conference Center, approximately 9.1 miles from the Plant. The EOF assumes overall responsibility for Nuclear Management Company emergency response. The EOF is designed to provide assistance in the decision-making process to protect the public health and safety, and to control radiological monitoring teams offsite. The EOF may be activated for the Unusual Event, and shall be fully activated for the Alert, Site Area Emergency, and General Emergency categories.

To assure the safety of the staff, equipment is provided for measuring external dose rates, and airborne radioactivity levels.

The staff is comprised of personnel from the Plant. In addition, liaison personnel from the county, state, and federal governments will also be present in the EOF.

The EOF has ready access to up-to-date Plant records, procedures, and emergency plans needed to exercise overall utility resources management and for recovery management. Hard copy records stored and maintained at the EOF include, but are not limited to:

Palisades Technical Specifications
Palisades Operating Procedures
Palisades Final Safety Analysis Report
Palisades Emergency Off Normal Procedures
Palisades Site Emergency Plan
Palisades Emergency Implementing Procedures
Michigan Emergency Management Plan
Van Buren County Emergency Plan
Berrien County Emergency Plan
Allegan County Emergency Plan
Palisades Piping and Instrument Diagrams

Other up-to-date records including radiological records, procedures, drawings, schematics, and diagrams are readily available via transmittal to the EOF.

The EOF shall serve as a central collection point for receipt and analysis of field monitoring data, and coordination of sample media.

7.3 COUNTY AND STATE EMERGENCY CENTERS

7.3.1 County Emergency Operations Centers

Potential emergencies could directly impact those individuals living within the 10-Mile Emergency Planning Zone, and indirectly affect property within the 50-Mile Emergency Planning Zone. Therefore, emergency planning efforts have been initiated by those affected counties within the 10-Mile Emergency Planning Zone. The affected counties are: Van Buren, Berrien, and Allegan Counties.

Each of these counties has established and maintains an Emergency Operations Center (EOC). These centers are located as follows:

a. Van Buren County Courthouse Annex
Paw Paw, Michigan

b. Berrien County Sheriff's Department
St Joseph, Michigan

c. Allegan Central Dispatch
Allegan, Michigan

7.3.2 State Emergency Operations Center

When it is determined that personnel and resources of state government are needed to support disaster operations of affected local governments, the State Emergency Operations Center (SEOC) is staffed in Lansing. This facility is staffed at any level of emergency depending on potential for required state response.

The Michigan State Field Team Center location will be determined at the time of the incident by personnel at the State EOC. That facility is equipped with the necessary communications control capabilities (when staffed), from which the State will dispatch offsite monitoring teams. All decision makers remain in Lansing.

7.4 JOINT PUBLIC INFORMATION CENTER (JPIC)

A Joint Public Information Center (JPIC) will be established at the Lake Michigan Community College. The JPIC will be staffed by public information representatives of the utility, state, county, and federal governments. The Plant Public Affairs Director will be located in this facility upon its activation.

TITLE: SITE EMERGENCY PLAN

7.5 COMMUNICATIONS EQUIPMENT

The members of the emergency organizations require correct and up-to-date information relevant to the potential or real emergency condition. Therefore, the communications systems that will be used by the emergency organizations must meet the following basic criteria:

a. Provide for prompt initial notification.

b. Maintain reliability.

c. Provide for alternate methods of communications.

7.5.1 Routine Communications System

Communications equipment available for offsite use include:

a. Commercial telephones - separate outside lines.

b. Intracompany telephone system.

c. State Police Radio - through Security Department.

d. Emergency Network System telephone to NRC.

e. Commercial telephone to Van Buren County Sheriff's Department, Paw Paw.

f. Commercial telephone to State Police Operation Center, East Lansing.

g. Power failure phones in major onsite response centers (Control Room, TSC, OSC). These phones activate when site power to the normal phones fails.

Table 7-1 summarizes communications resources.

TITLE: SITE EMERGENCY PLAN

7.6 ASSESSMENT EQUIPMENT SYSTEMS

7.6.1 Radiation Monitoring System

The Radiation Monitoring System measures, indicates, and records the presence and level of radiation, and alerts Plant personnel to abnormal levels of radioactivity, thereby contributing to personnel protection and proper operation of Plant equipment.

The system consists of permanently installed, continuous monitoring devices together with a program and provisions for specific sample collections and laboratory analyses. The system is designed to provide information for use in evaluating the radiological consequences of normal Plant operation, anticipated operational occurrences, and accidents. Control actions are initiated on the required systems when radiation levels exceed predetermined amounts.

These monitoring functions are performed by the following subsystems and programs:

a. Area Radiation Monitoring

b. Liquid Radiation Monitoring

c. Airborne Radiation Monitoring

    1. Gas

    2. Particulate

    3. Iodine

Data from these subsystems are displayed by readouts, annunciators, and recorders located in the Control Room. (Portable airborne and area monitors are capable of being plugged into receptacles throughout the Plant.) Instrumentation power for the Radiation Monitoring System will be supplied from a reliable source.

d. Area Radiation Monitors

Area radiation monitors are primarily for the purpose of measuring radiation dose rates for protection of Plant personnel and providing supporting data to the surveillance of Plant radiation levels.

Monitor alarm setpoints depend on the normal background radiation at the detector location and the calculated levels for abnormal conditions. The monitors will operate within the range of normal environmental conditions applicable to their locations.

Monitored points within the Plant are in areas where personnel exposure to radiation is most likely, and at appropriate access control boundaries. Readouts and alarms are provided both locally and in the Control Room.

e. Airborne Radiation Monitors

The radiation monitors located in the gaseous release paths monitor radioactivity with sufficient sensitivity to demonstrate compliance with 10 CFR 20 limits. They also provide sampling capability, ie, removable filters and/or gas sample stop valves. Samples analyzed with laboratory equipment permit evaluation of compliance to more restrictive regulations and provide data required.

f. Liquid Radiation Monitors

The monitoring systems consist of fixed detectors that display radiation levels in the Control Room.

Testing and maintenance features, such as remotely operated check sources, flushing connections, and cutoff valves are included for periodic system check and/or calibration. The liquid radiation monitors are designed to ensure that liquid effluent releases are maintained below the DAC values of 10 CFR 20 by the use of alarms and automatic shutoff features.

7.6.2 Meteorology

Onsite meteorological data is provided by a meteorological tower located in the northeast sector of the site. This system is primarily concerned with providing data for estimating the actual or potential effects of an accidental, airborne release of radioactivity.

The following data is available:

a. Wind direction and speed at 10 and 60 meters.

b. Stability class.

This data is transmitted to the Control Room at 15-minute averages. A remote interrogation capability is available. Details of the system as it applies to emergency offsite dose calculation are provided in Emergency Implementing Procedure EI-6.7, "Plant Site Meteorological System." Details on the system in general are provided in "Palisades Meteorological Monitoring Project Plan."

Backup meteorological data is provided by WSI. WSI provides wind speed and direction, and Pasquill stability class. Details on the WSI System as it relates to emergency offsite dose calculations, are provided in Emergency Implementing Procedure EI-6.8, "Backup and Supplemental Meteorology." Details on the WSI System in general are provided in the WSI Weather Information System User Manual.

Severe weather warnings are provided to the Plant by a private consultant. Predictions of sky to ground lightening, tornados, and wind speeds in excess of 40 mph are reported to the Control Room.

7.6.3 Fire Protection System

The Fire Protection System, including monitoring devices and fire suppression equipment, is completely detailed in the Fire Protection Implementing Procedures.

7.7 OFFSITE MONITORING

7.7.1 Radiological Monitoring

Radiological Monitoring Teams shall be activated at the direction of the Site Emergency Director (SED). Activation of the teams should be accomplished by notification of the Operational Support Center (OSC) Director by the Radiation Protection Support Group in the Technical Support Center (TSC). If the OSC has not been activated, notification should be made directly to the Radiation Protection Office. Monitoring teams shall generally consist of two Radiation Safety Technicians. The emergency vehicle shall provide transportation and be equipped with radio communications and equipment suitable for monitoring and/or sampling gaseous or liquid releases. The equipment and procedures supplied to the offsite team(s) provide the capability to sample for radioiodine in concentration as low as 10^{-7} micro-curies per cubic centimeter. The estimated deployment time for a monitoring team is 30 minutes.

a. The Environmental Monitoring Program provides a number of TLDs and airborne particulate sampling stations which are valuable for long-term appraisal of integrated dose.

b. The Michigan Department of Environmental Quality provides offsite field monitoring capability within approximately three hours.

c. The State Police Emergency Management Division can request aerial and field monitoring through the Department of Energy.

7.7.2 Laboratory Facilities

The Plant laboratory and counting rooms have the capability to perform the analyses required under emergency conditions. The Michigan Department of Environmental Quality, Radiological Protection Section operates a radiological laboratory in Lansing.

Palisades Plant, and the DC Cook Nuclear Plant, may exchange services for radiological laboratory analyses, laboratory boron analyses, and backup dispersion meteorology information.

Environment Inc Midwest Laboratory has agreed to provide the following services: collecting, analyzing, evaluating, and reporting on appropriate samples as needed for protective action information. Environment Inc, maintains a laboratory in Northbrook, IL which has the capability to perform chemical and radiological analyses.

TITLE: SITE EMERGENCY PLAN

7.8 FIRST AID AND MEDICAL CARE

7.8.1 First Aid and Medical Care

At least one person having American Red Cross Multimedia First Aid or equivalent will be available onsite at all times.

Specialized training is given for the treatment and handling of contaminated personnel and injuries.

Emergency call lists for ambulance service and medical facilities are kept current in the Emergency Implementing Procedures.

7.8.2 First Aid Equipment

There are first aid kits in appropriate areas of the Plant. Accountability and inventory checks are performed quarterly and after use.

7.8.3 Decontamination and First Aid

Personnel decontamination facilities for emergency conditions include showers, sinks, cleaning agents, and first aid kits, which are maintained near the Radiation Protection access control area. These supplies include special materials and Personnel Decontamination Procedures. Additional personnel decontamination equipment and facilities shall be available for decontamination of evacuees.

7.8.4 Medical Transportation

Company vehicles maintained onsite and/or private vehicles can be used to transport injured and/or contaminated personnel for medical treatment. In addition, ambulances are available from the Covert and South Haven Fire Departments, depending on the severity of the situation.

7.8.5 Medical Treatment

South Haven Community Hospital and Lakeland Regional Health System/St Joseph, have agreed to accept contaminated, injured patients.

TITLE: SITE EMERGENCY PLAN

7.8.6 Use of Protective Equipment and Supplies

Listings by general category of typical emergency protective equipment and supplies that are stored and maintained for emergency purposes are contained in Appendix E of the Plan. Additional protective actions considered as measures for minimizing radiological exposure and contamination of Plant personnel include use of protective equipment and clothing as described below:

a. Individual Respiratory Protection

Respiratory protection devices will be issued when necessary to significantly reduce the internal exposure to radionuclides. Self-Contained Breathing Apparatus will also be used in emergencies involving smoke, gases, oxygen deficient atmospheres, or unknown conditions. Both Self-Contained Breathing Apparatus and air-purifying type full-face respirators are maintained in or near the Control Room, and a larger supply of this equipment is available at the Radiation Protection area in access control. Respiratory protection devices will be issued to survey teams, rescue teams, and other personnel required to be in areas of suspected or known high airborne radioactivity. A reserve breathing air supply that is of a rate sufficient to support Control Room personnel for an extended period of time is available. In addition to breathing apparatus, thyroid blocking agents (ie, potassium iodide) will be dispensed for onsite personnel in accordance with Emergency Implementing Procedures.

b. Protective Clothing

Supplies of this apparel include coveralls, rubber gloves, shoe covers and boots, caps and hoods, and plastic suits. Inventories are maintained for normal Plant use in access control and in the stockroom.

Additional supplies of protective clothing are in the emergency kits. This clothing will be issued to survey teams, rescue teams, and other personnel required to enter known or suspect areas of radioactive contamination. It will also be issued to persons required to work in or occupy contaminated areas. For emergency conditions, normal street clothing is considered as protective apparel, which is supplemented as necessary to protect skin surfaces, and which can be cleaned or discarded later. Protective clothing is distributed offsite only to members of those support agencies required to occupy contaminated areas for some purpose. In this event, Nuclear Management Company will provide supplies to those people as available.

c. Breathing Air

A local supplier of compressed air is capable of providing emergency air cylinders on a 24-hour basis.

TITLE: SITE EMERGENCY PLAN

TABLE 7-1
PALISADES SEP COMMUNICATIONS MATRIX

	Control Room	TSC	OSC	EOF	State EOC	Van Buren EOC	NRC	Offsite Teams
Control Room		1. Intp Phone 2. SP Phone	1. Intp Phone 2. Co Network	1. Intp Phone 2. Radio[1]	1. Com Phone 2. Radio[2]	1. Com Phone 2. Radio[2]	1. ENS 2. Com Phone	NR
TSC	1. Intp Phone 2. SP Phone		1. Ded Circuit 2. Intp Phone		1. Com Phone 2. Radio[2]	1. Com Phone 2. Radio[2]	1. ENS 2. Com Phone	NR
OSC	1. Intp Phone 2. Co Network	1. SP Phone 2. Intp Phone		1. Intp Phone 2. Radio[3]	NR	NR	NR	1. Radio[3] 2. Com Phone
EOF	1. Intp Phone 2. Radio[1]	1. Ded Circuit 2. Com Phone	1. Intp Phone 2. Radio[3]		1. Com Phone 2. Co Network	1. Com Phone 2. Co Network	1. ENS 2. Com Phone	1. Radio[3] 2. Com Phone
State EOC	1. Com Phone 2. Radio[2]	1. Com Phone 2. Radio[2]	NR	1. Com Phone 2. Co Network		1. Com Phone 2. LEIN	NR	NR
Van Buren EOC	1. Com Phone 2. Radio[2]	1. Com Phone 2. Radio[2]	NR	1. Com Phone 2. Co Network	1. Com Phone 2. LEIN		NR	NR
NRC	1. ENS 2. Com Phone	1. ENS 2. Com Phone	NR	1. ENS 2. Com Phone	NR	NR		NR
Offsite Teams	NR	NR	1. Radio[3] 2. Com Phone	1. Radio[3] 2. Com Phone	NR	NR	NR	

Radio - [1]Control Room/EOF (Located in Control Room)
- [2]Plant Security Radio (in CAS & SAS/South Haven State Police (day) & Paw Paw State Police (backshifts & weekends))
- [3]Radiation Protection Radio Network

ENS - Emergency Notification System
Intp Phone - Intraplant Telephone System
SP Phone - Sound Powered Phone
Ded Circuit - Dedicated Telephone Circuit
Com Phone - Commercial Telephone
Co Network - Consumers Energy Telephone Network
LEIN - Michigan State Police Communication System
NR - Not Required

TITLE: SITE EMERGENCY PLAN

TABLE 7-1
PALISADES SEP COMMUNICATIONS MATRIX

BACKUP PHONE NUMBERS AND METHODS

1. **State of Michigan**

   a. 517-336-6250
   b. 269-637-2125
   c. Security Radio

2. **Van Buren County Sheriff**

   a. 269-657-2058
   b. 269-657-3101

3. **NRC**

   a. 301-816-5100
   b. 301-951-0550
   c. 301-415-0550

TITLE: SITE EMERGENCY PLAN

8.0 MAINTAINING EMERGENCY PREPAREDNESS

Palisades Plant shall maintain the Site Emergency Plan and the Site Emergency Implementing Procedures as two separate documents. It is intended that this Emergency Plan, although considered part of Palisades Nuclear Power Plant's Final Safety Analysis Report (FSAR), be maintained as a separate document.

In order to meet the constantly changing conditions, methods have been implemented to ensure that the Site Emergency Plan and Implementing Procedures remain effective over the life of the Plant. Efforts shall be made to assure continuous emergency preparedness and operational readiness among Nuclear Management Company personnel and the offsite response agencies and organizations.

8.1 ORGANIZATION PREPAREDNESS

8.1.1 Training

Palisades Plant personnel, including those on temporary assignment or in a training status, will receive training pertinent to the Site Emergency Plan and Implementing Procedures to ensure their safety (Table 8-1). Persons assigned specific responsibilities during an emergency will receive additional training appropriate to their respective assignments. The responsibility for training is that of the Training Manager. He may delegate specialty training responsibilities to personnel qualified to perform such training.

8.1.2 Drills and Exercises

Members of the operating staff need to be familiar with their specific duties and responsibilities in the event of an accident at the Palisades Plant. To accomplish this, periodic drills and exercises will be conducted to test the state of emergency preparedness. The prime objective of the drills and exercise is to verify emergency preparedness of participating personnel, organizations, and agencies.

Each drill and exercise will be conducted to meet the following objectives:

a. Ensure that the participants are familiar with their respective duties and responsibilities.

b. Verify the adequacy of the Palisades Plant Site Emergency Plan and the methods used in the Implementing Procedures.

c. Test communication networks and systems.

d. Check the adequacy of emergency supplies and equipment.

e. Verify the operability of emergency equipment.

f. Designed to allow for freeplay for decision making.

Emergency Planning will ensure that drills and exercises are conducted as specified in this Plan.

Scheduled drills and exercises will be held involving appropriate offsite as well as onsite emergency personnel, organizations, and agencies. These drills and exercises will be conducted to simulate actual emergency conditions. Drill scenarios will be prepared that involve participation of several emergency teams and will include specific parts of the onsite and offsite emergency organizations such as state, county, and federal organizations, and local services support personnel and organizations. Offsite emergency planning personnel will be given advance notice of the schedule date of the drill or exercise, although the actual details shall be kept confidential from Offsite Response Players. Official observers will be provided with materials in accordance with their requirements.

Recommendations for revisions to the Palisades Nuclear Power Plant Site Emergency Plan and/or Implementing Procedures and/or upgrading of emergency equipment and supplies as a result of a drill or exercise will be forwarded to Emergency Planning by observers and participants for inclusion in a formal critique. After review, recommendations will be forwarded to the Manager, Emergency Preparedness for comments. Recommended changes that are approved by the Director Business Support will be incorporated into the Site Emergency Plan and Implementing Procedures. Records shall be maintained on drills and exercises conducted at the Palisades Plant.

8.1.3 Major drills and exercises will include the following:

a. Medical Drill

A Medical drill shall be conducted at least once per calendar year. The drill shall involve the participation of local medical support personnel and organizations (eg, physicians, ambulance services, hospital, etc). Scenarios may include cases of radiation overexposure, contaminated personnel and/or contaminated/injured personnel.

b. Fire Emergency Drill

Drills will be conducted in accordance with the Palisades Fire Plan which has been reviewed and approved by the NRC.

c. Radiological Monitoring Drills

A radiological monitoring drill (onsite and/or offsite) shall be conducted annually. This drill shall include the collection and analysis of various materials. These may include grass, water, soil, and air samples.

d. Radiation Protection Drills

Radiation Protection drills shall be conducted semi-annually which involve response to, and analysis of, simulated elevated airborne and liquid samples, and direct radiation measurements.

e. Radiological Emergency Preparedness Exercise

An exercise which tests the Emergency Preparedness Plan and organization shall be conducted at least once per calendar year. These exercises shall be varied such that plans and preparedness organizations are tested completely within a six-year period. Provisions should be made to start exercises between 6:00 PM and 4:00 AM once every six years, and to develop scenarios which reach Site Area and/or General Emergency levels every two years to assist the state and counties in maintaining their Emergency Preparedness requirements.

Annual exercises may involve the local, county, and state government emergency planning agencies depending on their past participation and schedule in accordance with federal regulations. Federal emergency response agencies shall be involved in a major exercise at least once every five years. Specific items tested are: public warning, adequacy of Emergency Implementing Procedures, communications, accident assessment, radiological monitoring, use of the Protective Action Guidelines, evacuation methodology, direction and control, public information, recovery and reentry operations, and emergency equipment.

