

Supplemental Information

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Marion County Emergency Management
Radiological Emergency Preparedness (REP) Plan
For the Levy Nuclear Power Plant



SHERIFF
Marion County

***MARION COUNTY
EMERGENCY MANAGEMENT***



Radiological Emergency Preparedness (REP) Plan

For the

Levy Nuclear Power Plant

Draft

**Marion County
Levy Nuclear Plant
Radiological Emergency Plan**

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MARION COUNTY LEVY NUCLEAR PLANT SITE PLAN

I. General

The purpose of this Appendix is to provide for the health, safety and welfare of Florida residents and visitors in Marion County who would be affected by a radiological emergency at the Levy Nuclear Plant. Progress Energy is the licensed operator (the licensee) of the Levy Nuclear Plant.

Parts of Levy, Citrus, and Marion counties lie within the 10-mile plume exposure pathway Emergency Planning Zone, and they are risk counties. All or parts of Alachua, Dixie, Gilchrist, Lake, Levy, Marion, Citrus, Hernando, Sumter, Pasco, and Putnam counties lie within the 50-mile Ingestion Pathway Zone. A map of the 10-mile Emergency Planning Zone is shown in **Figure 1** and a map of the 50-mile Ingestion Pathway Zone is shown in **Figure 2**.

The Levy Nuclear Plant is located in Levy County, Florida. This is a large, primarily rural area located southwest of Gainesville and west of Ocala and approximately 7 miles north of the Crystal River Energy Complex, an energy facility also owned by Progress Energy.

Normal prevailing wind is from the northwest blowing to the southeast; however, any response action will be based upon the actual meteorological data at the time of the incident.

II. Organizations and Responsibilities

Marion County and other organizations with radiological emergency responsibilities for an emergency at the Levy Nuclear Plant are identified in this section. Each organization is responsible for assuring continuity of resources to support 24-hour operations for a protracted period. Each emergency response organization or sub organization having an operations role is responsible for developing its own Standard Operating Procedures which describe, in detail, its concept of operations and its relationship to the total effort. The relationship of these organizations and their responsibilities are graphically represented in **Figure 4**. In addition, each county jurisdiction of the State of Florida is authorized in Sections 252.35, 252.37, and 252.60 of the Florida Statutes to participate in cooperative relationships to accept services, equipment, supplies, materials, or funds for emergency management efforts.

A. Marion County Organizations and Responsibilities

1. Chairman, Marion County Board of County Commissioners

The Chairman, Marion County Board of County Commissioners, or designee, with the support of the Mayor of Dunnellon, has the overall responsibility for radiological emergency response planning and for assuring the accuracy of applicable portions of this plan. It is his/her responsibility to initiate actions and provide command and control at the local level, to include consideration of in-place sheltering or evacuation as options for protection of the

public, and for conducting emergency operations to cope with the effects of a radiological emergency.

The Chairman of the Marion County Board of County Commissioners, or designee, is responsible for assuring continuity of resources, administrative and material, to support 24-hour operations for a protracted period and for coordination with Federal, state and local government response agencies.

It is the responsibility of the Chairman, Marion County Board of County Commissioners, or designee, acting upon the recommendation of the Marion County Emergency Management Director, or designee, and the Department of Health Operations Officer or his/her representative, to authorize emergency workers to incur exposure in excess of 500 mR. In no case will this dose exceed that recommended in Protective Action Guides for emergency workers engaged in lifesaving activities.

2. **Director, Marion County Department of Emergency Management**

The Director of the Marion County Department of Emergency Management, or designee, is responsible for the development and maintenance of procedures for implementing the required portions of this plan consistent with the emergency conditions. The director, or designee, will also provide input for annual plan revision by the State Division of Emergency Management. The Marion County Emergency Management Director, or designee, will also coordinate overall emergency operations and support needs with the Division of Emergency Management, Levy County, Citrus County, state and Federal support agencies, and representatives from Progress Energy.

The Director, Marion County Department of Emergency Management, or designee, is responsible for early warning and notification of the population within the portion of the 10-mile Emergency Planning Zone in Marion County; activation of the Emergency Operations Center; and notification of the County Emergency Operations Center staff as appropriate to the emergency class.

3. **Marion County Sheriff's Office**

The Marion County Sheriff's Office is responsible for managing county-wide law enforcement activities including traffic control, controlling ingress and egress, and establishing traffic control points to ensure safe passage of evacuees to shelter.

If directed, the Sheriff's Office will coordinate operations to evacuate the population from the affected area to shelters by providing:

- a. Dissemination of warning and emergency information and communication support.

- b. Traffic control and law enforcement measures.
- c. Area security and control of ingress and egress within the affected area and along evacuation routes.
- d. Surveillance in the affected area to determine that all individuals have been evacuated.
- e. Surveillance and security to safeguard homes in the evacuated area.

The Sheriff's Office will provide assistance to the Dunnellon Police Department in maintaining area security and law enforcement within the shelters located in Marion County.

Traffic control and law enforcement measures will be provided to assist the evacuated population returning to their homes from shelters when the emergency is over.

The Sheriff's Office will also maintain communications with the Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

4. City of Dunnellon Police Department

The Dunnellon Police Department will provide, upon request, assistance to the Marion County Sheriff's Department in disseminating warning and emergency information, communications support, traffic control, law enforcement and area security as needed during evacuation of the population from Marion County. They will assist in providing the following services in support of the emergency operations:

- a. Operations to direct the evacuated population to designated shelters.
- b. Traffic control and law enforcement measures.
- c. Traffic control and law enforcement measures to assist evacuation and reentry operations.

The Dunnellon Police Department will maintain communications with the Marion County Sheriff's Office and coordinate support needs and operations with other agencies.

5. Marion County Road Department

The Marion County Road Department will provide assistance to the Marion County Sheriff's Office in disseminating warning and emergency information, communications support, traffic control, and area security for evacuation operations.

The Road Department will also provide the following services in support of emergency operations:

- a. Establishment and positioning of road blocks, route markers and traffic control signs to aid evacuation.
- b. Equipment and personnel support for maintenance and sanitation operations at reception centers and shelters.
- c. Waste pickup and disposal at reception centers and shelters.
- d. Assistance in decontamination of the area by providing personnel and equipment. The Marion County Road Department will also maintain communications with the Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

6. Marion County School Board

The Marion County School Board will provide the following resources in support of evacuation, reception, food service, and shelter operations:

- a. School buses and drivers to transport evacuees to the shelters.
- b. School facilities to accommodate reception, shelter and food services for evacuees.
- c. Personnel to augment the shelter staffs in registering the evacuees.
- d. Assistance in shelter management and food service operations.

The Marion County School Board will also maintain communications with the Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

7. City of Dunnellon and Rainbow Lakes Estates Fire Departments

The Fire Departments of Dunnellon and Rainbow Lakes Estates will, upon request, provide the following services in support of emergency operations:

- a. Assistance to the Marion County Sheriff's Office in dissemination of warning and emergency information, and in the provision of communications support.
- b. Fire surveillance and suppression service in shelters.

- c. Assistance in decontamination in areas affected by the emergency.

The City of Dunnellon and Rainbow Lakes Estates Fire Departments will also maintain communications with the Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

8. Marion County Health Department

The Marion County Division of Health Director and the Marion County Emergency Management Director, or their designees, will coordinate with and assist DOH with radiological accident assessment, and will also be responsible for the determination of proper protective actions in accordance with **Chapters 10, 11 and 12** of the State Annex to include the administration of potassium iodide to designated individuals, if deemed necessary and directed by proper authorities.

The Marion County Health Department will provide the following services in support of emergency operations at the reception centers and shelters:

- a. Health services, and disease prevention and control measures.
- b. Sanitation and personal hygiene services, and waste disposal.
- c. Procurement of medical service support.

The Health Department will assure the issuance of necessary health orders, restrictions, and emergency information to the evacuees housed at shelters, as well as to the general population of Marion County, to facilitate:

- Disease prevention and control measures.
- Sanitation and waste disposal.
- Safe food and water supply.

The Health Department will also maintain communications with the Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

9. Munroe Regional Medical Center

The Munroe Regional Medical Center will provide the following services in support of emergency operations:

- a. In-patient hospital care and hospital facility support.

- b. Professional medical service support at shelters.

The Munroe Regional Medical Center will also maintain communications with Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

10. Marion County Emergency Medical Services

Marion County Emergency Medical Services will provide the following services in support of emergency operations:

- a. Transportation of injured persons to Munroe Medical Center.
- b. Assistance in evacuating non-ambulatory persons from the area affected by the emergency.

Emergency Medical Services will maintain communications with Marion County Emergency Operations Center and coordinate support needs and operations with other agencies.

11. Marion County Public Information Officer

The designated Public Information Officer is responsible for the dissemination of information to the public through the facilities of the Emergency News Center. The Public Information Officer is the key liaison between the news media and county emergency response operations (See **Chapter 7**, Public Information and Education, of the State Annex).

B. Emergency Support Function 6 (Mass Care)

The American Red Cross is the lead agency for Emergency Support Function 6. The American Red Cross and the support agencies will participate in the coordination of 24-hour care and sheltering of evacuees from Levy, Citrus and Marion counties. This service will include the following:

- 1. Assigning a liaison to each reception center and assist in controlling the flow of evacuees to government-designated shelters.
- 2. Managing government-designated shelters which includes:
 - a. Working with local government in performing shelter surveys during pre-planning.
 - b. Training of shelter workers during pre-planning.
 - c. Staffing shelters.
 - d. Mass feeding.

- e. Providing Disaster Health Services (First Aid).
 - f. Registration of evacuees.
3. In the event the relocation period should last longer than anticipated, the American Red Cross will assist with additional Mass Care Services in government-designated shelters.

C. State Division of Emergency Management

The State Division of Emergency Management will maintain liaison with representatives from Progress Energy and will be responsible for keeping local, state and Federal agencies informed on planning, training, and operational requirements relative to a radiological emergency at the Levy Nuclear Plant. Upon notification of the declaration of a radiological emergency at the plant, the State Division of Emergency Management will assist in the notification of appropriate local, state and Federal response agencies in accordance with procedures outlined in **Chapter 5** (Notification and Activation) of the State Annex.

The State Division of Emergency Management will also be responsible for coordinating state resources utilized in the emergency response and for coordinating requests for Federal resources and support.

D. State Emergency Support Function 8 (Health and Medical)

The Department of Health is the lead agency for State Emergency Support Function 8. The Department of Health and the support agencies will be responsible for offsite radiological accident assessment and providing technical assistance to the counties by recommending appropriate protective actions. Assessment of the situation by the Department of Health will be based upon input from offsite radiological accident assessment teams and plant officials. The Department of Health will also provide assistance to the county Departments of Health regarding emergency medical operations.

E. Federal Government

If it is necessary, in the opinion of the Governor, the State will request Federal assistance. The two major federal agencies are the Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA). The NRC is responsible for onsite technical response including monitoring, assessment, technical control and predication of the impact of a radiological release. FEMA is responsible for offsite non-technical response. This would include coordinating with State and local agencies and offering assistance where possible.

The third federal agency is the Department of Energy (DOE). At the direction of the State Commissioner of Health, DOE, through the Federal Radiological Emergency Response Plan, will coordinate all offsite monitoring, evaluation, assessment and reporting of the activities of participating Federal agencies.

State resources such as command posts and communications will be made available to support the federal response.

F. Progress Energy

Representatives from Progress Energy will maintain liaison with state, county and Federal agencies. Progress Energy representatives will be responsible for keeping appropriate officials from these local, state and Federal agencies informed of emergency plans. Progress Energy will report any emergency situation using the standard emergency classification system outlined in the licensee's emergency plan and in accordance with procedures outlined in **Chapter 4** (Emergency Classification System) of the State Annex.

Until the Department of Health State Emergency Response Teams arrive and are operational at the scene, the licensee will provide offsite monitoring for, and recommend protective actions to the risk counties, and advise appropriate State Division of Emergency Management and Department of Health personnel of the recommendations.

III. Command and Control for Initial Radiological Response

Marion, Levy, and Citrus counties are responsible for initial radiological emergency response operations. The organization of Marion county emergency response agencies is outlined in **Figure 4**. Each county will coordinate emergency operations through the Emergency Management/Operations Directors, or their designees. The primary and support functions and responsibilities of each Marion county agency are outlined in **Figure 3**.

The State will support county emergency operations from the State Emergency Operations Center. If conditions warrant, the State Division of Emergency Management will provide coordination with risk county emergency operations and will activate the State Emergency Operations Center. Should the scope of the emergency exceed the response capability of the risk counties, increased State action will be warranted. The Governor may transfer responsibility for overall emergency management to the State by issuing an Executive Order under the provisions of Section 252.36, Florida Statutes. Upon issuance of such an Executive Order, the risk counties will continue to coordinate county response operations.

A. Marion County

The Chairperson, Marion County Board of County Commissioners, will initially exercise command and control to conduct emergency operations necessary to protect the population of Marion County from the effects of an emergency at the Levy Nuclear Power Plant. In his/her absence, responsibility will be delegated according to established county procedures for continuity of county government. The County will coordinate such actions through its Emergency Management Director, or designee, and county emergency response agencies.