Official observers from federal, state, or local governments will be encouraged to observe, evaluate, and critique the required exercises. A critique shall be scheduled at the conclusion of the exercise to evaluate the ability of organizations to respond as called for in the plan. The critique shall be conducted as soon as practicable after the exercise, and a formal evaluation or report shall result from the critique. Deficiencies identified in this evaluation shall be assigned to appropriate Nuclear Management Company staff.

f. Communication Tests

Communications shall be tested monthly with NRC headquarters from the Control Room, Technical Support Center and near-site Emergency Operations Facility. Communications shall be tested monthly with state and local governments within the plume exposure pathway of the Emergency Planning Zones. Communication shall be tested quarterly with those federal and state emergency response organizations within the ingestion pathway. Communication links with state emergency operations center and field assessment teams from the Plant shall be tested annually. Communication links with the county emergency operations centers shall be tested annually by calling the respective Sheriff's Department. Communications between the Control Room, Technical Support Center, and Emergency Operations Facility shall be tested annually.

8.1.4 Emergency Planning

Emergency Planning has been delegated responsibilities related to emergency planning which include, but are not limited to, the following:

a. Ensure offsite county, state, and supporting emergency plans are compatible with the Palisades Site Emergency Plan.

b. Conduct offsite agency training.

c. Ensure that the information, data, and procedures detailed in the Site Emergency Plan Implementing Procedures are consistent with the Palisades Site Emergency Plan.

d. Ensure that the Emergency Plan Implementing Procedures are coordinated and interface properly with other procedures (eg, Administrative Procedures, Security Procedures, Radiation Protection Procedures, and Training Procedures, etc).

e. Coordinate the onsite emergency planning drill and exercise activities.

f. Coordinate the onsite review and updating of the Palisades Site Emergency Plan and Implementing Procedures.

g. Assist the Palisades Training Department, in coordinating and/or providing emergency planning related specialty training.

h. Ensure the maintenance and inventory of emergency equipment and supplies.

i. Be familiar with current changes in the federal regulations and guidance which impact emergency planning activities.

j. Document all corrective actions resulting from Plant-related Emergency Planning critiques and audits.

k. Initiate appropriate Plant-related corrective actions, if any, resulting from the critiques of each integrated practice drill conducted at the Plant.

8.2 EDUCATIONAL INFORMATION FOR THE PUBLIC

For resident and transient members of the public within the 10-Mile Emergency Planning Zone, Nuclear Management Company, and the local and state governments will provide written information pertaining to topics associated with emergency planning. Information provided may include the following topics:

- Notification methods, time required for notification,
- Public initial actions.
- Educational information on radiation.
- Contact points and locations for additional information, including news media or local broadcast stations.
- Protective measures.
- Special needs of the handicapped.

This information can be disseminated to the public via varying methods. These methods may include direct mail of literature, information brochures contained in billing statements, telephone book inserts, and posting information documents in public areas.

At least annually, Nuclear Management Company and the local and state governments will update the information, if necessary, for members of the public within the 10-Mile Emergency Planning Zone.

TITLE: SITE EMERGENCY PLAN

8.3 REVIEW AND UPDATING OF THE EMERGENCY PLAN AND IMPLEMENTING PROCEDURES

The Palisades Plant Site Emergency Plan involves the coordination of Nuclear Management Company personnel and offsite support agencies. To achieve and maintain the most efficient course of emergency actions, the Palisades Plant Site Emergency Plan and Implementing Procedures, including appended letters of agreement, will be reviewed on an annual basis and updated as needed. These reviews are conducted to comply with the Nuclear Management Company procedures, federal regulations, and operation license provisions.

Proposed revisions to the Site Emergency Plan shall receive an effectiveness review in accordance with 10 CFR 50.54(q). If the change to the Site Emergency Plan reduces the effectiveness of the Plan, the Nuclear Regulatory Commission (NRC) shall review and approve the change prior to implementation. The proposed change shall be reviewed by the Off-Site Safety Review Committee (OSRC) prior to Plant Licensing submitting the proposed change to the NRC.

Proposed revisions to the Site Emergency Plan and the Emergency Implementing Procedures shall be reviewed and approved by the Plant Review Committee (PRC), in accordance with Palisades Administrative Procedure 3.01, "Plant Review Committee."

When revisions to the Site Emergency Plan affect offsite support agencies, they shall be notified as the changes occur.

Editorial changes to the Site Emergency Plan or Emergency Implementing Procedures such as titles and telephone lists are not subject to the review process described above.

An independent review of the Emergency Preparedness Program shall be conducted annually by the Nuclear Oversight Department.

The review shall include the Site Emergency Plan, Emergency Implementing Procedures, training, drills and exercises, equipment, and interfaces with state and local governments. Audit records shall be maintained by Document Control for at least 5 years. Emergency Planning shall ensure state and local governments have access to appropriate findings.

As the Site Emergency Plan is reviewed, the emergency organization or procedures may be changed as a result of the following:

a. Drills may detect deficiencies and may indicate a more desirable organization or procedure.

b. Changes in key personnel involved in the organization or procedure.

c. Changes in the Plant's organizational structure.

d. Changes in the functions of supporting agencies, resulting from reorganization, personnel changes, and equipment requirements.

e. Changes in state or federal regulations.

f. Modifications to the Plant.

g. Recommendations received from other organizations, such as the state and federal agencies or other nuclear facilities.

8.4 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT AND SUPPLIES

Emergency Planning is responsible for planning and scheduling the quarterly inventory and inspection of designated emergency supplies and equipment.

Designated emergency equipment and supplies and their storage locations will be listed in the Implementing Procedures. Equipment, supplies, and parts having shelf lives shall be checked and replaced as necessary. Operational readiness of emergency equipment and supplies can be assured by conducting surveillance testing, maintenance checks, calibration, or inventory of all supplies.

TITLE: SITE EMERGENCY PLAN

8.5 EMERGENCY EQUIPMENT NUCLEAR PERFORMANCE ASSESSMENT DEPARTMENT CONTROLS

8.5.1 Meteorological Monitoring Program

The Emergency Preparedness Section controls for the Palisades Plant Meteorological Monitoring Program are defined in procedures on "Standards and Requirements for the Meteorological Monitoring Program."

8.5.2 Dose Assessment Computer Programs

The Dose Assessment Computer Programs are in accordance with Palisades Administrative Procedure 9.14, "Control of Computer Software."

TITLE: SITE EMERGENCY PLAN

TABLE 8-1
PERIODIC TRAINING OF EMERGENCY RESPONSE PERSONNEL

PERSONNEL CATEGORY	INVOLVED PERSONNEL	TRAINING AND FREQUENCY
Licensed Operators	Shift Engineers Shift Managers Reactor Operators Other Licensed Staff Members	Reactor Operators and Senior Reactor Operators receive periodic on-the-job and formal training as scheduled and conducted by the operator requalification training program. This program shall include a comprehensive review of appropriate Site Emergency Plan Implementing Procedures.
Personnel Responsible for Assessment of Emergencies	Site Director Department Managers Staff Personnel designated by the General Manager who may act as OSC and TSC Supervisors. Other members of the Plant staff as designated by the General Manager.	Annual Training will include the Site Emergency Plan and Implementing Procedures, Technical Specifications and other related Plant programs, plans, and procedures. Detailed instructions with special attention given to protective action recommendations are provided. Personnel shall participate in scheduled exercises and drills on a periodic basis.
Security Force	Property Protection Supervisor Security Shift Leader Security Officers Property Protection Advisor	The listed individuals will receive training on at least an annual basis. The training program shall include the following subjects: A review of the applicable parts of the Site Emergency Plan Implementing Procedures with emphasis on the classifications of emergencies, communications, and specific areas of responsibility; personnel accountability, personnel and vehicle access control during emergencies; evacuation control, and interfaces with offsite support organizations and agencies.
Chemistry Staff	Chemical Engineer Chemistry Supervisors Chemistry Technicians	Training will include familiarization with emergency facilities and estimation of core damage
Fire Brigade	Fire Brigade Team Leader Designated Shift Personnel Other Plant Personnel as designated by Plant Management	This training will be done in accordance with the Fire Protection Plan.

TITLE: SITE EMERGENCY PLAN

TABLE 8-1
PERIODIC TRAINING OF EMERGENCY RESPONSE PERSONNEL

PERSONNEL CATEGORY	INVOLVED PERSONNEL	TRAINING AND FREQUENCY
Damage Control and Repair Teams	Engineering and Maintenance Manager Mechanical and Electrical Maintenance Supervisors and Personnel Maintenance Engineer Instrument and Control Supervisor	The annual training will include a review of the Site Emergency Plan Implementing Procedures with emphasis on radiation exposure control, emergency repair procedures, reentry and recovery planning, and operations.
Radiological Monitoring Personnel	Health Physicists Radiation Material Control Supervisor Radiation Protection Supervisors Plant Personnel designated as onsite and offsite Radiation Monitoring Teams	On at least an annual basis, detailed instructions are provided on such topics as classifications of emergencies, interfaces, and responsibilities of the radiological monitoring and assessment personnel, personnel protection during emergencies, location, and use of emergency equipment, determination of external and internal radiation exposure/contamination, decontamination of personnel and equipment, monitoring techniques, and communications.
First-Aid Teams	Designated Plant Supervisors Plant Personnel as designated by Plant Management	Each member of the First-Aid Team(s) shall receive the Red Cross Standard First-Aid Course. Satisfactory completion of course certifies them as members of the First-Aid Team(s) for a period of three years. In addition, each team member shall be instructed on the availability of onsite medical treatment facilities, equipment and supplies; communication systems; radiological hazards existing during personnel-related emergencies; and interfaces and responsibilities with local medical support personnel (ie, local physicians, ambulance personnel, etc).

TITLE: SITE EMERGENCY PLAN

TABLE 8-1
PERIODIC TRAINING OF EMERGENCY RESPONSE PERSONNEL

PERSONNEL CATEGORY	INVOLVED PERSONNEL	TRAINING AND FREQUENCY
Offsite Support Groups	Offsite support organizations such as the emergency preparedness offices, State Police the county sheriff's offices, fire and ambulance services, doctors, etc, who may respond to an emergency.	Annual training will be applicable to their expected response action and will ensure that they are adequately familiar with the Site Emergency Plan, radiation protection, and Plant layout in the event of an accident. Retraining will be made available annually to include changes made to the Site Emergency Plan. This program shall relate the importance of effective planning for emergency situations and the interface between Nuclear Management Company emergency organizations and the offsite (state, county, and federal) emergency organizations. The program shall include a review of the Plant's Site Emergency Plan Implementing Procedures with emphasis given to the classification of emergencies, reporting requirements, assessment, protective and corrective actions, and the communication network. In addition, specific training on dose calculations/projections, protective action guides, and reportable information shall be provided.
News Media	Local Media Personnel which may respond during an emergency situation at the Palisades Plant	The media will be invited annually to a training program pertaining to emergency planning. The training will include the relationship between the site and local emergency plans and cover basic radiation protection.
Other Plant Personnel - Nonessential	Plant personnel having no preassigned responsibilities during a radiological emergency	Annual training will be conducted concerning Radiological Emergency Procedures. The training will include: radiation exposure control, personnel accountability, site evacuation and reassembly.
Emergency Planning	Plant personnel having no preassigned responsibilities during a radiological emergency	Annually attending, observing, and reviewing another Plants. NRC evaluated exercise or practice drill for such an exercise; participating in industry, regulatory, state, local, or other conferences; or participating in Institute of Nuclear Power Operations inspections of Nuclear Management Company or other utilities Emergency Planning Programs, will meet the requirements of 10 CFR 50.47(b)16.

TITLE: SITE EMERGENCY PLAN

9.0 RECOVERY

In any emergency, the immediate action is directed to limiting the consequences of the incident in a manner that will afford maximum protection of the Plant personnel and the public. Once the immediate corrective and protective actions have established an effective control over the incident situation, the emergency actions will shift into the recovery phase.

A recovery plan, from a practical standpoint, must be flexible enough to adapt to existing, rather than theoretical, conditions. It is not possible to anticipate in advance all of the conditions that may be encountered in an emergency situation; therefore, the Palisades Site Emergency Plan is addressed to general principles that will serve as a guide for developing a flexible plan of action.

In the period immediately following an incident, initial radiation monitoring functions will involve only gross hazard evaluations and isolation and definition of radiological problem areas. This immediate radiation surveillance activity is intended to provide the basic information for the second stage of reentry and recovery.

9.1 The following is a brief description of actions which will be examined as required prior to authorizing reentry by the emergency staff.

9.1.1 Review available radiation surveillance data. Determine Plant areas potentially affected by radiation and contamination.

9.1.2 Review radiation exposures of personnel to participate in recovery operations. Determine need for additional personnel.

9.1.3 Review adequacy of radiation survey instrumentation and equipment (type, ranges, number, calibration, etc).

9.1.4 Preplan survey team activities:

a. Areas to be surveyed

b. Anticipated radiation and contamination levels

c. Radiation survey equipment required

d. Shielding requirements and availability

e. Protective clothing and equipment required

f. Access control procedures (issuance of RWP)

g. Exposure control limits and personnel dosimetry required

h. Decontamination requirements

i. Communications required

9.2 The initial reentry into the Plant areas should encompass the following (in order of priority):

9.2.1 Determine initial recovery operations.

9.2.2 Identify hazards or potential hazards associated with the recovery operations.

9.2.3 Conduct comprehensive radiation surveillance of Plant facilities and define radiological problem areas.

9.2.4 Isolate and post areas in the Plant with appropriate warning signs and rope barriers, as Radiation Areas, High Radiation Areas, and Contaminated Areas, as appropriate.

9.3 The nature and extent of the emergency situation will determine what recovery operations are required. The Recovery Organization described in Section 5 will be established as directed by the Recovery Manager.

9.3.1 In order for the recovery phase of the emergency to commence, the conditions which caused the incident must no longer exist. It is the responsibility of the Site Emergency Director (SED) to determine that the facility and/or surroundings are safe.

9.3.2 The following criteria must be met before the recovery and reentry phase can begin:

a. The Plant is in a controlled and stable condition,

b. Releases of radioactive material are controlled and within NRC authorized limits,

c. Radiation levels are stable or decreasing in all Plant areas.

TITLE: SITE EMERGENCY PLAN

9.4 The initial objectives of the recovery program are the determination of the damage to equipment, the installation of shielding, rope barriers and signs, the application of clearance tags, decontamination, and cleanup as required to place the Plant in an acceptable long-term condition. Other recovery operations will not be initiated until the area affected by the emergency has been defined. Particular attention will be directed toward isolating and tagging out components and systems as required to control or minimize hazards. A systematic investigation will be conducted to determine the equipment damaged and the extent of the damage.

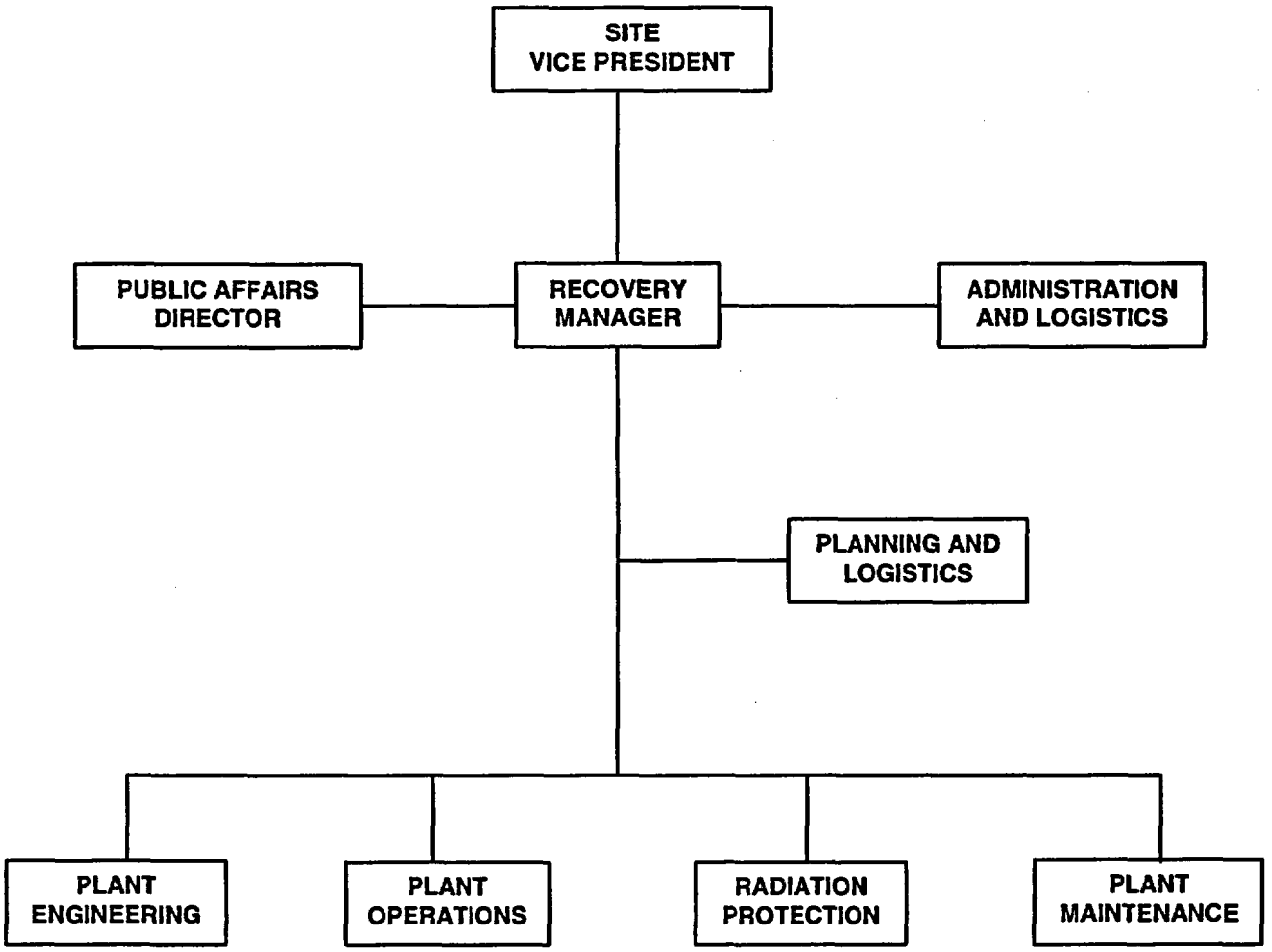
9.5 Once the initial objectives are completed, a detailed investigation of the accident causes and consequences both to the Plant and to the environment will be conducted. Determination will be made as to the equipment repair work required as well as the need to modify Plant operating procedures. Repair work and approved modifications shall be carried out as authorized. Test programs to confirm fitness for return to service will be developed and executed.

9.6 Recovery operations will be conducted in compliance with normal operational radiation exposure levels as specified in 10 CFR 20. When possible, any necessary releases of radiation during recovery will be planned, controlled, evaluated in advance for radiological impact, and appropriate offsite organizations and agencies informed of the scheduled releases and estimated impact.

9.7 The State EOC will be advised when the Plant deems it safe to begin the reentry phase of the offsite recovery operation. If the Governor has ordered an evacuation, it is legally required for him to officially rescind the order. The Michigan Department of Environmental Quality is responsible for coordinating reentry procedures for the offsite population.

TITLE: SITE EMERGENCY PLAN

FIGURE 9-1
LONG TERM RECOVERY ORGANIZATION



AGREEMENTS WITH OFF-SITE INDIVIDUALS, AGENCIES, AND ORGANIZATIONS

Criteria for agreements with off-site individuals, agencies, and organizations.

Letters of agreement, contracts, or signature pages may be used to verify agreements made with offsite individuals, agencies, and organizations. The use of signature pages is appropriate for use with organizations or agencies where response functions are covered by laws, regulations, or executive orders.

Letters of agreement contain the following as appropriate:

1. Concepts of operations,
2. Emergency measures or services to be provided,
3. Mutually acceptable criteria for implementation,
4. Arrangements for exchange of information,
5. Authorities,
6. Responsibilities,
7. and Limits of actions.

Contracts or contract excerpts may be used in place of letters of agreement and should address the above criteria as appropriate.

As specified in Section 8 of this plan, letters of agreement, contracts, and signature pages will be reviewed annually. The following agreements will be reviewed annually and updated as needed.

1. Covert Fire Department
2. South Haven Area Emergency Services Authority
3. Lakeland Regional Health System
4. South Haven Community Hospital
5. Medic 1 Community Emergency Service
6. Environmental Inc

AGREEMENTS WITH OFF-SITE INDIVIDUALS, AGENCIES, AND ORGANIZATIONS

7. Memo on Agreement with NSSS Vendor

8. Memo on Agreement with Nuclear Fuel Supplier

9. Reciprocal Laboratory Use Agreement

10. Institute of Nuclear Power Operations

11. Mutual Assistance Agreement

All letters of agreement, contracts, and signature pages are kept with the master file for this appendix in Document Control.