B. Levy County

The Chairperson, Levy County Board of County Commissioners, will initially exercise command and control to conduct emergency operations necessary to protect the population of Levy County from the effects of an emergency at the Levy Nuclear Plant. In his/her absence, responsibility will be delegated according to established county procedures for continuity of county government. The County will coordinate such actions through its Emergency Management Director, or designee, and county emergency response agencies.

C. Citrus County

The Chairperson, Citrus County Board of County Commissioners, through the county Emergency Operations Director, or designee, will be responsible for the command and control necessary to initiate actions and conduct emergency operations required to protect the population of Citrus County from the effects of an emergency at the Levy Nuclear Plant. In his/her absence, responsibility will be delegated according to established county procedures for continuity of government. The County will coordinate such actions through its Emergency Operations Director and county emergency response agencies.

IV. Emergency Classification System

Four classes of emergency in increasing order of significance are established: Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency. This emergency classification system will normally develop sequentially; gradation is provided to ensure adequate emergency management preparations for more serious indicators.

These classes of emergency are anticipated to develop sequentially; however, the possibility exists that the first indication of a problem could result in immediate declaration of any of the emergency classes.

A. Notification of Unusual Event

(Refer to REP SOP 1)

Classification Description:

Unusual Events are situations that are either in the process of occurring or have occurred which indicate a potential degradation of the level of safety at the Levy Nuclear Plant or indicate a security threat to the plant or facility's protection.

Release Potential:

No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Purpose:

The purpose of offsite notification is to assure that the first step in future response has been carried out, to bring the operations staff to a state of readiness and to provide systematic handling of Unusual Event information and decision-making.

Notification:

Upon receipt of Notification of an **Unusual Event** from the Progress Energy's emergency communicator, the Fire Dispatch personnel at the Sheriff's Office EOC/County Warning Point will verify the receipt of the message with the State Warning Point via the Hot Ring Down telephone system. Should the emergency notification come in on any circuit other than the Hot Ring Down telephone system, the authenticity of the message will be verified by the State Warning Point.

Activation and Actions:

The Marion County Emergency Operations Center is anticipated to be activated to a **Level III Activation** for the Notification of an **Unusual Event** emergency classification. This will be a monitoring phase. The Emergency Management Director or designee and the REP Coordinator will monitor the situation and be prepared to react if escalation to a higher classification is warranted or standby until verbal closeout of the emergency.

B. Alert Emergency

(Refer to REP SOP 2)

Classification Description:

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the Levy Nuclear Plant. It may also involve a security event that involves probable life threatening risk to site personnel or damage to site equipment because of intentional malicious dedicated efforts of a hostile act. (Hostile Action Based Event).

Release Potential:

Any releases of radioactive materials are expected to be limited to small fractions of the Environmental Protection Agency Protective Action Guide exposure levels and will not significantly affect offsite areas.

Purpose:

The purpose of this classification is to assure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required, and provide offsite authorities current information on plant status and parameters.

Notification:

Upon receipt of an **Alert Emergency** from the Progress Energy's Emergency Communicator, the Fire Dispatch personnel at the Sheriff's Office EOC/County Warning Point will verify the receipt of the message with the State Warning Point via the Hot Ring Down telephone system. Should the emergency notification come in on any system other than the Hot Ring Down telephone system, the authenticity of the message will be verified by the State Communications Operator.

Activation and Actions:

At this emergency classification, designated response organizations will be notified by the Marion County Sheriff's Office EOC warning point to standby until verbal closeout or escalation to a more severe class. Because of the possible threat to life and property, upon receipt of a notification of an **Alert**, the Marion County Emergency Management Director or designee should augment their resources by activating the Emergency Operations Center to a **Level II Activation**. This is considered a "Partial Activation". The Marion County Emergency Management Director or designee will also alert to standby status key local emergency response personnel, or may instruct them to report to the EOC, if the situation warrants. All emergency response organizations will remain on Alert status until verbal closeout or escalation to a more severe classification.

Upon notification of the **Alert Emergency**, the State Coordinating Officer may authorize the deployment of an Advance Team or Liaison Team. The deployment of an Advance Team will be initiated according to the **State of Florida State Emergency Response Team Standard Operating Procedures for Field Operations Team** as indicated in **Chapter 3, Section II.B (Direction and Control) of Annex A** and **Chapter 5, Section II.B (Notification and Activation) of the "State of Florida Radiological Emergency Management Plan"**. As the situation warrants, the Florida Department of Health staff may also be dispatched. The lead organization for each Emergency Support Function will be responsible for alerting or notifying necessary personnel within their respective Emergency Support Functions.

C. Site Area Emergency

(Refer to REP SOP 3)

Classification Description:

Events are in process or have occurred which involve actual or likely major failures of Levy Nuclear Plant functions needed for protection of the public. It may also involve a security event (Hostile Action Based event) that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) prevents effective access to equipment needed for the protection of the public.

Release Potential:

Any releases of radioactive materials are not expected to exceed Environmental Protection Agency Protective Action Guide exposure levels except within plant boundaries.

Purpose:

The purpose of the **Site Area Emergency** declaration is to assure that emergency response centers are staffed, to assure that monitoring teams are dispatched, to assure that personnel required for evacuation of areas near the plant are at duty stations if the situation becomes more serious, to provide consultation with offsite authorities, and to provide updates to the public through government authorities.

Notification:

Upon receipt of a **Site Area Emergency** from the Progress Energy's emergency communicator, the Fire Dispatch personnel at the Sheriff's Office EOC/Count Warning Point will verify the receipt of the message with the State Warning Point via the Hot Ring Down telephone system. Should the emergency notification come in on any system other than the Hot Ring Down telephone system, the authenticity of the message will be verified by the State Communications Operator.

Activation and Actions:

Upon receipt of a notification of a **Site Area Emergency**, the Marion County Emergency Management Director or designee will activate the Marion County Emergency Operations Center to a **Level I Activation**. This is a "Full Scale Activation". Local emergency response organizations will be activated and will report to their duty stations in accordance with established county procedures.

Based on the Florida DOH and Progress Energy's recommendations and after review of available resources, the Emergency Management Director or designee will formulate the County's position regarding the Protective Action Decisions (PADs) required if any.

Depending on the situation at the Levy Nuclear Plant, all children in Early Learning Centers (Day Care) in or near the Levy Nuclear Plant 10-mile EPZ, all School Children in Public Schools and all Special Needs Citizens in the Levy Nuclear Plant 10-mile EPZ should be evacuated during a declared **Site Area Emergency**. During a Hostile Action Based event at the Levy Nuclear Plant the school children may not be relocated due to the potential threat of hostile forces present in the community. School lock down instead may be recommended.

There are three Marion County Schools within the Levy Nuclear Plant 10-mile EPZ. They include the Dunnellon Middle School, Dunnellon Christian Academy and Romeo Elementary School.

If In Home Sheltering or evacuation near the Levy Nuclear Plant is

appropriate, the Chair Person for the Board of County Commissioners should sign a Local State of Emergency. Citrus, Marion and Levy Counties will then activate the public notification systems. The CodeRED System may also be utilized to provide information to the general public.

Citrus, Marion and Levy county officials will provide the public within a 10-mile radius of the Levy Nuclear Power Plant with periodic updates on the status of the emergency. If the Emergency News Center is operational, all public information will be coordinated through this facility.

A recommendation should be considered for farmers to place milk animals within **2-miles** of the Levy Nuclear Plant on stored feed and assess the need to extend the distance further out if needed.

Florida DOH will provide offsite radiological monitoring and protective action recommendations upon arrival at the area. Prior to deployment of the Florida DOH field monitoring teams, Progress Energy will provide dose projection data and protective action recommendations to Marion County and will advise appropriate State Division of Emergency Management personnel of those recommendations.

The State Division of Emergency Management will activate the State EOC in Tallahassee as indicated in **Chapter 3, Section II.B (Direction and Control) of Annex A** and **Chapter 5, Section II.B (Notification and Activation)** of the “**State of Florida Radiological Emergency Management Plan**”. All other response actions will be as for the previous classification.

D. General Emergency

(Refer to REP SOP 4)

Classification Description:

Events are in process or have occurred that involve actual or imminent substantial reactor core degradation or melting with potential for loss of containment integrity. It may also involve a security event (Hostile Action Based event) that result in an actual loss of physical control of the facility at the Levy Nuclear Plant.

Release Potential:

Releases of radioactive material can be reasonably expected to exceed Environmental Protection Agency Protective Action Guide exposure levels offsite.

Purpose:

The purpose of the General Emergency declaration is to initiate predetermined Protective Actions for the general public, to provide continuous assessment of information from Progress Energy's Levy Nuclear Plant and offsite radiation measurements, to initiate additional measures as indicated by actual or potential releases, to provide

consultation with offsite authorities, and to provide updates for the general public through government authorities.

Notification:

Upon receipt of a **General Emergency** from the utility's Emergency Communicator, Fire Dispatch personnel at the Sheriff's Office EOC/County Warning Point will verify the receipt of the message with the State Warning point via the Hot Ring Down telephone system. Should the emergency notification come in on any system other than the Hot Ring Down telephone system, the authenticity of the message will be verified by the State Communications Operator.

Activation and Actions:

Upon receipt of a notification of a **General Emergency**, the Marion County Sheriff's Office EOC should be activated to a **Level I Activation** if not already. The Emergency Management Director or designee will notify all local emergency response organizations and activate all emergency response centers. The public notification systems may be activated in Citrus, Marion and Levy counties.

Based on the Florida DOH and Progress Energy's recommendations and after review of available resources, the Emergency Management Director or designee will formulate the County's position regarding the Protective Action Decisions (PADs) required.

If it has not been previously performed, the Chairperson for the Board of County Commissioners should sign a Local State of Emergency.

Depending on the situation at the Levy Nuclear Plant, the Evacuation of the General Public in the Levy Nuclear Plant 10-mile EPZ should be implemented during this declared emergency. During a Hostile Action Based event at the Levy Nuclear Plant the General Public may not be evacuated due to the potential threat of hostile forces present in the community. In-house sheltering and lock down may be recommended.

All other response actions will be as for the previous emergency class with the addition of recommending the farmer to place the milk animals within **10-miles** of the Levy Nuclear Plant on stored feed and assess the need to extend the distance if needed.

V. Notification and Activation

Upon declaration of a radiological emergency at the Levy Nuclear Plant, the licensee's Emergency Coordinator, or designee, will notify the State Warning Point in Tallahassee and warning points in Marion County, Levy County, Citrus County, and the Department of Health simultaneously via the Hot Ring Down telephone system within 15 minutes. The State Warning Point will verify that all warning points have picked up on the Hot Ring Down system. The commercial telephone system is the secondary notification system. The Emergency Satellite Communications System can also be used as a backup system.

The notification message will include details of the emergency and relevant meteorological data, as required by the State of Florida Notification Message Form. The State Warning Point will verify receipt of the message by Marion County, Levy County, Citrus County, and the Department of Health. The State Warning Point will also notify other emergency response organizations, in accordance with the procedures outlined in **Chapter 5** (Notification and Activation) of the State Annex.

The Chairpersons of the Marion, Levy, and Citrus County Boards of County Commissioners or their designees will activate respective county response plans. Local response organizations will be notified of the emergency by the county warning points. The notification message will specify that the organization stand by or start to mobilize emergency response personnel. County emergency response personnel will be called to duty using established county notification procedures. If mobilization is required, emergency response personnel will report to their agency response center for specialized equipment and further instructions.

Procedures for notification and activation of county emergency response organizations at each emergency class are outlined below.

A. Notification of Unusual Event

At this emergency class, designated response organizations will be notified by the county warning point to stand by until verbal closeout or escalation to a more severe class.

B. Alert

At this emergency class, designated response organizations will be notified by the county warning point to stand by until verbal closeout or escalation to a more severe class. Upon receipt of a notification of an Alert, the Marion County Director of Emergency Management, or their designee, may augment their resources by activating the Emergency Operations Center for and other primary response centers on a limited basis. The director, or their designee, will also alert to standby status key local emergency response personnel, or may instruct them to report to the Emergency Operations Center, if the situation warrants. All emergency response organizations will maintain alert status until verbal closeout or escalation to a more severe class.

C. Site Area Emergency

Upon receipt of a notification of a Site Area Emergency, the Marion County Director of Emergency Management, or their designee, will activate the County Emergency Operations Center and other emergency response centers as appropriate. Local emergency response organizations will be activated and will report to their duty stations in accordance with established county procedures.

If in-place sheltering or evacuation near the site is appropriate, Marion, Levy and Citrus Counties will activate the public notification systems. Marion, Levy and Citrus county officials will provide the public within a 10-

mile radius of the Levy Nuclear Plant with periodic updates on the status of the emergency. If the Emergency News Center is operational, all public information will be coordinated through this facility.

The Department of Health will provide offsite radiological monitoring and protective action recommendations upon arrival at the area. Prior to deployment of the Department of Health field monitoring teams, the licensee will provide dose projection data and protective action recommendations to the risk counties and will advise appropriate State Division of Emergency Management personnel of those recommendations.