BASIS FOR DELETION OF APPENDIX B OF THE PALISADES SITE EMERGENCY PLAN

To File

From JRBrunet, Sr Plant Emergency Planning Coordinator — CONSUMERS POWER COMPANY

Date December 30, 1986

Subject PALISADES PLANT- BASIS FOR DELETION OF APPENDIX B OF THE PALISADES SITE EMERGENCY PLAN — Internal Correspondence

CC DCC: 950/22*06*01/LP — JRB86*078

The following basis for deleting Appendix B of the Palisades Site Emergency Plan was taken from the 12/17/86 memorandum by RAEnglish and DLFugere. This document is filed in Document Control under A200/22*06*01/LP.

I A. The plots of calculated time/distance/dose contained in Appendix B were generated during the development of evacuation time estimates. They were placed in the Plan because it was thought that this information might be useful during an emergency. The plots are no longer needed because this information can be more quickly obtained through the Companys' new automated dose assessment program maintained on the IBM PC's or the backup manual dose calculation procedures. In addition, the plots are only applicable for Maximum Hypothetical Accident Conditions where as the automated program or manual procedures provide results which are applicable for any accident scenario.

B. NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans & Preparedness in Support of Nuclear Power Plants, does not indicate that these plots have to be in the Plan.

C. The plots are not referenced in the Plan nor are they used in the Emergency Implementing Procedures.

II A. The curves of dose rate versus time since reactor shutdown, based on the containment isolation monitors RIA-1805 thru RIA-1808 contained in Appendix B are typical of working level material and as such should not be in the Plan. NUREG-0654 does not require this type of material in the Plan.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

1.0 INTRODUCTION

This report summarizes updates to evacuation time estimates (ETEs) for the Palisades Nuclear Power Plant (PNPP). The purpose of the ETEs is to analyze how the population within the emergency planning zone (EPZ) around the nuclear power plant would evacuate during a radiological emergency.

Estimates of the time required to evacuate from areas around nuclear power plant sites are required for all operating plants in the United States. The Federal government has prepared guidance for the preparation and format of these evacuation time estimates. Most notable are the guidance documents prepared by the U.S. Nuclear Regulatory Commission (NUREG-0654, Rev.1[1] and NUREG/CR 4831[2]).

1.2 Emergency Planning Zone Description

The Palisades Nuclear Power Plant is located in Van Buren County, Michigan approximately five miles south of the city of South Haven, Michigan. The Emergency Planning Zone (EPZ) encompasses an approximate ten-mile radius around the PNPP including the town of South Haven and portions of Van Buren, Allegan and Berrien Counties.

1.3 Sources of Data

The following data sources were reviewed in order to develop the appropriate input required for the computer simulation model used for the evacuation analysis:

1. Nuclear Management Corporation (NMC) provided a copy of the previous evacuation time estimate study and maps of the EPZ. Additional information including listings of major employers, schools, daycares, nursing and group homes, and recreation areas was providing by emergency planning official from Van Buren, Allegan, and Berrien Counties and from representatives of the Emergency Management Division of the Michigan State Police.

2. U.S. Census (2000) data was used to estimate the permanent population residing in the EPZ and to estimate the average household size (persons/household). This data was obtained from the U.S. Census Bureau website and from the Environmental Systems Research Institute (ESRI), 380 New York Street, Redlands, California.

3. Estimates of workforce populations were based on information from the previous evacuation time estimate study and telephone conversations with specific employers.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

4. Listings of transient facilities (parks, hotels, motels, recreational) were provided by emergency planning officials from Van Buren, Allegan, and Berrien Counties. Additional information was obtained from telephone phone books and Internet searches.

5. Descriptions of the roadway network were obtained from the previous evacuation time estimate study and the Van Buren, Allegan, and Berrien County Highway Departments. The roadway network was surveyed and the characteristics such as number of lanes, pavement width, shoulder type and width, posted speed limits, interchange and intersection geometries were noted and used for preparing the input streams for the transportation model.

1.4 General Assumptions

1. An actual evacuation would be conducted in accordance with current State and County radiological emergency response plans.

2. The evacuation time estimates represent an estimate of the time required to evacuate the population from the affected subareas included in the evacuation cases and include estimates of preparation and mobilization time.

3. The evacuation time estimates were developed assuming that all special facilities (e.g., schools, group homes) will be informed to evacuate at the same time as the general population.

4. The simultaneous evacuation of the Palisades AND D.C. Cook EPZs was not considered in this study.

5. It is assumed that all persons within the EPZ would evacuate the affected subareas.

6. It was assumed that the public would travel on evacuation routes designated by State and County law enforcement and emergency preparedness officials.

7. It was assumed that the permanent population would evacuate from their residences.

8. It was assumed that persons would evacuate as a family unit.

9. It was assumed that 100% of the school population would be evacuated directly to the appropriate reception centers and that no parental pickup would occur.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

10. It was assumed that school staff would evacuate with the students and not via their own vehicles.

11. Transport-dependent, including special needs individuals, would be evacuated by bus or ambulance as coordinated by State and County, and municipal emergency preparedness officials.

12. It was assumed that existing lane utilization and traffic control devices would be used during the evacuation.

13. It was assumed that State and County, and municipal preparedness officials would restrict access into the EPZ or affected areas during the evacuation.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

2.0 POPULATION ESTIMATION

The development of evacuation times necessarily involves estimation of vehicle demand. For this study, vehicle demand estimation was done in two stages. First, the number and distribution of the human population was made. Second, the number and types of vehicles that would be used during an evacuation were estimated. Regulatory guidance suggests that three population segments should be considered: permanent residents, transients, and special facility residents[1].

Permanent residents were defined as those individuals residing at a primary residence that is within the EPZ. Persons considered transients included tourists and employees not residing in the EPZ. The special facility population included those residents confined to hospitals and nursing and group homes. School populations (students and staff) were considered part of the special facility population.

2.1 Permanent Population

The permanent population was estimated by superimposing the PNPP EPZ map on U.S. Census Bureau census block maps. Using EPZ maps those census blocks that best matched the actual EPZ were selected. The five subareas within the EPZ were also defined based on the best match to the census block map. In most instances the actual EPZ edges and the subarea boundaries were consistent with census block boundaries; census boundaries usually follow man-made and natural geographic divisions such as major roadways, rivers, and political boundaries such as County lines. The location of the PNPP was taken as x=12596562, y=305912.

Once the EPZ and subarea boundaries were developed, the census tract and block attributes were linked to Table P39 in Census Summary File 1 (SF1), which was obtained from the U.S. Census Bureau website. The linked tables were then compiled for each subarea and the permanent populations were tabulated. This data is summarized in Table 2.1. The detailed permanent population for each subarea and county data is given in Appendix A.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.1 Permanent populations for subareas in the Palisades EPZ.

Subarea	Permanent Population This study	Previous Study	% Change
1	2,001	-	-
2	1,939		-
3	2,360	-	-
4 (Van Buren)	10,283	-	-
4 (Allegan)	1,433	-	-
5 (Van Buren)	4,308	-	-
5 (Berrien)	10,703	-	-
Van Buren County	**20,891**	**19,212**	**8.7%**
Allegan County	**1,433**	**1,142**	**25.5%**
Berrien County	**10,703**	**11,180**	**- 4.3%**
TOTAL EPZ Perm. Pop.	**33,027**	**31,534**	**4.7%**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

2.2 Transient Population

The transient population includes those persons that work at locations within the EPZ. Several components of the transient population are discussed below.

Employees

A listing of major employers and employee estimates is given in Table 2.2. Employee population information provided by the Chamber of Commerce survey was updated through telephone conversations. Employers were also asked to estimate the number of workers for each shift and for weekends.

Transient Population in Hotels and Motels

Hotels, motels, and bed and breakfasts that could be identified within the EPZ are given in Table 2.3. Local telephone books were used to develop a listing of these facilities and facility information (eg, number of rooms) was gathered during telephone conversations.

Transients at Parks

A listing of the parks and recreation areas was taken from the previous ETE and was updated using information provided by emergency planning officials from Berrien and Van Buren Counties and is presented in Table 2.4. It was also assumed that all persons at these facilities would be from outside the EPZ.

Transients at Marinas

Marinas in the EPZ are listed in Table 2.5. This listing was taken from the previous ETE and updated with information provided by officials from Van Buren County.

Transients at Shopping Centers

No major shopping centers were found in the PNPP EPZ.

2.3 SPECIAL FACILITY POPULATIONS

This section describes how different components of the special facility population were estimated. In this study, special facility populations included those individuals that have special needs and might require assistance during an evacuation, school and preschool children, and residents of facilities such as hospitals, and nursing homes.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.2 Major employers within the EPZ and estimations of employees.

Subarea	City	Facility	Workforce Population Day	Night	Weekend
1	Covert	Palisades Nuclear Power Plant	395	315	315
		Subarea 1 Subtotals	**395**	**315**	**315**
2	South Haven	Adkin's Blue Ribbon Packaging	60	0	0
	South Haven	Alpha Engineering	3	0	0
	South Haven	Baars Printing Company	6	0	0
	South Haven	Bohn Engine and Foundry	200	150	5
	South Haven	Taylor Controls, Inc.	12	0	0
		Subarea 2 Subtotals	**281**	**150**	**5**
4	South Haven	American Twisting Co.	25	20	0
	South Haven	Anderson Box	4	0	0
	South Haven	B & K Machine	15	5	0
	South Haven	BEI Incorporated	24	0	0
	South Haven	Consumers Concrete Co.	8	0	0
	South Haven	Controlled Rubber Products	60	60	0
	South Haven	Daggett's Concrete Products	10	0	3
	South Haven	Precision Machine	14	0	0
	South Haven	Scott Aviation Plant 4	45	45	0
	South Haven	SE Overton Co.	50	0	0
	South Haven	Sherman Dairy Products, Inc.	50	0	0
	South Haven	South Haven Coil	50	0	0
	South Haven	South Haven Community Hospital	152	100	100
	South Haven	South Haven Rubber Co.	40	30	0
	South Haven	System Components, Inc.	35	0	0
	South Haven	Triangle Trades, Inc.	20	0	0
	South Haven	Wyckoff Chemical Company, Inc.	60	0	0
		Subarea 4 Subtotals	**662**	**260**	**103**
5	Watervliet	Custom Built Brush Co.	12	0	0
	Coloma	Hipskind Building Supply	10	0	0
	Coloma	InnoCorp	25	0	0
	Watervliet	Jarvis Concrete Products	3	0	0
	Coloma	Menasa Corporation	70	40	0
	Coloma	Modern Light Metals	14	0	0
	Coloma	Russell Vending Company	7	0	0
	Watervliet	Shoreline Industries	15	8	0
	Coloma	Spartan Industries	8	0	0
	Watervliet	Watervliet Fruit Exchange	7	0	0
	Watervliet	Watervliet Paper Company	285	0	0
	Watervliet	Watervliet Hospital	110	90	90
	Coloma	West Gate Oil	8	3	0
		Subarea 5 Subtotals	**574**	**141**	**90**
		EPZ Totals	**1,912**	**866**	**513**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.3 Hotels, motels, bed and breakfasts within the EPZ.

Subarea	City	Facility	Populations		
			Day	Night	Weekend
4	South Haven	A & R's North Beach Inn and Cottages	40	40	40
4	South Haven	A Country Place Bed and Breakfast	29	29	29
4	South Haven	Arundel House	25	25	25
4	South Haven	Compton's Cove	32	32	32
4	South Haven	Elmhurst Farm Inn	10	10	10
4	South Haven	North Beach Inn and Restaurant	16	16	16
4	South Haven	Old Harbor Inn	65	65	65
4	South Haven	The Colonial	70	70	70
4	South Haven	The Last Resort Bed and Breakfast Inn	34	34	34
4	South Haven	The New Victoria Inn	54	54	54
		Subarea 4 Subtotals	**375**	**375**	**375**
5	Coloma	Cez Du Lac Motel	9	9	9
5	Coloma	Motto's Resort	42	42	42
		Subarea 5 Subtotals	**51**	**51**	**51**
		EPZ Totals	**426**	**426**	**426**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.4 Population and vehicle demand estimates for parks, trails, and recreation areas within the EPZ.

Subarea	Site	Population	Vehicles
1	Covert Township Park	400	80
	Van Buren State Park	6,500	1,760
	Subarea 1 Subtotals	**6,900**	**1,840**
3	Dune Lake Campground	100	55
	Subarea 3 Subtotals	**100**	**55**
4	Black River	600	125
	Cousin's Campground	120	30
	Jensen's Trailer Park	1,000	80
	North Beach	1,500	500
	Singing Sands RV Park	90	90
	South Beach	1,500	500
	Subarea 4 Subtotals	**4,810**	**1,325**
5	Benton Harbor/St. Joseph KOA	390	130
	Forest Beach	50	15
	Paw Paw Lake	280	15
	Paw Paw River Trading Post	115	30
	Rush Lake Campgrounds	24	24
	Sunset Park	50	15
	Subarea 5 Subtotals	**909**	**229**
	EPZ Totals	**12,719**	**3,449**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.5 Transient population estimates for marinas within the Palisades EPZ.

Subarea	Site	No. of Slips	Est. Population
4	All Seasons Marine, Inc.	46	92
	Bard's Marina		
	Black River Marina	45	90
	Boat Yard Basin	70	140
	Burr Docks		
	J&B Landing Launch		
	Jensen's Marina		
	Municipal Marina	74	148
	Nichols Landing Condo Assoc.		
	Oak Harbor Marina	85	170
	River Noire Marina		
	River Ridge Marina		
	Slips Away		
	South Haven City		
	South Haven Yacht Club		
	Summer Place Mooring		
	Three Mile Lake		
	Woodland Harbor Marina		
	Subarea 4 Subtotals		
5	Paw Paw Lake Sports and Marina	45	90
	Subarea 5 Subtotals	**45**	**90**
	EPZ Totals		

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Hospitals

The hospitals and medical facilities in the EPZ are given in Table 2.6.

Nursing Homes

A list of nursing homes, group homes, and community-based care centers is given Table 2.7. This listing was taken from the previous ETE and reviewed by officials from Allegan, Van Buren, and Berrien Counties.

Schools

A listing of schools and preschools provided by emergency planning officials from Allegan, Van Buren, and Berrien Counties. Each facility was contacted via telephone and the estimates of enrollment and staff were tabulated. This data is given in Table 2.8.

2.4 Special Events Populations

Several festival events are held in the South Haven vicinity on an annual basis. The Harbor Fest and All Crafts Fair attract about 20,000 people and are held on the first weekend in September. The South Haven Blueberry Festival is held on the last full weekend of July and attracts about 14,000 people to the area. Finally, the Fourth of July parade and fireworks draw approximately 25,000 to the South Haven beach area.

These events are not concurrent so it is not necessary to plan for an event with more that the event with the greatest attendance. For these EPZ, the greatest special event attendance is the Fourth of July activity.

2.5 Adjustments To Populations

Some adjustments to the population estimates were made when it was plausible that a given population could fluctuate and affect evacuation time estimates.

For example, a population change might occur as a result of workforce populations moving in and out of the EPZ. Whatever the reason, it is impossible for a person to be in more than one place at a given time and approximated adjustments to populations may be deemed appropriate. Following are discussions on how the various populations presented in Sections 2.1 through 2.4, were adjusted.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.6 Population estimates for hospitals.

Subarea	Facility	Patients			Staff*
		Ambulatory	Req. W.C.	Req. Amb.	
4	South Haven Community Hospital	44	26	12	252
	Subarea 4 Subtotals	**44**	**26**	**12**	**252**
5	Watervleit Hospital	48	12	10	200
	Subarea 5 Subtotals	**48**	**12**	**10**	**200**
	EPZ Totals	**92**	**38**	**60**	**452**

*List as employees in Table 2.2.

Table 2.7 Population estimates for nursing homes and community-based residential facilities.

Subarea	Facility	Residents			Staff
		Ambulatory	Req. W.C.	Req. Amb.	
3	Hebrews Adult Foster Care Home	3	-	-	1
	Subarea 3 Subtotals	**3**	**-**	**-**	**1**
4	Country Side Nursing Home	7	102	-	98
4	South Haven Care Centre	125	-	-	125
	Subarea 4 Subtotals	**132**	**102**	**0**	**223**
5	Abattoir Adult Foster Care	6	-	-	1
5	Deverney Adult Foster Care	12	-	-	1
5	Forest Beach AFC Home	15	-	-	8
5	Juniper Home	6	-	-	10
5	Pine Manor Adult Foster Care	18	-	-	1
	Subarea 5 Subtotals	**57**	**0**	**0**	**21**
	EPZ Totals	**192**	**102**	**0**	**245**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 2.8 Population estimates for schools and preschools, and daycare centers.

		Summer			Winter		
Subarea	Facility	Day	Night	Weekend	Day	Night	Weekend
3	Covert Elementary	0	0	0	454	0	0
	Covert High School	0	0	0	192	0	0
	Subarea 3 Subtotals	**0**	**0**	**0**	**646**	**0**	**0**
4	Central Elementary	0	0	0	534	0	0
	Hartman Elementary	0	0	0	124	0	0
	Indiana Elementary	0	0	0	116	0	0
	Lincoln Elementary	0	0	0	489	0	0
	Maple Grove Elementary	0	0	0	220	0	0
	South Haven High School	0	0	0	764	0	0
	South Haven Middle School	0	0	0	408	0	0
	St. Basil's Catholic Church	0	0	0	201	0	0
	St. Paul's Lutheran School	0	0	0	70	0	0
	Sunshine Day Care and Preschool	38	0	0	33	0	0
	Tiny Tots Preschool	208	0	0	208	0	0
	Subarea 4 Subtotals	**246**	**0**	**0**	**3,167**	**0**	**0**
5	Bangor High School	0	0	0	485	0	0
	Bangor Middle School	0	0	0	482	0	0
	Bangor Primary School	0	0	0	551	0	0
	Coloma Elementary	0	0	0	510	0	0
	Coloma High School	0	0	0	386	0	0
	Coloma Junior High	0	0	0	564	0	0
	Coloma Middle School	0	0	0	386	0	0
	Coloma Migrant Program	186	0	0	0	0	0
	Faith Evangelic Lutheran	0	0	0	26	0	0
	Harford Center	68	0	0	68	0	0
	Preschool Learning Center	103	0	0	103	0	0
	Salem Lutheran School	0	0	0	25	0	0
	Washington Elementary	0	0	0	481	0	0
	St. Joseph Prekindergarten	0	0	0	26	0	0
	Wood School	0	0	0	73	0	0
	Subarea 5 Subtotals	**357**	**0**	**0**	**4,166**	**0**	**0**
	EPZ Totals	**603**	**0**	**0**	**7,979**	**0**	**0**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Permanent Population Adjustments

The permanent population was adjusted to account for those individuals that commute to workplaces outside the EPZ. In the event of an actual evacuation, these individuals would be outside the EPZ and would already be evacuated.

Table P31 of the U.S. Census Summary File 3 (SF3) was used to estimate the portion of employees (citizens > 16 years age) commuting to workplaces outside the EPZ. A commute time of greater than 30 minutes was assumed to be indicative of travel outside the EPZ. Based on this assumption and using Table P31 of SF3, approximately 33% of Van Buren County residents leave the EPZ for work and approximately 20% of Berrien County residents leave the EPZ for work. There are no major employers in the Allegan County portion of the EPZ.

Employee Population Adjustments

The employee populations were adjusted to reflect the knowledge that some of the employees at workplaces in the EPZ probably commute from outside the EPZ and thus were not also counted in the permanent population. During the telephone conversations conducted to update the employee populations, the employers were asked to estimate the percentage of employees traveling more than 10 miles to work. Unfortunately, none of the employers listed in Table 2.2 were able to provide such estimates.

The only worker demographic information was provided by emergency planning officials from Van Buren County and is summarized in Table 2.9. Of the approximate 19,737 workers in Van Buren County, 15,286 (or 77.5%) were from Van Buren County. It was assumed that the remaining 4,451 workers from outside the county were also from outside the EPZ. The employee transient population was not counted as permanent population and the adjustment was 22.5% (4,451/19,737).