The State Division of Emergency Management will activate the State Emergency Operations Center in Tallahassee. All other response actions will be the same as the previous class.

D. General Emergency

Upon receipt of a notification of a General Emergency, the Marion County Emergency Management Director, or their designee, will notify all local emergency response organizations and activate all emergency response centers. The public notification systems will be activated in Marion, Levy, and Citrus counties.

All other response actions will be the same as the previous emergency class.

VI. Notification of the Public

Progress Energy has installed sirens for notification of the public within the 10-mile Emergency Planning Zone. The Director of Emergency Management in Marion County (or designee), the Director of Emergency Management in Levy County (or designee), and the Director of Emergency Operations in Citrus County (or designee), under the direction of the Chairperson of their respective Board of County Commissioners, will be responsible for activating the siren system. If Public action is required, then the sirens should be activated within **fifteen (15)** minutes of a decision made by the Marion, Citrus and Levy Emergency Management Directors or designees. Residents and transients within the 10-mile Emergency Planning Zone will be advised to tune to the following Emergency Alert System stations for detailed information and instructions:

Television Station	Location
Brighthouse Cable	Lecanto
Adelphia Cable	Beverly Hills
WTSP/TV Channel 10	St. Petersburg
WUFT/TV Channel 5	Gainesville
WCJB/TV Channel 20	Gainesville
WFLA/TV Channel 8	St. Petersburg
WTVT/TV Channel 13	St. Petersburg
WFTS/TV Channel 28	Tampa
WTOG/TV Channel 44	Tampa

RADIO STATION	FREQUENCY	AM/FM	LOCATION
WXCW	95.3	FM	CRYSTAL RIVER
WXOF	96.3	FM	CRYSTAL RIVER
WSKY	97.3	FM	GAINESVILLE
WKTK	98.5	FM	CRYSTAL RIVER
WTRS	102.3	FM	OCALA
WRGO	102.7	FM	INGLIS/YANKEETOWN
WRUF	103.7	FM	GAINESVILLE
WRZN	720	AM	HERNANDO

As a backup, and for notification of isolated areas, sheriff's office/police and fire vehicles and aircraft equipped with public address systems will advise residents of the protective actions they should take based on the severity of the accident, in accordance with established county procedures.

Boaters in the waters within the 10-mile Emergency Planning Zone will be notified of the emergency by loud speakers from boats and aircraft operated by the Marion, Levy, and Citrus County Sheriff's Offices, State Emergency Support Function 16 assets, U.S. Coast Guard, volunteer Fire Departments and the Citrus County Aquatic Services.

The public notification system may be activated for an Alert, and will be activated for a Site Area Emergency or a General Emergency in a timely manner following a decision by the Chairpersons of the Marion, Levy, and Citrus County Board of County Commissioners or their designees, to implement Protective Action Recommendations. The population within the 10-mile Emergency Planning Zone should receive primary notification and instructions via all primary notification systems for the general population, including the Emergency Alert System. Backup route alerting and notification shall be completed within 45 minutes.

Pre-scripted Emergency Alert System messages for Marion, Levy, and Citrus counties are maintained in the county's respective Standard Operating Procedures. Refer to **Appendix 1** for Marion County EAS Messages.

VII. Emergency Communications

A. Marion County

Twenty-four hour communications in Marion County are provided through the Sheriff's Office via the Hot Ring Down telephone system, commercial telephones, and Emergency Satellite Communication System.

Upon activation of the Marion County Emergency Operations Center, all emergency communications systems will be placed in service and tested.

Command and control of county emergency operations and emergency personnel will emanate from the county Emergency Operations Center. The county Emergency Operations Center in conjunction with the Sheriff's Dispatch Center will provide a focus for all county communications for emergency operations.

Direct communications between the Marion County Emergency Operations Center and the following organizations will be maintained:

The State Division of Emergency Management regarding the local situation and requests for state and federal support and resources.

The Department of Health (including the Mobile Emergency Radiological Laboratory) regarding accident assessment and protective actions.

The Levy Nuclear Plant via the Hot Ring Down telephone system, commercial telephones, and Emergency Satellite Communication System.

Communications with Levy and Citrus counties will be maintained via the Hot Ring Down telephone system, commercial telephones, or Emergency Satellite Communication System.

Communications with local emergency response agencies will be maintained by agency radio systems and commercial telephone.

Communications to medical facilities and ambulance services are available through the Emergency Medical Service Radio System operated by Marion County.

Communications with Federal emergency response agencies will be coordinated through the State Division of Emergency Management.

B. Test Schedule for Emergency Communications Equipment

Marion county testing of communications networks and equipment will be in accordance with procedures outlined in **Chapter 6** (Emergency Communications) of the State Annex and established county procedures.

VIII. Public Information

A. Public Education

A coordinated dissemination of information will be conducted annually in the area surrounding the Levy Nuclear Plant to keep the residents and the media informed of the possible consequences of a Nuclear Power Plant emergency and the response plans for management of the emergency.

Progress Energy, Marion, Levy, and Citrus counties will jointly develop and maintain a public information document containing appropriate educational material. This publication will include but not be limited to the following information:

1. Information about radiation.
2. The office and telephone number to contact for further information.
3. Information on protective measures, including evacuation routes, reception centers, sheltering, and the identification of radio stations that will be used to broadcast emergency information.
4. Specific information for the handicapped.

The information will be distributed to the permanent population within the 10-mile Emergency Planning Zone. Updated information will be provided at least annually.

Information documents will be distributed by Progress Energy to managers of transient lodging facilities within the 10-mile Emergency Planning Zone for use by transients. Appropriate public notices will be posted at beaches and other outdoor recreational facilities within the 10-mile Emergency Planning Zone that are under the control of state and local government. These will inform the transient population of appropriate actions to take when they hear an emergency alert signal (refer to **Chapter 7** of the State Annex).

B. Media Education

Progress Energy, Marion, Levy, and Citrus County, and the Division of Emergency Management will conduct coordinated programs annually to acquaint the news media with the radiological emergency plans and procedures for the Levy Nuclear Plant. Information on radiation and the points of release of public information during an emergency will be presented.

C. Emergency News Releases

Dissemination of information to the public and the news media will be coordinated by the public information officers from the licensee, State Division of Emergency Management and the Marion, Levy, and Citrus County Boards of County Commissioners. These individuals will obtain information about their respective emergency response activities and

disseminate it to the media. A common center for news releases in the Levy Nuclear Plant area is the Emergency News Center located adjacent to the Emergency Operations Facility of Progress Energy (refer to **Chapter 7** of the State Annex). Refer to Appendix 1 for pre-scripted EAS Messages.

D. Rumor Control

The Marion County Citizen's Information Center will be activated to answer public inquiries during an emergency. The Citizen's Information Center will be located in the county Emergency Operations Center, and will be operated on a 24-hour basis until the emergency has ended. Telephone numbers to call will be provided in media releases disseminated during the emergency.

Upon activation of the county Citizen's Information Center and the Florida Emergency Information Line for Rumor Control, a schedule will be established for the exchange and coordination of information in accordance with established procedures.

IX. Emergency Facilities and Equipment

A. Marion County Emergency Operations Center

The Emergency Operations Center for Marion County is located in the County Sheriff's Office, 692 NW 30th Avenue, Ocala. The alternate Emergency Operations Center for Marion County will be the Marion County Fire Rescue Operations Center in Ocala. The location of the Emergency Operations Center is shown in **Figure 5**.

Staffing of the Emergency Operations Center will include, but not be limited to, representatives from the following agencies:

1. Marion County Board of County Commissioners
2. Marion County Department of Emergency Management
3. Marion County Sheriff's Department
4. Marion County Emergency Medical Services
5. Marion County School Board
6. Marion County Health Department
7. Marion County Road Department
8. Progress Energy, if requested
9. The Department of Health (State Emergency Support Function 8)
10. Other organizations, as needed

The Marion County Emergency Operations Center will be activated by the Emergency Operations Director, or designee, upon receipt of a Site Area Emergency notification. The Emergency Operations Center may be activated at the Alert emergency class upon the direction of the Chairperson, Marion County Board of County Commissioners, if the situation warrants. Activation of the Emergency Operations Center will involve immediate staffing of designated personnel and notification of emergency response personnel who will be placed on standby status, in accordance with established county procedures. Emergency equipment and supplies are listed in **Figure 6**.

B. Licensee Emergency Operations Facility

Progress Energy's Emergency Operations Facility is located on West Venable Street in Crystal River, Florida, adjacent to the Crystal River airport. The Emergency Operations Facility is also used for emergency response to support the Crystal River 3 Nuclear Plant. The location of the Emergency Operations Facility is shown in **Figure 5**.

The licensee will activate the Emergency Operations Facility upon declaration of a Site Area Emergency or General Emergency, or as emergency conditions warrant. Representatives from the State, Marion, Levy, and Citrus counties will be dispatched to the Progress Energy Emergency Operations Facility for decision making involving protective action decisions.

C. Emergency News Center

An Emergency News Center with accommodations for media representatives will be located adjacent to the licensee's Emergency Operations Facility. The Emergency News Center is also used for emergency response to support the Crystal River 3 Nuclear Plant. Public Information Officers from the licensee, State, Marion County, Levy County and Citrus County will report to the Emergency News Center upon notification of a Site Area Emergency or General Emergency, or for an Alert, if conditions warrant. The location of the Emergency News Center is shown in **Figure 5**.

The Emergency News Center is the primary location for releasing information to the news media. At this location, public information staff (including technical experts) from the utility, state and counties will provide news releases. Official spokespersons from each organization will conduct periodic press conferences as conditions warrant (refer to **Chapter 7** of the State Annex).

D. Evacuation Shelters

1. Marion County

Locations of facilities in Marion County, which could be used to provide temporary shelters for evacuees from the 10-mile Emergency Planning Zone, are shown in **Figure 7**.

E. Radiological Facilities

1. Marion County

A radiological monitoring and wash down station will be established to inspect and decontaminate emergency vehicles leaving an evacuation area. The Marion County emergency washdown facility will be located as shown on **Figure 7**. The station will be staffed by the Volunteer Fire Department, and will be equipped with a fire pumper truck to assist in decontamination. Staff for the monitoring and wash down station will be sufficiently trained and will receive periodic refresher training.

Marion County will maintain radiological emergency response kits located in the EOC. Marion County will inventory and inspect radiological monitoring equipment after each exercise and at least quarterly to assure that they are operational. Local operability checks will be performed on all monitoring equipment at least once each calendar quarter and after each use.

Instrument calibration will be performed per vendor frequency recommendations.

Defective radiological monitoring instruments will be exchanged by the State Department of Health's Radiological Instruments Maintenance and Calibration Facility in Orlando.

F. Local Resources to Support the Federal Emergency Response

Federal emergency response agencies dispatched to the Levy Nuclear Plant emergency area will locate in close proximity. Federal government Public Information Officers will be located with the utility, State and local Public Information Officers at the Emergency News Center. State and local emergency personnel will assist the Federal response agencies in establishing a multiple agency coordination system (MACS).

X. Accident Assessment

Marion County does not have the necessary monitoring equipment or trained radiological health personnel to assess the effects of a radiological emergency at the Levy Nuclear Plant.

The Department of Health will be responsible for offsite radiological accident assessment (see **Chapter 9** of the State Annex).

Progress Energy has agreed to provide offsite monitoring and advise the risk counties of initial accident assessment until the Department of Health's State Emergency Response Team personnel arrive and are operational at their assigned locations in the field and at the licensee's Emergency Operations Facility. Marion County will utilize their limited monitoring resources in accordance with established procedures to support monitoring activities on an interim basis.

Should it become necessary to dispatch the Department of Health's survey teams to the affected off-site area, the Mobile Emergency Radiological Laboratory will be dispatched to its berthing site in the Levy Nuclear Plant area, in accordance with the Department of Health's established procedures. When the Department of Health's Bureau of Radiation Control field monitoring teams are deployed and the Mobile Emergency Radiological Laboratory is in its assigned location, the Mobile Emergency Radiological Laboratory will be the primary point for analysis and receipt of all off-site field monitoring data and sample media for accident assessment.

When the survey teams are deployed and the Mobile Emergency Response Laboratory is in its assigned location, accident assessment will be made based

on field monitoring results, the current meteorological conditions, plant condition, plant prognosis, and any utility released information. Data collected in the field will be transmitted to the Emergency Operations Facility to be evaluated by the Operations Officer, Department of Health. These evaluations will be provided to the State Coordinating Officer or designee at the Emergency Operations Facility for use in decision-making, and as a basis for recommendations for protective actions. Summaries and recommended protective actions will be forwarded to the State EOC and respective counties.

Monitoring of the affected area(s) and recommendations of protective actions will continue until radiation levels have decreased to the point that recovery and reentry actions are considered safe.

Marion County will provide monitoring teams for monitoring and emergency wash down stations, reception centers and shelters in their county.