Hotel, Motel, Park and Marina Populations

It was assumed that the transient populations estimated at hotels and motels, and for parks and recreation areas and marinas would be from outside the EPZ and were not part of the permanent population. While it is possible that permanent residents could be using these facilities, which would constitute double counting, no data was available to make such an estimate. Also, it is possible that some of the hotel and motel population might also use parks and recreation areas while in the EPZ, which would also result in double counting. Similarly, no data was available to make an estimate so it was assumed that hotel and motel populations and park and recreation area populations were distinct and separate.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Hospital Populations

It was assumed that all patients at hospitals were from outside the EPZ. The staff were treated as employees (listed in Table 2.2) and adjusted as discussed in Sections 2.5.2.

Table 2.9 Estimation of employees commuting into the EPZ for work.

Van Buren County worker place of residence	No. of workers
Van Buren County	15,286
Berrien County	892
Allegan County	1,154
Cass County	451
Kalamazoo County	1,638
Other	316
Total workers from outside Van Buren County	4,451 (22.5%)

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Nursing and Group Home Populations

It was assumed that all residents of nursing and group homes reside at such facilities on a permanent basis and were counted as permanent residents in the Census data. Therefore, no adjustments to these populations were necessary.

School Populations

The data for schools given in Table 2.8 indicate population estimates for both staff and students. All student populations, and a portion of the staff population, were also considered part of the permanent population. During non-school times (evenings and summers) students were assumed to reside at their residences.

Special Events Populations

No data was available to estimate the percentage of the special event attendees that reside outside the EPZ. Therefore, it was assumed that all special event attendees reside outside the EPZ and were not counted as part of the permanent population.

3.0 VEHICLE DEMAND ESTIMATION

Once the specific population components were established the average number of people occupying vehicles was determined. Following are vehicle demand estimates for each of the population components.

3.1 Vehicle Demands of the Permanent Population

The average household size and vehicle occupancy data were estimated using Summary File 3 of the U.S. 2000 census. The population of each county was taken from Table P39 of Summary File 1, the number of households was taken from Table DP-4 of SF3, and the number of vehicles was taken from Table H46 of SF3.

For Allegan County the average household size was 105,665 persons per 43,292 households, or 2.44. The vehicle occupancy for the permanent population was 105,665 persons per 75,510 vehicles or 1.40.

For Berrien County the household size was 162,452/73,445, or 2.21. Vehicle occupancy was 162,452/110,443, or 1.47.

In Van Buren County, the household size was 76,263/33,975, or 2.24. Vehicle occupancy was 76,263/54,292, or 1.41.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

A summary of the permanent population, households, and vehicle count by subarea is given in Table 3.1. The data presented in Table 3.1 are estimates of the maximum permanent population and vehicle counts but do not reflect the minor corrections discussed in Section 2.5.1.

3.2 Vehicle Demands of Transient Populations

Vehicle Demands of Employees

Estimates of vehicle counts for employees are given in Table 3.2. The employee populations given in Table 2.2 were adjusted to account for only those individuals living outside the EPZ (50% of total) and were applied to each shift. Vehicle estimates were based on the assumption that an average of one person would occupy evacuating vehicles. Most, if not all, staff at schools would accompany students to relocation centers and are not counted in this table.

Vehicle Demands for Other Transient Populations

A summary of vehicle demand estimates for populations at hotels and motels is given in Table 3.3. Populations in motels and hotels were based on the assumptions that room occupancy is an average of two persons per room. Vehicle demands for hotels and motels were based on the assumption that one vehicle per room would be used during an evacuation.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 3.1 Summary of the permanent population, households, and vehicle count by subarea.

Subarea	This study	Households	Vehicles
1	2,001	893	1,419
2	1,939	866	1,375
3	2,360	1,054	1,674
4 (Van Buren)	10,283	4,591	7,293
4 (Allegan)	1,433	587	1,024
5 (Van Buren)	4,308	1,923	3,055
5 (Berrien)	10,703	4,843	7,281
Van Buren County	**20,891**	9,326	14,816
Allegan County	**1,433**	587	1,024
Berrien County	**10,703**	4,843	7,281
TOTAL EPZ Perm. Pop.	**33,027**	14,757	23,121

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 3.2 Summary of the adjusted population and vehicle demand estimates for employees.

		Workforce Population			Vehicles		
Subarea	Facility	Day	Night	Weekend	Day	Night	Weekend
1	Palisades Nuclear Power Plant	395	315	315	395	315	315
	Subarea 1 Subtotals	**395**	**315**	**315**	**395**	**315**	**315**
2	Adkin's Blue Ribbon Packaging	60	0	0	60	0	0
	Alpha Engineering	3	0	0	3	0	0
	Baars Printing Company	6	0	0	6	0	0
	Bohn Engine and Foundry	200	150	5	200	150	5
	Taylor Controls, Inc.	12	0	0	12	0	0
	Subarea 2 Subtotals	**281**	**150**	**5**	**281**	**150**	**5**
4	American Twisting Co.	25	20	0	25	20	0
	Anderson Box	4	0	0	4	0	0
	B & K Machine	15	5	0	15	5	0
	BEI Incorporated	24	0	0	24	0	0
	Consumers Concrete Co.	8	0	0	8	0	0
	Controlled Rubber Products	60	60	0	60	60	0
	Daggett's Concrete Products	10	0	3	10	0	3
	Precision Machine	14	0	0	14	0	0
	Scott Aviation Plant 4	45	45	0	45	45	0
	SE Overton Co.	50	0	0	50	0	0
	Sherman Dairy Products, Inc.	50	0	0	50	0	0
	South Haven Coil	50	0	0	50	0	0
	South Haven Community Hospital	152	100	100	152	100	100
	South Haven Rubber Co.	40	30	0	40	30	0
	System Components, Inc.	35	0	0	35	0	0
	Triangle Trades, Inc.	20	0	0	20	0	0
	Wyckoff Chemical Company, Inc.	60	0	0	60	0	0
	Subarea 4 Subtotals	**662**	**260**	**103**	**662**	**260**	**103**
5	Custom Built Brush Co.	12	0	0	12	0	0
	Hipskind Building Supply	10	0	0	10	0	0
	InnoCorp	25	0	0	25	0	0
	Jarvis Concrete Products	3	0	0	3	0	0
	Menasa Corporation	70	40	0	70	40	0
	Modern Light Metals	14	0	0	14	0	0
	Russell Vending Company	7	0	0	7	0	0
	Shoreline Industries	15	8	0	15	8	0
	Spartan Industries	8	0	0	8	0	0
	Watervliet Fruit Exchange	7	0	0	7	0	0
	Watervliet Paper Company	285	0	0	285	0	0
	Watervliet Hospital	110	90	90	110	90	90
	West Gate Oil	8	3	0	8	3	0
	Subarea 5 Subtotals	**574**	**141**	**90**	**574**	**141**	**90**
	EPZ Totals	**1,912**	**866**	**513**	**1,912**	**866**	**513**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 3.3 Vehicle demand for hotels, motels, bed and breakfasts within the EPZ.

		Population			Vehicles		
Subarea	Facility	Day	Night	Weekend	Day	Night	Weekend
4	A & R's North Beach Inn and Cottages	40	40	40	20	20	20
	A Country Place Bed and Breakfast	29	29	29	15	15	15
	Arundel House	25	25	25	13	13	13
	Compton's Cove	32	32	32	16	16	16
	Elmhurst Farm Inn	10	10	10	5	5	5
	North Beach Inn and Restaurant	16	16	16	8	8	8
	Old Harbor Inn	65	65	65	33	33	33
	The Colonial	70	70	70	35	35	35
	The Last Resort Bed and Breakfast Inn	34	34	34	17	17	17
	The New Victoria Inn	54	54	54	27	27	27
	Subarea 4 Subtotals	**375**	**375**	**375**	**188**	**188**	**188**
5	Cez Du Lac Motel	9	9	9	5	5	5
	Motto's Resort	42	42	42	21	21	21
	Subarea 5 Subtotals	**51**	**51**	**51**	**26**	**26**	**26**
	EPZ Totals	**426**	**426**	**426**	**213**	**213**	**213**

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

A summary for parks and recreation areas was given in Table 2.4. Populations and vehicle estimates for parks and recreational facilities were based on telephone conversations, Internet searches and assumptions that maximum use is based on available parking spaces. A population of four persons per parking space was assumed. A summary of all transient populations by subarea is given in Table 3.4.

3.3 Vehicle Demands of Special Facility Populations

Estimates of the special facilities populations were presented in Table 2.6 (hospitals), Table 2.7 (nursing and group homes) and Table 2.8 (schools, preschools, daycares). Estimates of the special needs individuals and transportation-dependent individuals were presented in Section 2.3.1.

Most individuals in the special facilities population are ambulatory and would not require special transportation capability such as wheel chair lifts or ramps or an ambulance. Nevertheless, the staff at the Country Side Nursing Home and the South Haven Community Hospital (both in Subarea 4) and The Watervliet Hospital in Subarea 5 did indicate that as many as 140 persons might require wheel chair-capable transportation. Also, the two hospitals indicated that as many as 22 people may require ambulance transportation.

It was assumed that all special facility populations, including the necessary staff persons, would evacuate with the population via bus, van, ambulance, or other suitable means as described in existing response plans. Emergency planning officials provided listings of transportation resources that would be available in an evacuation event.

Van Buren County has available up to 156 school buses each with a capacity of 72 persons. Also, Van Buren County has 34 special education vehicles each with a capacity of 15 persons. Van Buren Transit could also provide 12 additional buses with capacities of 12 plus one wheel chair each, 7 buses with capacities of 22 plus two wheel chairs each, and two minivans providing capacity of nineteen. Allegan County has available 61 buses each with a capacity of 66.

Ambulances would be available from South Haven Emergency (2), Covert Fire and Ambulance (2), Van Buren EMS (4 + 3 wheel chair units), and Coloma Ambulance (3). Each ambulance unit has a capacity of two persons (plus crew). Based on these resource estimates, bus capacity is approximately 16,000 persons, wheel chair capacity is 32 persons, and ambulance capacity is 11 persons.

A summary of the special facility populations and vehicle demand is given in Table 3.5.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 3.4 Summary of transient populations and vehicle demand by subarea.

Subarea	Number of Persons			Number of Vehicles		
	Weekday	Night	Weekend	Weekday	Night	Weekend
1	7,295	7,215	7,215	2,235	2,155	2,155
2	281	150	5	281	150	5
3	100	100	100	55	55	55
4	5,847	5,445	5,288	2,175	1,773	1,616
5	1,579	1,146	1,095	874	395	390
EPZ Total	15,102	14,056	13,703	5,620	4,528	4,221

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 3.5 Summary of special populations and vehicle demand by subarea.

Subarea	Number of Persons			Number of Vehicles (no. of buses unless noted)		
	Ambulatory	W.C.	Req. Amb.	Ambulatory	W.C.	Req. Amb.
3	649[a]	0	0	10	0	0
4	3,502	128	12	49[b]	64	6
5	4,480	12	10	63	6	5
EPZ Total	8,631	140	22	122	72	11

[a]from Table 2.8, 646 + 1 staff/20 students (=33) + 3 from Table 2.7.
[b]based on expected bus capacity of72 for Van Buren County transportation resources. Actual vehicle demand would likely be more if Allegan County transportation resources were also used because bus capacities are less (66).

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

4.0 METHODOLOGY

4.1 Estimation of Trip Generation Times

Trip generation times can be thought as descriptions of how vehicles begin to move on the roadway network. In this study, it was assumed that no vehicles would begin evacuating for at least 30 minutes (maximum 15 minute notification time and 15 minute trip preparation time) after the declaration of an emergency. It must be emphasized that the evacuating public will not begin to leave at the same time. Rather, the departure times for vehicles vary. A common way of expressing trip generation times is with cumulative time distributions. The set of these distribution used for this study is presented in Figure 4.1.

Departure times are a function of trip preparation times, perceived urgency, and logistics involved in arriving home from work and coordinating efforts with other family members. It was assumed that all the permanent population would begin an evacuation within two hours of an emergency announcement.

It was assumed that the transient population would be informed of the evacuation within 30 minutes. While employees may be expected to remain at the workplace to facilitate workplace shutdowns, it was assumed that such activities would not last longer than 30 minutes. Other components of the transient population (ie; hotel and motel patrons) would likely act similarly.

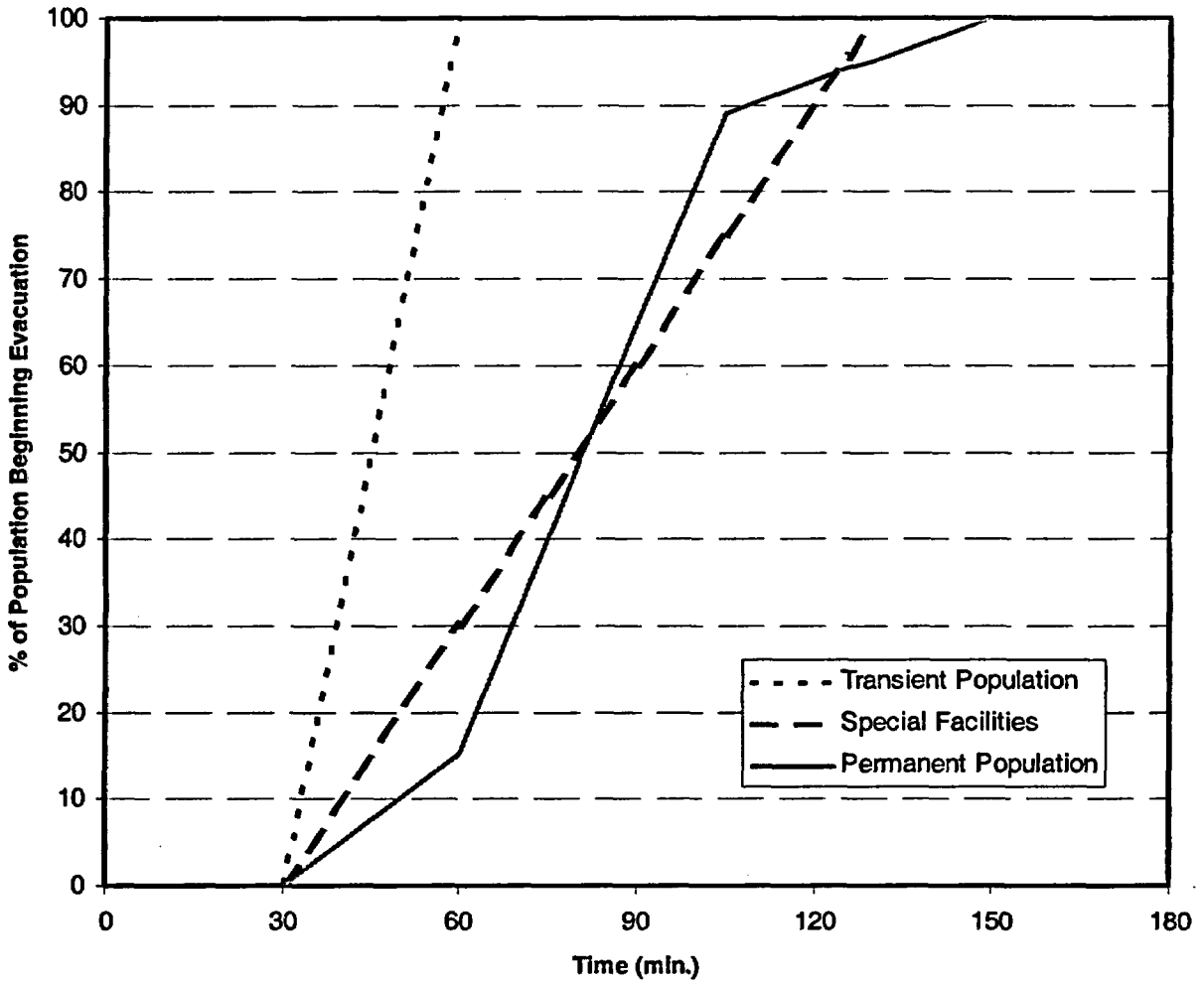
Schools will be evacuated, also at the Site Area Emergency level, directly to reception centers as soon as transportation resources arrive at the schools. It was assumed that bus mobilization times would be about an hour. Accordingly, the schools population could be expected to evacuate within ninety minutes of an evacuation decision.

4.2 Evacuation Routes

The evacuation routes evaluated in this study have been established in previous traffic network analyses and reflect the need to move vehicles from specific subareas to designated relocation destinations. The purpose of this study is to generate evacuation time estimates assuming these routes are appropriate. Evacuation routes are listed by subarea in Table 4.1.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 4.1 The cumulative time distribution describing the rate of evacuation commencement for the various population components.



POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 4.1 Evacuation routes for the Palisades EPZ.

Evacuation Routes
Subarea 1
Blue Star Highway North
Blue Star Highway South
I-196 South
I-196 North
30th Ave. East
32nd Ave. East
Subarea 2
Blue Star Highway North
Blue Star Highway South
Adam Road North
Highway 1 South
I-196 South
I-196 North
12th Ave. East
16nd Ave. East
Subarea 3
Blue Star Highway North
Blue Star Highway South
I-196 South
I-196 North
Coloma North Road South
70th Street South
30th Ave. East
34nd Ave. East
Subarea 4
Blue Star Highway North
Blue Star Highway South
I-196 South
I-196 North
68th Street North
66th Street North
62nd Street North
Kibbie Lacota Road East
Phoenix Road East
8th Ave. East
12th Ave. East
16th Ave. East
Subarea 5
Blue Star Highway North
Blue Star Highway South
I-196 South
I-196 North
Coloma North Road South
Friday Road South
70th Street South

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

4.3 Estimation of Highway Capacity

Once the vehicle demand and loading characteristics (eg, trip generation time) have been determined the next step is to estimate the capacity of the street and highway network. The ability of the road network to handle vehicle demand is a major factor in determining evacuation times. By definition, capacity is the maximum numbers of vehicles that can pass a given point during a specified period considering roadway, traffic, and control conditions (ie, signaling or signage). By convention, capacity is expressed in units of vehicles per hour (vph).

In discussing capacity, different traffic flow conditions have been assigned alphabetical designations, A through F, to generally reflect varying traffic operational characteristics. These designations have been termed "Levels of Service" (LOS). For example, LOS A connotes free-flow and high-speed operating conditions; LOS F represents a forced flow condition. LOS E describes traffic operating at or near capacity.

Because of the effect of weather on the capacity of a roadway, it is necessary to adjust capacity figures to represent estimated road conditions during inclement weather. Based on limited empirical data, weather conditions such as heavy rain reduce the values of capacity for highways by approximately 20%. For snowy weather conditions during the winter months, reductions of 25% relative to normal weather conditions were assumed. Free-flow speeds for inclement weather conditions were also reduced 20% for rain and 25% for snow. These factors are applied to all roadway segments.

In the congested traffic environment, which is often characteristic of an evacuation scenario, the capacity of a roadway section has the greatest effect on travel time. The major factors that control capacity of intersections and the approaches to intersections are turning movements, competing traffic streams, control regimes, traffic composition, and approach geometries. The major factors that control capacity along roadway segments are traffic composition, weather conditions, pavement conditions, and lighting.

Capacity estimations were made for two-lane roads, multi-lane roads, multi-lane freeways, and freeway ramps. Estimates for roads and freeways were done on a "per lane" basis. Capacities at intersections were approximated by the simulation software and are described later.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

To represent the varying road types and geometries, roads were categorized in the following manner:

- 10 ft. lanes with 1 ft. shoulders
- 11 ft. lanes with 2 ft. shoulders
- 12 ft. lanes with 6 ft. shoulders

Using data from Chapter 20 of HCM 2000 and from the previous ETES for the PNPP estimates were made for both two-way and one-way traffic. Highway capacity was estimated to be 1,000 vph per lane. Freeway capacity was estimated to be 1,692 vph per lane and freeway ramp capacity was estimated to be 1,333 vph.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

4.4 Application of EPZ Data to Model

The model simulation tools used for this ETE are grouped together in a computer software package called the Traffic Software Integrated System (TSIS). TSIS is developed and distributed by the Federal Highway Administration (FHWA). TSIS consists of several modules, or components, that can be used to represent entire traffic environments.