XI. Radiological Exposure Control

Emergency workers will be issued direct-read and permanent record dosimeter badges prior to entering any area suspected of radioactive contamination, and given instructions on assembly, wear position and record keeping, in accordance with procedures outlined in **Chapter 11** (Protective Response) of the State Annex and with established county procedures. Personnel performing emergency service functions inside the radiation hazard area will read direct-read dosimeters at 30-minute intervals and report accumulated exposure to their supervisor every six hours and when readings reach 100mR and 500mR as outlined in **Chapter 10** (Radiological Exposure Control) of the State Annex. The supervisor will be responsible for maintaining dose records that will be reported to the Marion County Emergency Operations Center at least every 6 hours. It will be the joint responsibility of the emergency worker and his supervisor to assess the projected dose and interpret or extrapolate the individual's potential or projected exposure.

The Department of Health Bureau of Radiation Control exposure limit is 500mR per day and 5000mR for the duration of the emergency. Any person whose exposure has reached 500mR or more will be directed to leave the area and report to a personnel monitoring station for appropriate actions. The worker's supervisor will report the exposure to the Radiological Emergency Planning Coordinator/Radiation Officer, who will then report the worker's name and reading to the Radiological Safety Officer and Department of Health personnel.

Should it become necessary to expose emergency workers to radiation doses in excess of Environmental Protection Agency Protective Action Guides, the Chairperson, Marion County Board of County Commissioners, will make the decision after consultation with the Department of Health, Operations Director and County Health Department. Should the Chairperson be absent, the next Commissioner in line will make the decision.

The use of KI has been pre-approved by the State Health Officer for state and county radiation workers. Based on actual releases of radioactive iodine, the DOH Operations Officer will direct KI be taken by state radiation workers and will notify the counties of the decision. The decision to administer potassium iodide (KI) to county emergency workers will then be made by the Chairperson of the Board of County Commissioners or designee in accordance with established

county procedures. During a rapidly escalating incident, where releases of radioactive iodine are imminent or have occurred, the county health officers may recommend county radiation workers take KI before consultation with the DOH Operations Officer. The County Health Officer will be available for consultation. KI for thyroid blocking is considered to be the proper response for emergency workers when they are involved in a nuclear emergency where the projected radiation dose to the thyroid from radioactive iodine is >5 Rem. The County Health Officer is responsible for proper storage, periodic inspection and distribution of KI in accordance with established county procedures and State of Florida Department of Health Standard Operating Procedure 7.

Personnel who are injured in the area of a radiological emergency will be treated as possible contamination victims until positive determination of contamination can be made. Emergency medical personnel will follow established county procedures to prevent the spread of contamination on an injured person, to medical support personnel and medical equipment until the injured person can be transported to Seven Rivers Regional Medical Center or Citrus Memorial Health Systems for treatment of the contaminated injury. Possible or actual radiological contamination should not delay treatment of severely injured victims.

At the termination of the emergency, radiation exposure records will be prepared for each emergency worker who worked inside the radiation hazard area in accordance with **Chapter 10** (Radiological Exposure Control) of the State Annex. These records will be forwarded through the Marion County Emergency Management Director to the State Division of Emergency Management Radiological Safety Officer who will prepare a permanent record and return one copy to the County director. The permanent record Dosimeter Badges will be collected and returned to the State Division of Emergency Management Radiological Safety Officer. Currently the Florida Department of Health is the contractor who is responsible for supplying and reading the Dosimeter Badges. The contractor shall also provide quality assurance and verification of Dosimeter Badge readings. A printout of Dosimeter Badge readings will be provided to Marion County Emergency Management agencies and the Department of Community Affairs, Division of Emergency Management in Tallahassee, Florida.

Dosimeter Badges will be stored at the County Emergency Operations Centers. Procedures have been established for routine exchange and servicing of the Dosimeter Badges by the contractor during non-emergency periods.

XII. Protective Response

Protective actions which may be initiated to provide for the safety of the public may include any or all of the following: Notification of affected residents and transients to seek immediate in-place shelter, evacuation of transients and residents within designated Zone's exposed to a plume of radioactive gases to shelter areas outside the 10-mile Emergency Planning Zone, control of entrance into affected areas, implementation of procedures to prevent the consumption and distribution of contaminated food and water supplies and implementation of procedures to decontaminate persons exposed to radiation.

A. Protective Action Guides

The DOH personnel will use the Environmental Protection Agency's Protective Action Guide Manual 400-R-92-001 as guide for recommending protective actions based on their analysis. The Department of Health Operations Officer will provide these recommendations to the Governors Authorized Representative. The decision to implement protective action recommendations will be made jointly by the Chairpersons, Boards of County Commissioners, and the Governor or the State Coordinating Officer or designee. If time does not permit state involvement in initial decision making, the decision to take protective actions may be made by the Chairpersons, Boards of County Commissioners, or their designated alternates. County Emergency Management/Operations Directors will implement protective actions.

Predetermined protective actions will be taken when the projected dose rate at any place and time appear to be at or above those recommended in Protective Action Guidelines identified in **Chapter 11** (Protective Response) of the State Annex.

B. Potassium Iodide

Potassium iodide can be given to emergency workers in doses to saturate the human thyroid gland with stable iodide and thus prevent the uptake of inhaled or ingested radioactive iodide. Potassium iodide does not protect other parts of the body to radiation exposure and does not protect the thyroid from external radiation. The greatest percentage of thyroid protection occurs when potassium iodide is administered at or about the time of exposure. Potassium iodide will be furnished for emergency workers and difficult to move people in accordance with established county procedures and policies and with the Department of Health, Standard Operating Procedures and **Chapter 10** (Radiological Exposure Control) and **Chapter 11** (Protective Response) of the State Annex.

Potassium iodide will be issued to members of the general public, in accordance with the Department of Health, Standard Operating Procedures and **Chapter 10** (Radiological Exposure Control) and **Chapter 11** (Protective Response) of the State Annex. To provide for issuance of potassium iodide to members of the public, doses have been procured. These doses are strategically located near nuclear power plant sites. During an emergency, if stocks at one or more locations run low, additional stocks from other sites will be brought in. The issuance of

potassium iodide will be authorized by the Department of Health's Bureau of Radiation Control Operations Officer or designee.

C. Control of Entrance into Affected Areas

No re-entry will be authorized without concurrence of the State Coordinating Officer or designee and the Chairperson of the Marion County Commissioners or their designees. This decision will be based upon the advice of the Department of Health and the County Health Department. Cleared areas will be opened only when clearly definable boundaries are available. County law enforcement personnel will provide support to control entrance into the affected area.