The first tool used in TSIS is TRAFED, a graphical tool that allows one to create representations of traffic networks and is specifically designed to work with FHWA's Corridor Simulation (CORSIM) microscopic traffic simulator. CORSIM consists of an integrated set of two microscopic models; NETSIM represents traffic on urban streets and FRESIM represents traffic on freeways.

In this study, the network of major roadways in the PNPP was entered into TSIS using the TRAFED module. TRAFED network layouts consist of a series of nodes and links. In general, nodes can be thought of as intersections and links can be thought of as roadways. Some nodes are not intersections but represent sources or sinks of traffic, or describe a connection between a FRESIM and NETSIM modules. Source nodes were used to describe traffic loading onto the roadway network from population "centroids". These centroids were developed by combining vehicle counts from adjoining census blocks. Sink, or exit, nodes represented points on evacuation routes outside the EPZ.

Once a roadway network has been developed and the entry nodes have been edited to reflect the loading histograms, the TRAFED file is loaded into the CORSIM module. CORSIM is a stochastic, or probabilistic model. This means that random numbers are generated and assigned to vehicles. When a simulation is run the characteristics of that vehicles travel are the result of a specific set of random numbers. Therefore, to gain a better understanding of transportation the network must be simulated several times using different sets of random numbers. In this study, each scenario examined was run at least three times.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

5.0 EVACUATION TIME ESTIMATES

5.1 Evacuation Regions and Scenarios

Evacuation Regions

The Palisades NPP EPZ is divided into five subareas that reflect a best match between geographic boundaries and two-, five-, and ten-mile radii around the plant.

Federal guidance documents also specify that the EPZ be divided into sixteen sectors each representing 22.5° segments around the compass[1]. In the event of an emergency, officials will consider the severity and nature of the emergency and weather conditions (e.g., wind strength and direction), and will recommend protective action for some or all of the subareas. Officials will specify which segment(s) at what distance from the Palisades NPP (2-, 5-, or 10-miles) are affected. This "keyhole" is superimposed on the EPZ map and subarea area selected. Sixteen compass segments at three different radii yields forty-eight, subarea groupings. Because there are only 5 subareas, however, most of the subarea groups are the same. To avoid redundant analyses of scenarios a list of unique subarea groups was assembled and is given in Table 5.1. Each of these six subarea groups is referred to as an Evacuation Region.

Evacuation Scenarios

To evaluate the evacuation of the Palisades NPP EPZ under circumstances that offer different population composition and attributes, evacuation time estimates were conducted considering different combinations of these scenarios. An evacuation scenario can be thought of as a specific set of conditions that might exist at the commencement of a General Emergency. The conditions considered in this study are season (summer versus winter), day of the week (weekday versus weekend day), Time of day (daytime versus evening or night), and weather (fair or poor). If the season is summer poor weather is rain and if the season is winter poor weather is a 6-8" snow. These scenarios are given in Table 5.2.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

5.2 EPZ Evacuation Time Estimates

Using data described in Section 3.0 and the simulation described in Section 4.0, evacuation time estimates were made. The results of these estimates are summarized in Table 5.3 and Table 5.4. The times provided in this table represent estimates of travel time of the last evacuating vehicle to reach the EPZ edge and do not consider travel time from the EPZ edge to a relocation center. It should also be noted that these estimates only reflect the movement of people from the affected areas and do not reflect movement of those individuals that might evacuate from subareas adjoining the affected subarea(s).

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 5.1 Evacuation regions for the Palisades NPP EPZ.

Evac. Region	Subareas				
1	1				
2	1	2			
3	1		3		
4	1	2	3	4	
5	1	2	3		5
6	1	2	3	4	5

Table 5.2 Evacuation scenarios.

Scenario	Season	Day	Time of Day	Weather
1	Summer	Weekend	Midday	Fair
2	Summer	Weekend	Midday	Poor/Adverse
3*	Summer	Weekend	Evening/Night	Fair
4*	Summer	Weekend	Evening/Night	Poor/Adverse
5	Summer	Weekday	Midday	Fair
6	Summer	Weekday	Midday	Poor/Adverse
7	Summer	Weekday	Evening/Night	Fair
8	Summer	Weekday	Evening/Night	Poor/Adverse
9	Winter	Weekend	Midday	Fair
10	Winter	Weekend	Midday	Poor/Adverse
11	Winter	Weekend	Evening/Night	Fair
12	Winter	Weekend	Evening/Night	Poor/Adverse
13	Winter	Weekday	Midday	Fair
14	Winter	Weekday	Midday	Poor/Adverse
15	Winter	Weekday	Evening/Night	Fair
16	Winter	Weekday	Evening/Night	Poor/Adverse

*Includes summer festival populations.

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Table 5.3 Evacuation Times Estimates (in minutes) for Scenarios 1-8

	Scenarios							
Region	1	2	3	4	5	6	7	8
	Summer Weekend Midday Fair	Summer Weekend Midday Poor	Summer Weekend Evening Fair	Summer Weekend Evening Poor	Summer Weekday Midday Fair	Summer Weekday Midday Poor	Summer Weekday Evening Fair	Summer Weekday Evening Poor
1	150	170	150	170	150	170	140	150
2	170	180	170	180	180	190	170	170
3	160	170	160	170	170	170	150	150
4	290	320	540	600	230	240	230	230
5	300	300	560	600	230	240	220	230
6	320	340	600	620	260	280	240	230

Table 5.4 Evacuation Times Estimates (in minutes) for Scenarios 9-16.

	Scenarios							
Region	9	10	11	12	13	14	15	16
	Winter Weekend Midday Fair	Winter Weekend Midday Poor	Winter Weekend Evening Fair	Winter Weekend Evening Poor	Winter Weekday Midday Fair	Winter Weekday Midday Poor	Winter Weekday Evening Fair	Winter Weekday Evening Poor
1	160	180	170	180	180	190	160	160
2	170	190	170	190	180	250	190	210
3	160	190	170	190	190	210	180	190
4	310	350	300	330	360	390	230	240
5	320	350	320	340	340	400	330	340
6	380	380	360	390	400	440	380	420

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

PERMANENT POPULATION DATA

STFID is a concatenated string of state (26), county (eg, 159), block tract (eg, 960500), and census block (4 digits).

POP100 is the permanent population

POPDENS is permanent population density (permanent population/sq. mile)

HU100 is the number of households

ZTCA5 is the five-digit zip code

AREALAND is the Block land area in units of sq. meters

AREAWATR is the Block water area in units of sq. meters

Subarea 1 (Van Buren County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590105001019	0	0	15358	0	49090	0
261590105001020	79	35	517934	0	49090	395
261590105001021	0	0	6165	0	49090	0
261590105001022	131	67	7664	0	49090	44270
261590105001023	98	44	353183	0	49090	719
261590105001025	0	0	60274	0	49090	0
261590105001026	0	0	52435	0	49090	0
261590105001027	0	0	9570	0	49090	0
261590105001028	0	1	24352	0	49090	0
261590105001029	52	41	569410	0	49090	237
261590105001030	12	4	12921	0	49090	2405
261590105001031	17	5	28435	0	49090	1548
261590105001032	10	4	164313	0	49090	158
261590105001033	18	6	31028	0	49090	1503
261590105001034	28	19	14831	0	49090	4890
261590105001035	6	5	14607	0	49090	1064
261590105001036	0	0	151	0	49090	0
261590105001037	16	6	193327	0	49090	214
261590105001038	49	28	1874507	0	49090	68
261590105002014	87	31	808646	0	49090	279
261590105002015	12	13	81968	0	49090	379
261590105002016	30	14	1131101	0	49090	69
261590105002017	33	13	268142	0	49090	319
261590105002018	0	0	250454	0	49090	0
261590105002019	37	3	76977	0	49090	1245
261590105002020	42	15	245864	0	49090	442
261590105002021	55	19	1262786	0	49090	113
261590106001000	7	6	16945	0	49043	1070
261590106001001	26	13	204490	0	49043	329
261590106001002	122	47	996832	0	49043	317

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590106001003	73	24	955068	0	49043	198
261590106001004	13	6	607442	0	49043	55
261590106001006	0	0	42728	0	49043	0
261590106001009	7	6	550096	0	49043	33
261590106001010	0	0	265794	0	49090	0
261590106001011	0	0	22628	0	49090	0
261590106001012	0	0	89696	0	49043	0
261590106001013	3	35	2297131	0	49090	3
261590106001014	5	8	16633	0	49043	779
261590106001015	0	0	1955	0	49090	0
261590106001016	2	6	6509	0	49043	796
261590106001017	13	9	11769	0	49043	2861
261590106001018	0	0	1339	0	49043	0
261590106001019	6	3	236133	0	49043	66
261590106001020	0	2	1466	0	49043	0
261590106001021	59	153	1262797	0	49043	121
261590106001022	0	10	27915	0	49043	0
261590106001023	0	0	2452	0	49043	0
261590106001024	0	17	40939	0	49043	0
261590106001025	0	2	3703	0	49043	0
261590106001026	0	5	8068	0	49043	0
261590106001027	0	5	7983	0	49043	0
261590106001028	0	0	36617	0	49090	0
261590106001029	17	11	662545	0	49043	66
261590106001054	24	11	52577	0	49043	1182
261590106001055	9	5	14369	0	49043	1622
261590106002002	37	19	1198504	0	49090	80
261590106002003	18	4	189425	0	49090	246
261590106002004	30	25	1348013	0	49090	58
261590106002005	22	9	1279775	0	49090	45
261590106002006	28	13	1012716	0	49090	72
261590106002007	65	32	951371	0	49043	177
261590106002008	69	32	1079566	0	49043	166
261590106002009	41	14	202441	0	49043	525
261590106002014	26	8	145021	0	49043	464
261590106002015	48	25	1146024	0	49043	108
261590106002016	21	11	973208	0	49043	56
261590106002017	18	7	185977	0	49043	251
261590106002018	10	6	250555	0	49043	103
261590106002019	12	3	578906	0	49043	54
261590106002020	0	0	6493	0	49043	0
261590105002005	144	53	1450749	0	49090	257
261590105001024	102	89	395195	0	49090	668
261590106001008	14	8	939358	0	49043	39
261590106001005	98	36	6575096	0	49043	39
261590106001007	0	0	597615	0	49043	0

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Subarea 2 (Van Buren County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590102002013	78	26	830615	0	49090	243
261590102002018	14	5	513789	0	49090	71
261590102002019	2	1	187347	0	49090	28
261590102002020	16	6	321989	0	49090	129
261590104002009	32	17	46845	0	49090	1769
261590104002010	26	14	163281	0	49090	412
261590104002011	0	0	104154	0	49090	0
261590104002021	32	24	28341	0	49090	2924
261590104002022	23	13	26774	0	49090	2225
261590104002023	31	19	24748	0	49090	3244
261590104002024	16	7	26911	0	49090	1540
261590104002025	0	3	36869	0	49090	0
261590104002026	0	1	17285	0	49090	0
261590104002027	0	0	9842	0	49090	0
261590104002028	0	0	916	0	49090	0
261590104002029	16	11	8467	0	49090	4894
261590104002030	0	0	5736	0	49090	0
261590104002031	14	16	23720	0	49090	1529
261590104002032	0	0	15890	0	49090	0
261590104002033	136	63	678220	0	49090	519
261590104002034	0	0	3185	0	49090	0
261590104002035	0	0	8450	0	49090	0
261590104003021	11	7	91533	0	49090	311
261590104003022	11	3	258678	0	49090	110
261590104003023	8	4	276873	0	49090	75
261590104003024	0	0	114242	0	49090	0
261590104003025	0	0	84625	0	49090	0
261590104003026	0	0	9735	0	49090	0
261590104003027	0	0	4358	0	49090	0
261590104003028	33	18	223665	0	49090	382
261590104003029	0	0	57752	0	49090	0
261590104003030	0	0	2113	0	49090	0
261590104003031	11	6	63522	0	49090	449
261590104003032	21	7	75117	0	49090	724
261590104003033	2	3	19829	0	49090	261
261590104003034	1	1	106772	0	49090	24
261590104003035	0	1	94107	0	49090	0
261590104003036	0	0	9073	0	49090	0
261590105001000	81	41	852222	0	49090	246
261590105001001	32	17	496148	0	49090	167
261590105001002	8	3	10982	0	49090	1887
261590105001003	4	2	100442	0	49090	103
261590105001004	24	9	363770	0	49090	171
261590105001005	9	3	280276	0	49090	83
261590105001006	0	0	37103	0	49090	0
261590105001007	11	6	274658	0	49090	104
261590105001008	10	6	133776	0	49090	194
261590105001009	2	3	1633	0	49090	3172
261590105001010	5	1	82995	0	49090	156
261590105001011	6	3	64006	0	49090	243
261590105001012	8	5	58858	0	49090	352

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590105001013	49	24	354238	0	49090	358
261590105001014	0	3	31197	0	49090	0
261590105001015	48	17	520842	0	49090	239
261590105001016	20	11	121861	0	49090	425
261590105001017	27	11	321411	0	49090	218
261590105001018	0	1	460989	0	49090	0
261590105002000	134	55	1259366	0	49090	276
261590105002001	101	38	1268686	0	49090	206
261590105002002	59	24	790512	0	49090	193
261590105002003	69	29	1243802	0	49090	144
261590105002004	32	14	378933	0	49090	219
261590105002006	26	8	160102	0	49090	421
261590105002007	74	33	2869433	0	49090	67
261590105002008	103	44	2539856	0	49090	105
261590105002009	50	23	2518218	0	49090	51
261590105002010	70	30	1366663	0	49090	133
261590105002011	2	2	76967	0	49090	67
261590105002012	52	31	1711661	0	49090	79
261590105002013	43	21	204423	0	49090	545
261590105001024	102	89	395195	0	49090	668
261590105002005	144	53	1450749	0	49090	257

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Subarea 3 (Van Buren County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590106001030	0	3	429917	0	49043	0
261590106001031	8	20	1204574	0	49043	17
261590106001032	2	1	63905	0	49043	81
261590106001033	1	7	108659	0	49043	24
261590106001034	26	44	947708	0	49043	71
261590106001035	0	1	626998	0	49043	0
261590106001036	11	3	677622	0	49038	42
261590106001037	0	3	652335	0	49038	0
261590106001038	21	20	455273	0	49038	119
261590106001039	39	16	45392	0	49038	2225
261590106001040	41	16	243013	0	49038	437
261590106001041	0	0	63130	0	49038	0
261590106001042	44	21	1063642	0	49038	107
261590106001043	0	0	6084	0	49038	0
261590106001044	0	0	3571	0	49038	0
261590106001045	40	17	929578	0	49038	111
261590106001046	67	34	2547361	0	49038	68
261590106001047	132	58	2566061	0	49038	133
261590106001048	97	41	3857513	0	49043	65
261590106001049	58	30	3650035	0	49043	41
261590106001050	28	11	657323	0	49043	110
261590106001051	28	11	1299136	0	49043	56
261590106001052	88	35	2554810	0	49043	89
261590106001053	162	71	2570680	0	49043	163
261590106001056	0	0	6108	0	49038	0
261590106001057	32	13	419866	0	49038	197
261590106001058	36	13	372716	0	49038	250
261590106001059	2	1	20731	0	49038	250
261590106001060	0	1	163740	0	49038	0
261590106001061	0	1	18912	0	49038	0
261590106001062	4	24	252440	0	49038	41
261590106001063	0	0	293252	0	49038	0
261590106001064	0	0	542463	0	49038	0
261590106001065	2	7	42085	0	49038	123
261590106001066	2	16	268826	0	49038	19
261590106002000	68	22	1536130	0	49090	115
261590106002001	114	46	1516556	0	49090	195
261590106002010	91	29	1305166	0	49043	181
261590106002011	42	21	2183292	0	49043	50
261590106002012	40	13	1291580	0	49090	80
261590106002013	54	29	1301817	0	49043	107
261590106002021	4	2	8424	0	49043	1230
261590106002022	62	30	1160022	0	49043	138
261590106002023	0	0	323974	0	49043	0
261590106002024	24	8	433615	0	49043	143
261590106002025	8	4	371175	0	49043	56
261590106002026	12	3	61166	0	49043	508
261590106002027	19	8	296825	0	49043	166
261590106002028	26	11	465991	0	49043	145
261590106002029	10	7	960159	0	49043	27
261590106002030	27	5	812449	0	49043	86

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590106002031	43	8	333550	0	49043	334
261590106002032	4	5	712338	0	49043	15
261590106002033	48	14	540810	0	49043	230
261590106002034	33	10	43209	0	49043	1978
261590106002035	13	6	13797	0	49043	2440
261590106002036	55	37	76548	0	49043	1861
261590106002037	46	16	46028	0	49043	2588
261590106002038	19	7	402633	0	49043	122
261590106002039	11	4	222689	0	49043	128
261590106002040	21	5	1589464	0	49043	34
261590106002041	6	3	771219	0	49043	20
261590106002042	10	4	440849	0	49043	59
261590106002043	26	8	1576056	0	49043	43
261590106002044	53	31	4474686	0	49043	31
261590106002045	0	0	277430	0	49043	0
261590106002046	0	0	32800	0	49043	0
261590106002047	22	8	674357	0	49043	84
261590106002048	7	7	624357	0	49043	29
261590106002049	9	3	57644	0	49043	404
261590106002050	1	1	401214	0	49043	6
261590106002051	0	0	31503	0	49043	0
261590106002052	0	0	37568	0	49043	0
261590106002053	0	0	100742	0	49043	0
261590106002054	0	0	25525	0	49043	0
261590106002055	68	37	2209170	0	49043	80
261590106002056	95	40	2562813	0	49043	96
261590106002057	15	6	424262	0	49043	92
261590106002058	16	8	501661	0	49043	83
261590106002059	5	2	656251	0	49043	20
261590108001018	4	2	615833	0	49090	17
261590108001019	4	1	45500	0	49043	228
261590108001070	18	11	1031177	0	49043	45
261590108001071	19	6	782099	0	49043	63
261590108001072	5	3	246373	0	49043	53
261590106001005	98	36	6575096	0	49043	39
261590106001007	0	0	597615	0	49043	0
261590106001008	14	8	939358	0	49043	39

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Subarea 4 (Van Buren County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590102001000	106	34	2691213	0	49090	102
261590102001001	160	66	1362085	0	49090	304
261590102001002	395	172	1268071	0	49090	807
261590102001003	60	29	1217356	0	49090	128
261590102001004	33	13	443751	0	49090	193
261590102001005	17	10	878847	0	49090	50
261590102001006	2	1	21738	0	49090	238
261590102001007	19	7	15216	0	49090	3234
261590102001008	0	0	15629	0	49090	0
261590102001009	0	0	14250	0	49090	0
261590102001010	10	4	48459	0	49090	534
261590102001011	268	114	2586277	0	49090	268
261590102001012	0	0	6433	0	49090	0
261590102001013	0	1	7478	0	49090	0
261590102001014	248	110	1216103	0	49090	528
261590102001015	0	0	52470	0	49090	0
261590102001016	26	8	17296	0	49090	3893
261590102001017	5	3	57297	0	49090	226
261590102001018	15	8	1003692	0	49090	39
261590102001019	7	3	1696869	0	49090	11
261590102001020	70	27	599061	0	49090	303
261590102001021	21	7	25074	0	49090	2169
261590102001022	28	9	31856	0	49090	2276
261590102001023	19	8	24974	0	49090	1970
261590102001024	67	24	2565854	0	49090	68
261590102001025	25	13	2546106	0	49090	25
261590102001026	95	45	2578898	0	49090	95
261590102001027	8	4	157887	0	49090	131
261590102001028	13	4	288461	0	49090	117
261590102001029	48	18	1732979	0	49090	69
261590102001030	35	17	2313931	0	49090	39
261590102001031	0	0	52238	0	49090	0
261590102001032	5	4	487965	0	49090	27
261590102001033	18	7	299347	0	49090	156
261590102001034	23	7	1001204	0	49090	59
261590102001035	19	6	1132000	0	49090	43
261590102002000	40	21	2538136	0	49013	41
261590102002001	120	35	2578662	0	49013	121
261590102002002	49	17	1292370	0	49013	98
261590102002003	23	8	1114050	0	49013	53
261590102002004	7	2	155901	0	49013	116
261590102002005	14	7	287641	0	49090	126
261590102002006	20	10	996450	0	49013	52
261590102002007	0	1	256307	0	49013	0
261590102002008	9	5	186862	0	49090	125
261590102002009	56	14	1026751	0	49090	141
261590102002010	35	8	831324	0	49090	109
261590102002011	21	7	460793	0	49090	118
261590102002012	45	20	1135948	0	49090	103
261590102002014	197	73	342374	0	49090	1490
261590102002015	0	0	9407	0	49090	0

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590102002016	0	0	9095	0	49090	0
261590102002017	36	12	647229	0	49090	144
261590102002021	33	12	643218	0	49090	133
261590102002022	3	2	153974	0	49090	50
261590102002023	9	2	210771	0	49090	111
261590102002024	36	11	76956	0	49090	1212
261590102002025	2	1	125507	0	49090	41
261590102002026	23	10	245050	0	49090	243
261590102002027	4	2	50957	0	49090	203
261590102002028	4	2	31275	0	49090	331
261590102002029	19	10	1002322	0	49090	49
261590102002030	55	22	2338136	0	49013	61
261590102002031	25	9	640875	0	49013	101
261590102002032	98	36	3209650	0	49013	79
261590102002033	63	20	1924662	0	49013	85
261590102002034	0	0	84608	0	49013	0
261590102002035	29	12	1857794	0	49013	40
261590102002036	0	0	10288	0	49013	0
261590102002037	22	8	210985	0	49013	270
261590102002038	4	3	306701	0	49013	34
261590102002039	39	12	631543	0	49090	160
261590102002040	0	0	122080	0	49090	0
261590102002041	3	2	14267	0	49090	545
261590102002042	6	4	63464	0	49090	245
261590102002043	10	3	173630	0	49090	149
261590102002044	19	4	348010	0	49090	141
261590102002045	0	0	7725	0	49090	0
261590102002046	1	1	99048	0	49013	26
261590102003001	0	0	179065	0	49056	0
261590102003002	6	3	567649	0	49056	27
261590102003003	43	17	961167	0	49056	116
261590102003004	48	15	413387	0	49056	301
261590102003005	2	1	362285	0	49056	14
261590102003006	40	15	2655831	0	49090	39
261590102003007	105	39	1841303	0	49090	148
261590102003008	0	0	11491	0	49090	0
261590102003009	23	8	327449	0	49056	182
261590102003010	6	3	422782	0	49056	37
261590102003011	3	1	129413	0	49056	60
261590102003014	23	7	1258937	0	49056	47
261590102003015	25	9	1258152	0	49056	51
261590102003016	83	31	2568412	0	49090	84
261590102003017	44	18	2560863	0	49090	45
261590102003018	10	5	1655909	0	49090	16
261590102003019	25	8	489006	0	49090	132
261590102003020	35	19	2546731	0	49090	36
261590102003021	60	24	1191345	49816	49056	130
261590102003022	11	1	23689	0	49090	1203
261590102003023	72	24	1276896	0	49056	146
261590102003024	53	22	2525918	0	49056	54
261590102003025	29	15	2560442	0	49013	29
261590102003026	23	7	704129	0	49090	85
261590102003027	15	7	221981	0	49090	175

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590102003028	4	3	154925	0	49090	67
261590102003029	35	16	1849540	0	49090	49
261590103001000	150	95	95513	0	49090	4067
261590103001001	3	6	170441	0	49090	46
261590103001002	288	91	613281	0	49090	1216
261590103001003	4	2	787	0	49090	13164
261590103001004	11	6	18844	0	49090	1512
261590103001005	0	0	2091	0	49090	0
261590103001006	1	1	11128	0	49090	233
261590103001007	44	34	36368	0	49090	3134
261590103001008	8	17	15483	0	49090	1338
261590103001009	84	152	175774	0	49090	1238
261590103001010	8	21	12394	0	49090	1672
261590103001011	0	3	10940	0	49090	0
261590103001012	0	0	1064	0	49090	0
261590103001013	45	67	216180	0	49090	539
261590103001014	7	3	131296	0	49090	138
261590103001015	1	2	10417	0	49090	249
261590103001016	4	2	9678	0	49090	1071
261590103001017	0	0	24800	0	49090	0
261590103001018	2	1	77213	0	49090	67
261590103001019	2	1	28048	0	49090	185
261590103001020	53	37	234536	0	49090	585
261590103001021	0	0	56492	0	49090	0
261590103001022	0	0	13411	0	49090	0
261590103001023	34	46	26096	0	49090	3374
261590103001024	23	46	33700	0	49090	1768
261590103001025	22	25	23358	0	49090	2439
261590103001026	0	1	5074	0	49090	0
261590103001027	33	42	25013	0	49090	3417
261590103001028	7	7	30521	0	49090	594
261590103001029	26	31	21496	0	49090	3133
261590103001030	10	35	40999	0	49090	632
261590103001031	8	16	8937	0	49090	2318
261590103001032	0	3	10402	0	49090	0
261590103001033	12	14	20310	0	49090	1530
261590103001034	10	11	52241	0	49090	496
261590103001035	12	15	9034	0	49090	3440
261590103001036	6	9	1022	0	49090	15205
261590103001037	23	66	48731	0	49090	1222
261590103001038	7	14	5742	0	49090	3157
261590103001039	7	14	965	0	49090	18787
261590103001040	4	19	14791	0	49090	700
261590103001041	0	0	1362	0	49090	0
261590103001042	4	2	6698	0	49090	1547
261590103001043	0	0	4331	0	49090	0
261590103001044	0	0	36296	0	49090	0
261590103001045	5	4	83586	0	49090	155
261590103001999	0	0	0	58388	490HH	
261590103002000	119	60	108769	0	49090	2834
261590103002001	40	17	17393	0	49090	5956
261590103002002	47	24	21394	0	49090	5690
261590103002003	18	10	36861	0	49090	1265

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590103002004	100	84	37618	0	49090	6885
261590103002005	0	2	5452	0	49090	0
261590103002006	4	8	12703	0	49090	816
261590103002007	9	20	22568	0	49090	1033
261590103002008	6	2	16421	0	49090	946
261590103002009	53	24	55056	0	49090	2493
261590103002010	52	21	43804	0	49090	3075
261590103002011	45	14	47630	0	49090	2447
261590103002012	31	11	14019	0	49090	5727
261590103002013	96	44	67581	0	49090	3679
261590103002014	8	3	15239	0	49090	1360
261590103002015	37	21	17620	0	49090	5439
261590103002016	1	1	24899	0	49090	104
261590103002017	5	5	9278	0	49090	1396
261590103002018	0	1	7888	0	49090	0
261590103002019	2	1	11296	0	49090	459
261590103002020	15	8	6732	0	49090	5771
261590103002021	16	5	7468	0	49090	5549
261590103002022	24	13	33325	0	49090	1865
261590103002023	48	24	62610	0	49090	1986
261590103002024	45	19	21532	0	49090	5413
261590103002025	12	5	15140	0	49090	2053
261590103002026	18	6	10171	0	49090	4584
261590103002027	23	11	12594	0	49090	4730
261590103002028	38	16	26279	0	49090	3745
261590103002029	15	5	16677	0	49090	2330
261590103003000	8	34	96691	0	49090	214
261590103003001	44	33	27203	0	49090	4189
261590103003002	50	40	12493	0	49090	10366
261590103003003	20	27	12802	0	49090	4046
261590103003004	12	19	11382	0	49090	2731
261590103003005	49	24	12105	0	49090	10484
261590103003006	28	13	13847	0	49090	5237
261590103003007	23	12	13409	0	49090	4443
261590103003008	23	16	11613	0	49090	5130
261590103003009	8	4	14557	0	49090	1423
261590103003010	10	6	24251	0	49090	1068
261590103003011	0	0	11058	0	49090	0
261590103003012	0	4	5845	0	49090	0
261590103003013	24	12	11534	0	49090	5389
261590103003014	23	18	12901	0	49090	4617
261590103003015	33	16	13328	0	49090	6413
261590103003016	8	4	11775	0	49090	1760
261590103003017	29	12	11101	0	49090	6766
261590103003018	33	15	11981	0	49090	7134
261590103003019	31	17	11906	0	49090	6744
261590103003020	24	15	10579	0	49090	5876
261590103003021	1	1	8474	0	49090	306
261590103003022	18	13	12253	0	49090	3805
261590103003023	25	17	13044	0	49090	4964
261590103003024	23	14	15321	0	49090	3888
261590103003025	38	21	15680	0	49090	6277
261590103003999	0	0	0	33674	490HH	

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590104001000	60	24	41258	0	49090	3767
261590104001001	17	10	14731	0	49090	2989
261590104001002	27	13	15044	0	49090	4648
261590104001003	32	20	13086	0	49090	6333
261590104001004	23	14	14861	0	49090	4008
261590104001005	0	1	15879	0	49090	0
261590104001006	13	13	12106	0	49090	2781
261590104001007	18	16	14323	0	49090	3255
261590104001008	21	15	14846	0	49090	3664
261590104001009	33	15	15339	0	49090	5572
261590104001010	30	12	14038	0	49090	5535
261590104001011	46	17	13783	0	49090	8644
261590104001012	41	16	14574	0	49090	7286
261590104001013	108	48	78518	0	49090	3562
261590104001014	11	7	5892	0	49090	4835
261590104001015	47	30	59064	0	49090	2061
261590104001016	0	2	4039	0	49090	0
261590104001017	32	13	22840	0	49090	3629
261590104001018	7	1	12038	0	49090	1506
261590104001019	7	4	38157	0	49090	475
261590104001020	34	13	15358	0	49090	5734
261590104001021	32	12	14852	0	49090	5580
261590104001022	31	13	10953	0	49090	7330
261590104001023	24	7	11723	0	49090	5302
261590104001024	4	4	13609	0	49090	761
261590104001025	26	11	13540	0	49090	4973
261590104002000	8	3	10953	0	49090	1892
261590104002001	13	6	12613	0	49090	2669
261590104002002	0	0	38753	0	49090	0
261590104002003	0	0	66280	0	49090	0
261590104002004	95	34	42762	0	49090	5754
261590104002005	58	30	35510	0	49090	4230
261590104002006	18	12	60566	0	49090	770
261590104002007	17	10	32759	0	49090	1344
261590104002008	20	9	8281	0	49090	6255
261590104002012	22	8	12704	0	49090	4485
261590104002013	28	11	13209	0	49090	5490
261590104002014	0	0	15636	0	49090	0
261590104002015	18	9	12107	0	49090	3851
261590104002016	16	5	13528	0	49090	3063
261590104002017	37	13	12398	0	49090	7729
261590104002018	37	12	10944	0	49090	8756
261590104002019	20	7	11962	0	49090	4330
261590104002020	20	10	11777	0	49090	4398
261590104003000	0	0	7240	0	49090	0
261590104003001	1	2	11511	0	49090	225
261590104003002	4	3	37634	0	49090	275
261590104003003	12	4	8340	0	49090	3727
261590104003004	11	3	9946	0	49090	2864
261590104003005	38	14	14159	0	49090	6951
261590104003006	43	22	14106	0	49090	7895
261590104003007	14	8	10814	0	49090	3353
261590104003008	119	46	128571	0	49090	2397

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590104003009	19	12	18178	0	49090	2707
261590104003010	9	4	15271	0	49090	1526
261590104003011	0	0	17937	0	49090	0
261590104003012	22	10	17819	0	49090	3198
261590104003013	199	47	232718	0	49090	2215
261590104003014	0	0	43280	0	49090	0
261590104003015	26	14	15733	0	49090	4280
261590104003016	21	10	10218	0	49090	5323
261590104003017	19	9	13796	0	49090	3567
261590104003018	23	10	9308	0	49090	6400
261590104003019	22	13	10603	0	49090	5374
261590104003020	0	0	118392	0	49090	0
261590104004000	5	3	12888	0	49090	1005
261590104004001	83	33	15420	0	49090	13941
261590104004002	31	13	17134	0	49090	4686
261590104004003	120	54	80841	0	49090	3845
261590104004004	36	11	16830	0	49090	5540
261590104004005	33	10	15918	0	49090	5369
261590104004006	8	2	17169	0	49090	1207
261590104004007	45	18	18631	0	49090	6256
261590104004008	9	5	10496	0	49090	2221
261590104004009	7	4	8270	0	49090	2192
261590104004010	16	6	30035	0	49090	1380
261590104004011	74	33	74738	0	49090	2564
261590104004012	18	10	15432	0	49090	3021
261590104004013	8	3	8173	0	49090	2535
261590104004014	58	24	30915	0	49090	4859
261590104004015	55	32	46064	0	49090	3092
261590104004016	26	8	19404	0	49090	3470
261590104004017	9	3	60812	0	49090	383
261590104004018	0	0	62491	0	49090	0
261590104004019	44	22	108541	0	49090	1050
261590104004020	0	0	12059	0	49090	0
261590104004021	52	35	46302	0	49090	2909
261590104004022	0	0	30740	0	49090	0
261590105003000	23	8	442502	0	49090	135
261590105003001	0	0	197207	0	49090	0
261590105003002	0	0	29978	0	49090	0
261590105003003	0	0	15758	0	49090	0
261590105003004	11	10	98822	0	49090	288
261590105003005	50	23	568843	0	49090	228
261590105003006	0	0	51073	0	49090	0
261590105003007	10	5	86709	0	49090	299
261590105003008	0	0	53553	0	49090	0
261590105003009	145	64	77619	0	49090	4838
261590105003010	10	4	260645	0	49090	99
261590105003011	10	4	392242	0	49090	66
261590105003012	11	6	86359	0	49090	330
261590105003013	35	14	683596	0	49090	133
261590105003014	85	30	950440	0	49090	232
261590105003015	0	1	317606	0	49090	0
261590105003016	0	1	365730	0	49090	0
261590105003017	0	0	31930	0	49090	0

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590105003018	0	0	5270	0	49090	0
261590105003019	37	18	728979	0	49090	131
261590105003020	4	2	6500	0	49090	1594
261590105003021	0	0	690	0	49090	0
261590105003022	2	1	58398	0	49090	89
261590105003023	0	0	51420	0	49090	0
261590105003024	0	0	88092	0	49090	0
261590105003025	40	16	212672	0	49090	487
261590105003026	7	2	86167	0	49090	210
261590105003027	17	8	252061	0	49090	175
261590105003028	311	145	219813	0	49090	3664
261590105003029	10	4	130509	0	49090	198
261590105003030	16	6	28206	0	49090	1469
261590105003031	2	2	42111	0	49090	123
261590105003032	24	12	150347	0	49090	413
261590105003033	107	51	975666	0	49090	284
261590105003034	67	32	877370	0	49090	198
261590105003035	76	27	972224	0	49090	202
261590105003036	93	40	971288	0	49090	248
261590105003037	18	7	16335	0	49090	2854
261590105003038	164	65	2645518	0	49090	161
261590105003039	63	26	1258720	0	49090	130

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Subarea 4 (Allegan County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260050309004000	38	16	945416	0	49090	104
260050309004001	133	51	3371771	0	49090	102
260050309004002	14	5	21627	0	49090	1677
260050309004003	0	1	195412	0	49090	0
260050309004004	46	13	1156669	0	49090	103
260050309004005	37	19	1393289	0	49090	69
260050309004006	18	6	323859	0	49090	144
260050309004007	48	20	1432355	0	49090	87
260050309004008	0	0	17106	0	49090	0
260050309004009	3	2	73832	0	49090	105
260050309004010	22	11	374792	0	49090	152
260050309004011	32	12	217304	0	49090	381
260050309004012	41	39	601470	0	49090	177
260050309004013	0	0	95567	0	49090	0
260050309004014	23	13	29280	0	49090	2034
260050309004015	28	38	302207	0	49090	240
260050309004018	3	2	41215	0	49090	189
260050309004019	6	3	17714	0	49090	877
260050309004020	25	6	14487	0	49090	4470
260050309004021	15	7	12446	0	49090	3121
260050309004022	2	3	17136	0	49090	302
260050309004023	5	7	42747	0	49090	303
260050309004024	0	3	12446	0	49090	0
260050309004025	0	1	29220	0	49090	0
260050309004026	5	5	44404	0	49090	292
260050309004027	0	2	5308	0	49090	0
260050309004028	10	9	75125	0	49090	345
260050309004029	0	5	13865	0	49090	0
260050309004030	0	7	18933	0	49090	0
260050309004031	0	14	16009	0	49090	0
260050309004032	0	11	14163	0	49090	0
260050309004033	0	12	18111	0	49090	0
260050309004034	5	9	18565	0	49090	698
260050309004035	0	0	100494	0	49090	0
260050309004036	0	0	6750	0	49090	0
260050309004037	9	5	63428	0	49090	368
260050309004038	11	6	310337	0	49090	92
260050309004039	8	2	16568	0	49090	1251
260050309004040	2	88	22015	0	49090	235
260050309004041	16	18	125880	0	49090	329
260050309004042	10	8	1986	0	49090	13041
260050309004043	15	15	54708	0	49090	710
260050309004044	8	13	65844	0	49090	315
260050309004045	8	21	14052	0	49090	1475
260050309005005	159	67	5134405	0	49090	80
260050309005006	0	0	11425	0	49090	0
260050309005007	61	21	635440	0	49090	249
260050309005008	34	13	3057966	0	49090	29
260050309005009	24	9	1388388	0	49090	45
260050309005010	0	0	8051	0	49090	0
260050309005011	82	29	1907483	0	49090	111

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260050309005012	13	7	1672395	0	49090	20
260050309005013	52	22	1042439	0	49090	129
260050309005016	97	45	2708705	0	49090	93
260050309005017	0	0	98198	0	49090	0
260050309005018	42	17	2192466	0	49090	50
260050309005019	0	0	2930	0	49090	0
260050309005020	88	28	3826673	0	49090	60
260050309004016	135	263	3195547	0	49090	109

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Subarea 5 (Van Buren County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590107001002	46	20	218504	0	49013	545
261590107001003	80	38	324738	0	49013	638
261590107001004	4	1	38183	0	49013	271
261590107001005	4	2	33309	0	49013	311
261590107001006	25	7	30387	0	49013	2131
261590107001007	32	13	83924	0	49013	988
261590107001008	89	45	125221	0	49013	1841
261590107001009	26	10	18441	0	49013	3652
261590107001010	32	13	33519	0	49013	2473
261590107001011	24	6	9170	0	49013	6779
261590107001012	14	6	32256	0	49013	1124
261590107001013	18	12	24198	0	49013	1927
261590107001014	8	5	22519	0	49013	920
261590107001015	18	9	15476	0	49013	3012
261590107001019	34	8	14549	0	49013	6053
261590107001020	44	16	23026	0	49013	4949
261590107001021	27	9	19583	0	49013	3571
261590107001022	10	4	12278	0	49013	2109
261590107001023	0	0	8907	0	49013	0
261590107001024	6	2	40777	0	49013	381
261590107001025	0	0	21581	0	49013	0
261590107001026	0	0	43056	0	49013	0
261590107001044	0	0	18181	0	49013	0
261590107001045	0	0	13403	0	49013	0
261590107001046	5	4	7947	0	49013	1630
261590107001047	14	5	4554	0	49013	7962
261590107001048	14	7	12196	0	49013	2973
261590107001049	12	4	9347	0	49013	3325
261590107001050	29	11	18284	0	49013	4108
261590107002000	7	3	16386	0	49013	1106
261590107002001	2	1	14512	0	49013	357
261590107002002	0	0	10773	0	49013	0
261590107002003	11	6	11688	0	49013	2438
261590107002004	17	8	13302	0	49013	3310
261590107002005	7	3	13381	0	49013	1355
261590107002006	17	5	10349	0	49013	4254
261590107002007	47	18	61076	0	49013	1993
261590107002008	0	0	3972	0	49013	0
261590107002009	10	5	13675	0	49013	1894
261590107002010	14	6	9862	0	49013	3677
261590107002011	28	10	12684	0	49013	5717
261590107002012	21	7	12810	0	49013	4246
261590107002013	31	10	12664	0	49013	6340
261590107002014	13	7	5955	0	49013	5654
261590107002015	0	1	9342	0	49013	0
261590107002016	14	7	9695	0	49013	3740
261590107002017	27	11	18332	0	49013	3815
261590107002018	0	0	712	0	49013	0
261590107002019	30	8	9679	0	49013	8028
261590107002020	15	9	9795	0	49013	3966
261590107002021	15	4	9435	0	49013	4118

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590107002022	33	8	7319	0	49013	11678
261590107002023	50	18	110538	0	49013	1172
261590107002024	50	24	287798	0	49013	450
261590107002025	0	0	4677	0	49013	0
261590107002026	0	0	7903	0	49013	0
261590107002027	3	2	161042	0	49013	48
261590107002028	2	1	8497	0	49013	610
261590107002029	26	9	22677	0	49013	2970
261590107002030	12	6	11208	0	49013	2773
261590107002031	10	4	8106	0	49013	3195
261590107002032	0	1	4246	0	49013	0
261590107002033	20	4	10795	0	49013	4798
261590107002034	25	11	12622	0	49013	5130
261590107002035	18	8	11586	0	49013	4024
261590107002036	39	11	10954	0	49013	9221
261590107002037	3	1	4710	0	49013	1650
261590107002038	18	8	11390	0	49013	4093
261590107002039	23	7	12774	0	49013	4663
261590107002040	15	5	25170	0	49013	1543
261590107002041	20	6	14415	0	49013	3593
261590107002042	3	1	5709	0	49013	1361
261590107002043	0	0	4891	0	49013	0
261590107002044	32	13	172334	0	49013	481
261590107002045	19	9	83513	0	49013	589
261590107002046	0	0	1014	0	49013	0
261590107002047	0	0	884693	0	49013	0
261590107002048	0	0	8421	0	49013	0
261590108001000	27	11	1175611	0	49013	59
261590108001001	18	7	699111	0	49013	67
261590108001002	8	6	594597	0	49013	35
261590108001003	0	0	21263	0	49013	0
261590108001004	24	8	158655	0	49013	392
261590108001005	0	0	7021	0	49013	0
261590108001006	0	0	4509	0	49013	0
261590108001007	8	4	135617	0	49013	153
261590108001008	16	12	2138789	0	49013	19
261590108001009	13	5	916675	0	49013	37
261590108001010	3	1	613740	0	49013	13
261590108001011	2	1	128166	0	49013	40
261590108001012	1	2	672599	0	49013	4
261590108001013	0	0	39255	0	49090	0
261590108001014	2	1	431714	0	49090	12
261590108001015	3	1	321050	0	49090	24
261590108001016	0	0	7526	0	49090	0
261590108001017	2	1	377807	0	49090	14
261590108001020	4	3	433420	0	49090	24
261590108001021	32	12	1279234	0	49043	65
261590108001022	14	5	350078	0	49013	104
261590108001023	8	4	934781	0	49013	22
261590108001024	5	1	169234	0	49013	77
261590108001025	0	0	136452	0	49013	0
261590108001026	2	1	132652	0	49013	39
261590108001027	0	0	24215	0	49013	0

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
2615901080010 28	0	1	62192	0	49013	0
2615901080010 29	2	1	408302	0	49013	13
2615901080010 30	6	2	35710	0	49013	435
2615901080010 31	13	4	220450	0	49013	153
2615901080010 32	0	0	12223	0	49013	0
2615901080010 33	0	0	4942	0	49013	0
2615901080010 34	23	8	1557975	0	49013	38
2615901080010 35	0	0	537692	0	49013	0
2615901080010 36	4	1	385263	0	49013	27
2615901080010 37	8	3	1083764	0	49013	19
2615901080010 38	51	18	1718612	0	49013	77
2615901080010 39	53	26	1829216	0	49013	75
2615901080010 40	20	9	432203	0	49013	120
2615901080010 41	36	10	313592	0	49013	297
2615901080010 42	71	20	1030918	0	49013	178
2615901080010 43	2	1	12525	0	49013	414
2615901080010 44	20	6	423914	0	49013	122
2615901080010 45	53	22	2574903	0	49013	53
2615901080010 46	5	1	21944	0	49013	590
2615901080010 47	61	20	1308412	0	49013	121
2615901080010 48	0	0	736	0	49013	0
2615901080010 49	4	3	28284	0	49013	366
2615901080010 50	25	9	977336	0	49013	66
2615901080010 51	2	1	114061	0	49013	45
2615901080010 52	9	3	477421	0	49013	49
2615901080010 53	4	2	267616	0	49013	39
2615901080010 54	43	15	1464126	0	49013	76
2615901080010 55	5	2	549799	0	49013	24
2615901080010 56	0	0	36963	0	49013	0
2615901080010 57	7	4	14789	0	49013	1226
2615901080010 58	0	2	9503	0	49013	0
2615901080010 59	8	3	69767	0	49013	297
2615901080010 60	2	1	329180	0	49013	16
2615901080010 61	41	13	1799026	0	49013	59
2615901080010 62	15	5	342216	0	49013	114
2615901080010 63	5	4	281499	0	49013	46
2615901080010 64	12	2	1216267	0	49013	26
2615901080010 65	15	7	2196229	0	49013	18
2615901080010 66	5	2	110197	0	49013	118
2615901080010 67	60	23	2638620	0	49013	59
2615901080010 68	45	18	1228957	0	49043	95
2615901080010 69	13	8	782333	0	49043	43
2615901080010 73	9	3	261667	0	49043	89
2615901080010 74	0	0	38203	0	49043	0
2615901080010 75	68	22	1159268	0	49043	152
2615901080010 76	30	12	1175380	0	49043	66
2615901080010 77	49	19	1917728	0	49013	66
2615901080010 78	25	12	2561226	0	49013	25
2615901080019 98	0	0	0	143909	49013	
2615901080019 99	0	0	0	108773	49013	
2615901080020 00	24	12	37204	0	49013	1671
2615901080020 01	19	8	762424	0	49013	65

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
2615901080020002	39	12	1567009	0	49013	64
2615901080020003	0	0	40920	0	49013	0
2615901080020004	13	6	894908	0	49013	38
2615901080020005	38	13	1304044	0	49013	75
2615901080020006	76	29	3004863	0	49013	66
2615901080020007	64	16	1172789	0	49013	141
2615901080020008	19	13	2226352	52968	49013	22
2615901080020009	0	0	65282	0	49013	0
2615901080020010	23	14	3217512	0	49013	19
2615901080020011	29	14	2512160	66343	49013	30
2615901080020012	10	4	436249	0	49013	59
2615901080020013	0	0	174679	0	49013	0
2615901080020014	0	0	34642	0	49013	0
2615901080020015	14	10	2294399	117926	49057	16
2615901080020016	0	0	167320	0	49057	0
2615901080020017	14	6	487180	0	49013	74
2615901080020018	23	9	338818	0	49057	176
2615901080020019	3	1	3832	0	49013	2028
2615901080020020	9	3	7026	0	49013	3318
2615901080020021	23	11	1128488	0	49057	53
2615901080020022	76	44	2810509	0	49013	70
2615901080020023	14	9	321766	0	49013	113
2615901080020024	91	98	557048	0	49013	423
2615901080020025	18	8	3698	0	49013	12607
2615901080020026	24	18	406402	0	49013	153
2615901080020027	34	27	1271742	0	49057	69
2615901080020028	83	14	1178240	0	49057	182
2615901080020029	54	35	1635484	0	49057	86
2615901080020030	25	12	572487	0	49057	113
2615901080020031	1	1	398162	0	49057	7
2615901080020032	0	0	171227	0	49013	0
2615901080020033	0	0	6199	0	49013	0
2615901080020034	0	0	47618	0	49013	0
2615901080020035	0	0	58518	0	49057	0
2615901080020036	3	1	1354403	0	49057	6
2615901080020037	26	9	686604	0	49057	98
2615901080020038	27	12	1058567	0	49057	66
2615901080020039	20	9	1307797	148140	49064	40
2615901080020040	14	7	925541	76918	49064	39
2615901080020041	0	0	7783	0	49064	0
2615901080020042	0	0	9592	0	49013	0
2615901080020043	0	0	4622	0	49064	0
2615901080020044	0	0	9414	0	49064	0
2615901080020997	0	0	0	216288	49057	
2615901080020998	0	0	0	487397	490HH	
2615901080020999	0	0	0	507729	490HH	
2615901140010005	19	9	1873618	0	49057	26
2615901140010006	40	16	1383060	0	49057	75
2615901140010007	57	50	301897	0	49057	489
2615901140010008	0	2	14896	0	49057	0
2615901140010009	0	0	104092	0	49057	0
2615901140010010	30	12	283340	0	49057	274

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
261590114001011	28	10	1633096	0	49057	44
261590114001012	78	32	3912271	0	49057	52
261590114001013	14	5	310163	0	49057	117
261590114001014	18	6	1016183	0	49057	46
261590114001015	0	0	7586	0	49057	0
261590114001016	42	16	960474	0	49057	113
261590114001017	20	10	851754	0	49057	61
261590114001021	2	1	2028978	0	49057	3
261590114001024	2	1	185683	0	49057	28
261590114001025	23	9	17756	0	49057	3355
261590114001026	34	9	9942	0	49057	8857
261590114001027	0	0	18728	0	49057	0
261590114001028	0	0	6218	0	49057	0
261590114001029	38	12	293966	0	49057	335
261590114001030	4	1	13832	0	49057	749
261590114001031	37	18	632416	0	49057	152
261590114001032	13	5	440130	0	49057	76
261590114001033	9	4	268658	0	49057	87
261590114001034	215	76	3778258	0	49057	147
261590114001035	42	13	37202	0	49057	2924
261590114001036	25	10	21877	0	49057	2960
261590114001037	59	20	103694	0	49057	1474
261590114001038	26	12	90951	0	49057	740
261590114001039	0	0	15791	0	49057	0
261590114001998	0	0	0	251128	49057	
261590114001999	0	0	0	54935	49057	

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

Subarea 5 (Berrien County)

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210101002000	189	91	2617260	53588	49038	187
260210101002001	0	0	1050	0	49038	0
260210101002002	0	0	1196	0	49038	0
260210101002003	17	10	24088	0	49038	1828
260210101002004	11	7	23170	0	49038	1230
260210101002005	32	23	127852	0	49038	648
260210101002006	16	10	67482	0	49038	614
260210101002007	18	15	141444	0	49038	330
260210101002008	1	4	19668	0	49038	132
260210101002009	138	165	1056189	0	49038	338
260210101002010	8	17	10786	0	49038	1921
260210101002011	0	0	1972	0	49038	0
260210101002012	57	30	167599	0	49038	881
260210101002013	15	8	13740	0	49038	2827
260210101002014	53	28	1331731	0	49038	103
260210101002015	4	3	7743	0	49038	1338
260210101002016	16	7	35823	0	49038	1157
260210101002017	21	9	17895	0	49038	3039
260210101002018	3	8	9514	0	49038	817
260210101002019	22	7	19330	0	49038	2948
260210101002020	22	8	40563	0	49038	1405
260210101002021	16	5	35901	0	49038	1154
260210101002022	6	5	13600	0	49038	1143
260210101002023	5	5	16694	0	49038	776
260210101002024	16	5	17715	0	49038	2339
260210101002025	3	2	37165	0	49038	209
260210101002026	52	19	182608	0	49022	738
260210101002027	32	11	314375	0	49038	264
260210101002028	72	30	949061	0	49022	196
260210101002029	38	20	564139	0	49022	174
260210101003000	58	22	1300728	0	49038	115
260210101003001	111	62	1686518	151674	49038	170
260210101003002	51	34	261416	0	49038	505
260210101003003	15	8	25946	0	49038	1497
260210101003004	8	2	15715	0	49038	1318
260210101003005	6	3	15553	0	49038	999
260210101003006	0	0	92598	0	49038	0
260210101003007	67	29	2045875	0	49038	85
260210101003008	29	11	564191	0	49038	133
260210101003009	31	18	1301781	16468	49038	62
260210101003010	0	0	471	0	49038	0
260210101003011	27	13	688069	0	49038	102
260210101003012	0	0	22532	0	49038	0
260210101003013	0	0	65104	0	49038	0
260210101003014	78	27	1707449	0	49038	118
260210101003015	54	24	1752814	0	49038	80
260210101003016	18	8	58218	0	49038	801
260210101003021	5	5	126247	0	49038	103
260210101004000	39	18	1776837	68940	49038	57
260210101004001	23	7	629886	0	49038	95
260210101004002	27	12	13937	0	49038	5018

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210101004003	12	10	178824	0	49038	174
260210101004004	223	85	579676	0	49038	996
260210101004005	0	0	815	0	49038	0
260210101004006	21	21	340443	0	49038	160
260210101004007	36	37	330447	0	49038	282
260210101004008	23	20	39970	0	49038	1490
260210101004009	8	5	25124	0	49038	825
260210101004010	12	11	142057	0	49038	219
260210101004011	9	9	29294	0	49038	796
260210101004012	14	11	29295	0	49038	1238
260210101004013	8	6	12600	0	49038	1644
260210101004014	0	0	302	0	49038	0
260210101004015	17	14	29103	0	49038	1513
260210101004016	2	1	11729	0	49038	442
260210101004017	25	11	9525	0	49038	6798
260210101004018	6	8	15210	0	49038	1022
260210101004019	0	6	14476	0	49038	0
260210101004020	8	5	13795	0	49038	1502
260210101004021	39	23	108861	0	49038	928
260210101004022	15	9	21600	0	49038	1799
260210101004023	17	5	25288	0	49038	1741
260210101004024	14	10	25936	0	49038	1398
260210101004025	5	3	11669	0	49038	1110
260210101004026	59	28	178338	0	49038	857
260210101004027	0	1	6972	0	49038	0
260210101004028	0	0	627	0	49038	0
260210101004029	5	3	14034	0	49038	923
260210101004030	9	9	18256	0	49038	1277
260210101004031	3	1	8061	0	49038	964
260210101004032	7	3	16507	0	49038	1098
260210101004033	20	8	17775	0	49038	2914
260210101004034	18	9	13082	0	49038	3564
260210101004035	0	0	9520	0	49038	0
260210101004036	2	1	4912	0	49038	1055
260210101004037	15	9	4588	0	49038	8468
260210101004038	0	4	6771	0	49038	0
260210101004039	7	5	6924	0	49038	2618
260210101004040	9	4	3054	0	49038	7633
260210101004041	0	0	6556	0	49038	0
260210101004042	6	16	12640	0	49038	1229
260210101004043	13	6	17320	0	49038	1944
260210101004044	6	6	16376	0	49038	949
260210101004045	7	4	16410	0	49038	1105
260210101004046	14	10	30633	0	49038	1184
260210101004047	45	26	157095	0	49038	742
260210101004048	8	4	8347	0	49038	2482
260210101004049	3	3	13294	0	49038	584
260210101004050	12	6	13383	0	49038	2322
260210101004051	16	11	15768	0	49038	2628
260210101004052	9	9	13853	0	49038	1683
260210101004053	15	9	15105	0	49038	2572
260210101004054	0	0	1183	0	49038	0
260210101004055	6	4	18259	0	49038	851

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210101004056	27	9	31456	0	49038	2223
260210102001000	18	7	597447	0	49038	78
260210102001001	51	20	1639569	0	49038	81
260210102001002	87	39	2562457	0	49038	88
260210102001003	125	47	1590600	0	49038	204
260210102001004	94	49	233310	0	49038	1043
260210102001005	123	56	1682825	0	49038	189
260210102001006	23	12	704182	0	49038	85
260210102001007	48	15	260935	0	49038	476
260210102001008	26	9	34574	0	49038	1948
260210102001009	13	8	13829	0	49038	2435
260210102001010	15	16	19836	0	49038	1959
260210102001011	17	8	16261	0	49038	2708
260210102001012	11	18	28702	0	49038	993
260210102001013	24	9	10443	0	49038	5952
260210102001014	22	12	14397	0	49038	3958
260210102001015	15	11	15174	0	49038	2560
260210102001016	21	12	13540	0	49038	4017
260210102001017	9	5	8190	0	49038	2846
260210102001018	12	10	11983	0	49038	2594
260210102001019	37	15	22067	0	49038	4343
260210102001020	68	47	228943	0	49038	769
260210102001999	0	0	0	386176	49038	
260210102002000	208	209	384471	0	49038	1401
260210102002001	13	8	15811	0	49038	2130
260210102002002	21	13	26641	0	49038	2042
260210102002003	15	10	12934	0	49038	3004
260210102002004	9	7	12403	0	49038	1879
260210102002005	24	10	18102	0	49038	3434
260210102002006	12	11	27005	0	49038	1151
260210102002007	15	12	11120	0	49038	3494
260210102002008	186	92	253581	0	49038	1900
260210102002009	67	29	156763	0	49038	1107
260210102002010	138	65	362986	0	49038	985
260210102002011	18	13	13899	0	49038	3354
260210102002012	15	7	9148	0	49038	4247
260210102002013	297	122	953475	0	49038	807
260210102002014	15	8	15974	0	49038	2432
260210102002015	14	6	9562	0	49038	3792
260210102002016	12	5	17479	0	49038	1778
260210102002017	20	9	19887	0	49038	2605
260210102002018	19	9	15512	0	49038	3172
260210102002019	38	11	11223	0	49038	8769
260210102002020	97	28	153547	0	49038	1636
260210102002021	3	4	12008	0	49038	647
260210102002022	75	113	134727	0	49038	1442
260210102002023	0	12	3775	0	49038	0
260210102002999	0	0	0	1497312	490HH	
260210102003000	125	104	238018	0	49038	1360
260210102003001	6	5	11034	0	49038	1408
260210102003002	3	3	8282	0	49038	938
260210102003003	58	25	44434	0	49038	3381
260210102003004	8	4	9871	0	49038	2099

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210102003005	32	11	18802	0	49038	4408
260210102003006	22	10	15199	0	49038	3749
260210102003007	36	14	32449	0	49038	2873
260210102003008	0	0	9343	0	49038	0
260210102003009	0	0	601	0	49038	0
260210102003010	26	11	46987	0	49038	1433
260210102003011	114	49	158061	0	49038	1868
260210102003012	55	27	55639	0	49038	2560
260210102003013	64	31	156650	0	49038	1058
260210102003014	33	17	58958	0	49038	1450
260210102003015	57	33	87658	0	49038	1684
260210102003016	16	7	21986	0	49098	1885
260210102003017	43	19	484578	0	49098	230
260210102003018	40	13	35489	0	49038	2919
260210102003999	0	0	0	164331	490HH	
260210102005000	43	21	2495190	0	49038	45
260210102005001	7	2	330115	0	49038	55
260210102005002	33	12	827836	0	49038	103
260210102005003	47	16	1281271	0	49038	95
260210102005004	71	34	2575296	0	49038	71
260210102005005	141	51	1294431	0	49038	282
260210102005006	60	28	1282783	0	49038	121
260210102005007	91	38	1255305	0	49038	188
260210102005008	53	22	805125	56755	49038	170
260210102005009	393	143	3012121	0	49038	338
260210102005010	153	74	37924	0	49038	10449
260210102005011	90	40	454791	0	49038	513
260210102005012	0	0	6552	0	49038	0
260210102006000	37	18	534537	0	49098	179
260210102006001	78	74	14050	0	49038	14379
260210102006002	22	15	6611	0	49038	8619
260210102006003	14	13	7341	0	49038	4939
260210102006004	23	10	12623	0	49038	4719
260210102006005	27	11	13166	0	49038	5311
260210102006006	28	9	16874	0	49038	4298
260210102006007	0	0	37435	0	49098	0
260210102006008	0	0	5316	0	49098	0
260210102006009	4	1	11395	0	49038	909
260210102006010	0	0	14462	0	49038	0
260210102006011	27	15	75307	0	49038	929
260210102006012	37	17	250041	0	49038	383
260210102006013	13	5	99603	0	49038	338
260210102006014	48	21	1760139	0	49038	71
260210102006015	41	13	1386756	0	49038	77
260210102006016	123	50	205951	0	49038	1547
260210102006017	5	4	37869	0	49038	342
260210102006018	50	25	44878	0	49038	2886
260210102006019	0	0	1314	0	49038	0
260210102006020	29	12	10599	0	49038	7086
260210102006021	15	7	10735	0	49038	3619
260210102006022	13	7	11424	0	49038	2947
260210102006023	8	5	5216	0	49038	3972
260210102006024	17	8	5141	0	49038	8564

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210102006025	39	15	10493	0	49038	9626
260210102006026	0	1	9105	0	49038	0
260210102006027	0	0	4767	0	49038	0
260210102006028	0	0	4978	0	49038	0
260210102006029	0	0	8574	0	49038	0
260210102006030	0	0	4489	0	49038	0
260210102006031	21	8	168664	0	49038	322
260210102006032	12	6	242863	0	49038	128
260210102006033	19	6	15444	0	49038	3186
260210102006034	8	4	14531	0	49038	1426
260210102006035	23	10	17487	0	49038	3407
260210102006036	1	3	16093	0	49038	161
260210102006037	12	6	31195	0	49038	996
260210102006038	0	0	1906	0	49038	0
260210102006039	17	7	12664	0	49038	3477
260210102006040	34	15	14069	0	49038	6259
260210103001000	0	0	7643	0	49098	0
260210103001001	23	13	50212	0	49098	1186
260210103001002	111	44	348158	0	49098	826
260210103001003	31	12	57240	0	49098	1403
260210103001004	10	3	31467	0	49098	823
260210103001005	20	7	31190	0	49098	1661
260210103001006	0	0	5213	0	49098	0
260210103001007	13	5	5417	0	49098	6216
260210103001008	51	20	32716	0	49098	4037
260210103001009	58	25	51972	0	49098	2890
260210103001010	84	27	42862	0	49098	5076
260210103001011	17	10	7085	0	49098	6215
260210103001012	21	8	9894	0	49098	5497
260210103001013	6	3	5273	0	49098	2947
260210103001014	36	15	14812	0	49098	6295
260210103001015	24	9	14720	0	49098	4223
260210103001016	64	27	40709	0	49098	4072
260210103001017	24	10	19475	0	49098	3192
260210103001018	0	0	812	0	49098	0
260210103001019	50	22	51278	0	49098	2525
260210103001020	16	7	43059	0	49098	962
260210103001021	44	16	68038	0	49098	1675
260210103001022	26	7	21858	0	49098	3081
260210103001023	23	9	15630	0	49098	3811
260210103001024	2	1	2934	0	49098	1765
260210103002000	47	18	95777	0	49098	1271
260210103002001	51	29	471579	0	49098	280
260210103002002	59	51	637451	0	49098	240
260210103002003	27	22	36205	0	49098	1931
260210103002004	78	30	155743	0	49098	1297
260210103002005	22	10	34897	0	49098	1633
260210103002006	21	9	39859	0	49098	1365
260210103002007	0	0	479482	0	49098	0
260210103002008	148	85	283323	0	49098	1353
260210103002009	36	17	21772	0	49098	4283
260210103002010	0	0	16804	0	49098	0
260210103002011	23	10	11014	0	49098	5409

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210103002012	20	6	6938	0	49098	7466
260210103002013	14	6	7434	0	49098	4878
260210103002014	0	0	3899	0	49038	0
260210103002015	21	8	10392	0	49098	5234
260210103002016	13	4	12042	0	49098	2796
260210103002017	61	23	20370	0	49098	7756
260210103002018	47	16	13178	0	49098	9237
260210103002019	15	6	4709	0	49098	8250
260210103002020	6	2	6301	0	49098	2466
260210103002021	91	37	260866	0	49038	903
260210103002022	35	12	34408	0	49098	2635
260210103002999	0	0	0	462945	490HH	
260210103004000	49	22	1099002	0	49098	115
260210103004001	97	37	2200231	0	49098	114
260210103004002	38	14	1269199	0	49098	78
260210103004003	0	0	72530	119372	49098	0
260210103004004	11	4	28583	0	49098	997
260210103004005	5	1	54928	0	49098	236
260210103004006	30	11	222813	0	49098	349
260210103004007	6	5	114504	0	49098	136
260210103004008	12	5	87797	0	49098	354
260210103004009	49	24	47050	0	49098	2697
260210103004010	10	4	6980	0	49098	3711
260210103004011	23	9	36243	0	49098	1644
260210103004012	66	23	89855	0	49098	1902
260210103004013	29	10	35146	0	49098	2137
260210103004014	27	13	14854	0	49098	4708
260210103004015	37	16	49056	0	49098	1953
260210103004016	0	0	26668	0	49098	0
260210103004017	38	16	19279	0	49098	5105
260210103004018	6	2	11684	0	49098	1330
260210103004019	0	0	23400	0	49098	0
260210103004020	16	8	62669	0	49098	661
260210103004021	21	6	5936	0	49098	9163
260210103004022	9	2	27027	0	49098	862
260210103004023	6	3	16478	0	49098	943
260210103005000	126	34	2497360	23978	49098	131
260210103005001	84	30	1443065	0	49098	151
260210103005002	10	4	384668	0	49098	67
260210103005003	0	0	107601	0	49098	0
260210103005004	31	13	551310	0	49098	146
260210103005005	6	3	838412	0	49098	19
260210103005006	28	12	439872	0	49098	165
260210103005007	123	48	3237708	47427	49098	98
260210103005008	3	1	83646	0	49098	93
260210103005009	10	4	93382	0	49098	277
260210103005010	17	15	420387	0	49098	105
260210103005011	0	0	155270	0	49098	0
260210103005012	30	36	68375	0	49038	1136
260210103005013	0	0	178	0	49098	0
260210103005014	40	79	197807	0	49098	524
260210103005015	13	29	34066	0	49098	988
260210103005016	0	0	15970	0	49098	0

POPULATION DISTRIBUTION AND EVACUATION TIME ESTIMATES

STFID	POP100	HU100	AREALAND	AREAWATR	ZCTA5	POPDENS
260210103005017	8	3	7633	0	49098	2715
260210103005018	6	7	21393	0	49098	726
260210103005019	10	5	144828	0	49098	179
260210103005020	5	3	154134	0	49098	84
260210103005021	0	0	5512	0	49098	0
260210103005022	27	15	23322	0	49098	2998
260210103005023	0	2	2394	0	49098	0
260210103005024	8	3	3035	0	49098	6827
260210103005025	65	75	68885	0	49098	2444
260210103005026	0	2	3220	0	49098	0
260210103005027	0	0	26057	0	49098	0
260210103005028	6	2	3441	0	49098	4516
260210103005029	2	15	12383	0	49098	418
260210103005030	39	44	97586	0	49098	1035
260210103005031	3	4	2763	0	49098	2812
260210103005032	28	17	2939	0	49098	24675
260210103005033	120	47	231845	0	49098	1341
260210103005034	42	36	48467	0	49098	2244
260210103005035	2	17	23419	0	49098	221
260210103005036	8	14	36754	0	49098	564
260210103005037	20	10	7514	0	49098	6894
260210103005038	19	17	22028	0	49098	2234
260210103005039	11	9	9920	0	49098	2872
260210103005040	25	10	13750	0	49098	4709
260210103005041	59	19	49623	0	49098	3079
260210103005042	28	11	14881	0	49098	4873
260210103005043	13	7	10992	0	49098	3063
260210103005044	8	5	11879	0	49098	1744
260210103005045	44	13	17491	0	49098	6515
260210103005046	18	6	8797	0	49098	5300
260210103005047	26	12	25426	0	49098	2648
260210103005048	18	5	8862	0	49098	5261
260210103005999	0	0	0	1436216	490HH	

EMERGENCY IMPLEMENTING PROCEDURES

EI-1 Emergency Classification and Actions

Upon recognition that abnormal Plant or site conditions exist, this procedure will be used to determine the appropriate Emergency Action Level(s) and to assure that all mandatory and subsequent actions are carried out.

EI-1.1 Emergency Response to Credible Security Threats

This procedure provides guidance for declaring and responding to an Unusual Event or an Alert based on a credible security threat.

EI-2.1 Site Emergency Director

This procedure defines the responsibilities of the Site Emergency Director.

EI-2.2 Emergency Staff Augmentation

This procedure establishes a method for augmenting onsite staffing under emergency conditions.

EI-3 Communications and Notifications

This procedure details the notification format and provides call lists of offsite agencies. The primary and alternate communications lines are also described.

EI-4.1 Technical Support Center Activation

This procedure describes the activation, staffing, physical facilities, equipment, and operations of the TSC.

EI-4.2 Operational Support Center Activation

This procedure describes the activation, staffing, physical facilities, equipment, and operations of the OSC.

EI-4.3 Emergency Operations Facility Activation

This procedure describes the activation, staffing, physical facilities, equipment, and operations of the EOF South Haven Conference Center.

EI-5 Reentry

This procedure provides guidelines for entry into the affected area of the Plant after the emergency condition has been stabilized. It also provides guidelines for the initial recovery operation prior to the establishment of the Long-Term Recovery Organization.

EMERGENCY IMPLEMENTING PROCEDURES

EI-5.1 Recovery

This procedure describes the recovery phase of emergency response at Palisades, and provides guidelines for restoring the plant to its preemergency condition.

EI-6 Offsite Dose Calculation and Recommendations for Protective Action

This procedure provides a method to determine the appropriate steps required to calculate offsite dose and recommend offsite protective actions.

EI-6.1 Release Rate Determination from Stack Gas Monitors

This procedure provides a manual calculation of a release rate for radioactive effluents from the Plant stack.

EI-6.2 Release Rate Determination from Steam Line Monitors RIA-2323 and RIA-2324 for Steam Releases Through Atmospheric Dump Valves

This procedure provides a manual calculation of a release rate for radioactive effluents from the atmospheric dump valves.

EI-6.3 Release Rate Determination from High-Range Effluent Monitors

This procedure provides a release rate calculation for radioactive effluents from the Plant stack or steam dumps.

EI-6.4 Release/Potential Release Determination from Containment High-Range Monitors

This procedure provides a release/potential release rate from radioactive material released into containment.

EI-6.6 Gamma E-Bar Determinations

This procedure provides a Gamma E-Bar (Average Gamma Energy Per Disintegration) for input into offsite dose calculations.

EI-6.7 Plant Site Meteorological System

This procedure provides a means to access the Plant site meteorological system for meteorological data required in the offsite dose calculations.

EMERGENCY IMPLEMENTING PROCEDURES

EI-6.8 Backup and Supplemental Meteorology

This procedure provides a means to access the Weather Services International (WSI) meteorological system and obtain meteorological data required in the offsite dose calculations when onsite meteorological data is not available.

EI-6.9 Automated Dose Assessment Program

This procedure provides basic instruction on how to initiate and operate the IBM PC Automated Dose Assessment Program "Offsite."

EI-6.10 Offsite Dose Calculation - Straight Line Gaussian (Manual Method)

This procedure provides a manual backup to the automated dose assessment program to calculate whole body and thyroid dose rates.

EI-6.13 Protective Action Recommendations for Offsite Population

This procedure provides guidelines for determining protection actions for the general public to be recommended to the appropriate state and local authorities in the event of a radiological emergency.

EI-7.0 Emergency Post Accident Sampling and Determination of Fuel Failure Using Dose Rates

This procedure provides the decision process necessary to implement sampling under emergency conditions.

EI-7.1 Emergency Sampling - PCS Liquid/Gas and Containment Air (Canceled)

This procedure describes the sequential method of sampling the Primary Coolant System (PCS) and/or the containment atmosphere during a post accident condition using the PASM panel. (This procedure was canceled following elimination of the PASM panel.)

EI-7.2 Emergency Post Accident Analysis (Canceled)

This procedure describes the sequential method of analyzing the PCS samples obtained during an accident condition. (This procedure was canceled following elimination of the PASM panel.)

EMERGENCY IMPLEMENTING PROCEDURES

EI-7.3 Hydrogen and Oxygen Gas Analysis of Post Accident Samples (Canceled)

This procedure describes the steps necessary to determine the hydrogen concentration from a PCS gas sample collected at the PASM panel, as well as the hydrogen and oxygen concentration from containment atmospheric gas samples. (This procedure was canceled following elimination of the PASM panel.)

EI-7.4 Post Accident Gas and Liquid Activity Analysis (Canceled)

This procedure describes the steps necessary to analyze samples for gamma activity during a post accident condition. (This procedure was canceled following elimination of the PASM panel.)

EI-7.5 Boron: Chloride Ion Chromatography Method Post Accident (Canceled)

This procedure describes the steps necessary to analyze and determine the boron concentration in a diluted PCS sample during a post accident condition. (This procedure was canceled following elimination of the PASM panel.)

EI-7.8 pH: Hydrogen Specific Ion Electrode (Canceled 10/95)

This procedure describes the steps necessary to determine the pH of an undiluted PCS sample during a post accident condition. (This procedure was canceled 10/95).

EI-7.10 Post Accident Sampling, Radioactive Gaseous Effluent Monitoring

This procedure describes the steps necessary to obtain a post accident sample of the stack effluent utilizing the radioactive gaseous effluent monitor.

EI-8 Onsite Radiological Monitoring

This procedure provides guidelines for post accident radiological monitoring on site.

EI-9 Offsite Radiological Monitoring

This procedure provides guidelines for post accident radiological monitoring off site.

EI-10 Accident Environmental Assessment

This procedure provides guidelines for post accident collection and replacement of environmental TLDs, obtaining data from air monitoring stations, collection and assessment of waterborne effluents, and obtaining water/milk/vegetation samples.

EMERGENCY IMPLEMENTING PROCEDURES

EI-11 Determination of Extent of Core Damage

This procedure provides a method of estimating the degree of core damage during accident conditions.

EI-11.2 Core Damage Assessment from Post Accident Sampling (Canceled)

This procedure provides a method of determining extent of core damage via gamma isotopic analysis at the PASM panel. (This procedure was canceled following elimination of the PASM panel.)

EI-12.1 Personnel Accountability

To provide guidelines and assign responsibility for personnel assembly and accountability.

EI-12.2 Assembly Area Personnel Lists (Canceled 10/95)

Provides updates for assembly area lists. (This procedure was canceled 10/95).

EI-12.3 Search and Rescue Team Responsibilities

Provides guidelines for search and rescue teams during an emergency.

EI-13 Evacuation/Reassembly

This procedure provides site evacuation procedures and the subsequent reassembly of personnel.

EI-14 Medical Care/Treatment of Contaminated, Injured Personnel

This procedure provides guidelines on personnel emergency radiation exposure limits, personnel decontamination procedures, the use of thyroid blocking agents, and the methods of transporting contaminated/injured victims to hospitals.

EI-15.1 Drills and Exercises

This procedure details the requirements for drills and exercises which test the efficiency of the Site Emergency Plan.

EI-15.2 Communications Tests

This procedure establishes requirements for testing the emergency communications systems.

EMERGENCY IMPLEMENTING PROCEDURES

EI-15.3 Post Accident Sample Monitoring System Operator Training (Canceled)

This procedure provides training guidelines for the post accident sample panel. (This procedure was canceled following elimination of the PASM panel.)

EI-16.1 Maintenance of Emergency Equipment

This procedure establishes a method for the regular inventory and testing of emergency equipment and supplies.

EI-16.2 Post Accident Sample Monitoring System Supplies and Associated Equipment Checks (Canceled)

This procedure establishes a method for the regular inventory and operability checks of the Post Accident Sample Monitoring Panel supply cabinets and associated equipment. (This procedure was canceled following elimination of the PASM panel.)

GENERAL EQUIPMENT IN EMERGENCY KITS

Eight emergency kits will be maintained and inspected at least quarterly, readily accessible from each of the following locations: Technical Support Center (TSC), Operational Support Center (OSC), Emergency Operations Facility (EOF), Emergency Vehicle 23-069, Emergency Vehicle 23-035; Medical Emergency Kits: Health Physics Office Ambulance Kit and South Haven Community Hospital. One Medical Emergency First Aid Kit is located in the Health Physics office.

The first five emergency kits consist of the following generic equipment classifications. Specific equipment inventories are contained in the Emergency Implementing Procedures.

a. Monitoring instrumentation and equipment including: dose rate and count rate meters, air sampling equipment, personnel dosimetry equipment.

b. Protective equipment including: protective clothing, respiratory equipment, thyroid blocking agent.

c. Communications equipment including: radios, telephones, megaphones.

d. Reference material including: Emergency plans and procedures, maps, equipment lists, spare forms.

e. Miscellaneous equipment including: survey, posting and boundary equipment, plastic bags, flashlights, office supplies, decontamination equipment.

The Maintenance Emergency Kit contains only maintenance equipment.

The Medical Emergency Kits consist of monitoring instrumentation and equipment, protective equipment, survey, posting and boundary equipment, decontamination and first aid supplies.

The Medical Emergency First Aid Kit consists of Medical First Aid supplies for use in responding to contaminated or noncontaminated injuries.

NUREG-0654 CROSSREFERENCE

NUREG-0654 FEMA-REP-1 REV 1	SITE EMERGENCY PLAN*
A.1.a	Section 5
A.1.b	5.1 through 5.5
A.1.c	Figure 5.1
A.1.d	3.2
A.1.e	3.2, Table 7.1
A.3	5.6, 5.7, 5.8, Appendix A
A.4	5.1
B.1	5.2
B.2	5.2.5
B.3	5.4.1
B.4	5.4.1
B.5	Figure 5-2
B.6	5.3 through 5.8, Figure 5-1
B.7.a	5.4
B.7.b	5.5
B.7.c	Figure 5-1
B.7.d	5.3.5
B.8	5.8, Appendix A
B.9	5.6.1 through 5.6.3, Appendix A
C.1.a	5.7.2
C.1.b	7.1, 7.2
C.1.c	5.7.2.a
C.2.b	6.1.2.j
C.3	7.7.2
C.4	Appendix A
D.1	Table 4.1 and 4.2
D.2	Table 4.2
E.1	6.1.1.b.2, 6.1.2.a, Figure 6-1
E.2	5.4
E.3	6.1.1.b.2(f)
E.4	6.1.1.b.2(g)
E.6	6.4.1.b.3(a)
E.7	6.4.1.b

* The referenced section of the Site Emergency Plan represents the principal location where the NUREG is addressed.

NUREG-0654 CROSSREFERENCE

NUREG-0654 FEMA-REP-1 REV 1	SITE EMERGENCY PLAN*
F.1	3.2, Table 7.2, 6.1.1, 6.1.2
F.2	7.8.1
F.3	8.1.2
G.1	8.2
G.2	8.2
G.3	5.3.5, 7.4
G.4.a	5.3.5
G.4.b	5.3.5
G.4.c	5.3.5
G.5	Table 8.1
H.1	5.3.2
H.2	5.3.4
H.4	5.4
H.5	7.6
H.6	7.6.2, 7.7
H.7	7.7.1
H.8	7.6.2
H.9	5.3.3
H.10	8.4
H.11	Appendix E
H.12	7.2
I.1	Table 4.2
I.2	7.6
I.3	6.2.5
I.4	7.6, 7.7
I.5	7.6.2
I.6	6.2.5
I.7	7.7.1
I.8	6.2.5
I.9	7.7.1
I.10	6.2.5

* The referenced section of the Site Emergency Plan represents the principal location where the NUREG is addressed.

NUREG-0654 CROSSREFERENCE

NUREG-0654 FEMA-REP-1 REV 1	SITE EMERGENCY PLAN*
J.1	6.4.1.a.1
J.2	6.4.1
J.3	6.4.1.a.4
J.4	6.4.1
J.5	6.4.1.a.1
J.6	7.8.6
J.7	6.1.1
J.8	Appendix C
J.10	6.4.1.b, 7.7
K.1	6.5
K.2	6.5.1
K.3	6.5.1
K.5	6.4.2, 6.5.2
K.6	6.4.2
K.7	6.5.2
L.1	5.6.1
L.2	6.5.2
L.4	5.6.1
M.1	9.0
M.2	Figure 9-1
M.3	9.0
M.4	6.2.5
N.1	8.1.2
N.2	8.1.2
N.3	8.1.2
N.4	8.1.2
N.5	8.1.2
O.1	8.1.1
O.2	8.1.1, 8.1.2
O.3	6.5.2
O.4	8.1.1
O.5	8.1.1

* The referenced section of the Site Emergency Plan represents the principal location where the NUREG is addressed.

NUREG-0654 CROSSREFERENCE

NUREG-0654 FEMA-REP-1 REV 1	SITE EMERGENCY PLAN*
P.1	Table 8.1
P.2	5.1
P.3	8.1.3
P.4	8.3
P.5	8.3
P.6	2.5.2
P.7	Appendix D
P.8	Table of Contents
P.9	8.3
P.10	8.1.2.7

* The referenced section of the Site Emergency Plan represents the principal location where the NUREG is addressed.