D. Sheltering (In-Place)

The decision to implement taking shelter indoors instead of evacuation will be made by the Chairperson of the Board of County Commissioners through the Marion County Director of Emergency Management. This decision will be made based upon the recommendation of the Department of Health, and/or the County Health Department, and/or Progress Energy (prior to activation of the Emergency Operations Facility). The notification to take shelter indoors will be issued by radio broadcast, emergency personnel using loudspeakers, and through the sounding of the siren alert. Protective actions for special needs facilities will be given separate consideration.

E. Evacuation

Evacuation of any Marion County endangered area within the 10-mile Emergency Planning Zone will be directed by the Chairperson, Board of County Commissioners. If the area has been declared a disaster area under provisions of Chapter 252, Florida Statutes, the Governor or the State Coordinating Officer or designee will direct the evacuation jointly with the Marion County Chairperson of the Board of County Commissioners based on consultation with the Department of Health.

If the order to evacuate is given, evacuation may be required for all or part of the 10-mile Emergency Planning Zone designated by sector and utilizing geographic boundaries. Citizens residing in a sector/zone which is ordered to evacuate will be instructed to proceed according to the evacuation plan for that zone. The population distribution by sector/zone within the 10-mile emergency planning zone is shown in **Figure 8**.

Law enforcement officers from Levy County, assisted by Citrus County and Marion County law enforcement officers and State Emergency Support Function 16 (Law Enforcement) will establish traffic control points along evacuation routes to expedite the flow of traffic during the evacuation process. Barricades will be utilized at those points not manned by law enforcement personnel. Entrances to the affected area will be blocked to all traffic except for school buses, ambulances, fire-rescue vehicles or other emergency vehicles being used in the evacuation.

F. Evacuation Areas and Route Description

Population Data and Evacuation Time Estimates

In 2007 Progress Energy hired the company KLD Associates to develop a study to gather population data, traffic capacity, and evacuation time estimates for the Levy Nuclear Plant 10-mile EPZ. This data will be used by the Chairperson of the Board of County Commissioners or designee and the Emergency Management Director or designee to determine the appropriate Protective Action Decision.

Refer to **Appendix 2** for a detailed description of Levy Nuclear Plant Evacuation Time Estimates. Refer to **Figures 9 and 10** for evacuation routes and times to clear zones.

The Levy Nuclear Plant 10-mile Emergency Planning Zone has been sectioned off by geographical boundaries. These boundaries are represented by the term "zone." The following table lists the 17 sets of possible Protective Action Recommendations and information describing the one Marion County zone protective actions that would or could be implemented within the 10-mile EPZ during a radiological incident at the Levy Nuclear Plant. Refer to **Figure 11** for populations in each zone.

Protective Action Zone Information

PAR	MARION		CITRUS		LEVY	
	Evacuate	Shelter	Evacuate	Shelter	Evacuate	Shelter
1	None	None	None	None	L5, L6	None
2	None	M9	None	C1, C3, C4	L5, L6	L7, L8
3	M9	None	C1, C3, C4	None	L5, L6, L7, L8	None
4	M9	None	C1, C3, C4	None	L5, L6	None
5	None	None	C1, C3, C4	None	L5, L6, L7, L8	None
6	M9	None	None	None	L5, L6, L7, L8	None
7	M9	None	None	None	L5, L6	None
8	M9	None	C1, C3, C4	None	L5, L6	L7, L8
9	None	M9	C1, C3, C4	None	L5, L6, L7, L8	None
10	M9	None	None	C1, C3, C4	L5, L6, L7, L8	None
11	M9	None	C1, C3, C4	None	L5, L6	L7, L8
12	None	M9	None	C1, C3, C4	L5, L6, L7, L8	None
13	None	M9	C1, C3, C4	None	L5, L6	L7, L8
14	None	None	C1, C3, C4	None	L5, L6	None
15	None	None	None	C1, C3, C4	L5, L6	L7, L8
16	None	M9	None	C1, C3, C4	L5, L6	None
17	None	M9	None	None	L5, L6	L7, L8

Refer to the following Zone Description and associated Evacuation Routes when using the above Table.

Marion County

Zone M9

Out approximately 5 – 10 miles east/northeast of the Progress Energy Levy Site Complex as described by the following:

Northwestern, Northern, and eastern boundaries – The area of Rainbow Lakes Estates US Rt. 41

Southeastern Boundary – US Rt. 41 to include all areas of Dunnellon City Limits west of US Rt. 41

Western Boundary – Marion/Levy County line

Southern Boundary – Lake Rousseau and Withlacoochee River

This Zone includes the following cities, neighborhoods, or areas:

- Rainbow Lakes Estates
- Rainbow's End
- The area of Rainbow Springs west of Rt. 41
- The area of Dunnellon City Limits west of Rt. 41

Evacuees should proceed north on Rt. 41 to Williston.

G. Evacuation for Special Needs

1. Mobility Impaired Residents

Marion County mobility impaired residents who require special evacuation assistance will be registered with Marion County Department of Emergency Management. If evacuation is necessary, these residents will be notified and transported by County school buses and ambulances if needed to the reception and shelter centers listed on **Figure 7**. Those requiring hospitalization will be transported to Citrus Memorial Health Systems, Nature Coast Regional Hospital, or Munroe Regional Medical Center in Ocala, Florida. Those who have not registered for special evacuation assistance will be instructed to call the Marion County Emergency Management Office.

2. Schools

Children in day care centers within the affected Marion County area will be evacuated by school buses to the reception and shelter centers listed on **Figure 7**.

Children in public schools within the affected area will be evacuated by school buses to locations as follows:

- Marion County: Dunnellon Middle School, Dunnellon Christian Academy, and Romeo Elementary School to the reception and shelter centers listed on **Figure 7**.

Parents will be advised via the broadcast media where to pick up their children. Additional information on evacuation procedures is published and distributed annually through the county school system.

3. Hospitals

There are no hospitals located in Marion County that are within the 10-mile Emergency Planning Zone.

The Seven Rivers Regional Medical Center located in Levy County will be evacuated by the hospital administrator and Nature Coast Emergency Medical Services with assistance, if needed, from the Department of Community Services. In good weather, with light to medium loads and readily available ambulances, evacuation of the facility would require three hours. With adverse weather conditions, evacuation time would be five hours and forty-five minutes. The patients will be evacuated to Marion County's Munroe Regional Medical Center in Ocala, Florida.

4. Group Homes

There are no Group Homes located in Marion County that are within the 10-mile EPZ.

5. Incarceration Facilities

If required, inmates of facilities within the 10-mile Emergency Planning Zone will be transported to facilities outside the Emergency Planning Zone by a combined effort of the Sheriff's Office and the affected police departments. Presently, Marion County has no incarceration facilities within the 10-mile Emergency Planning Zone.

6. Offshore Areas

There are no offshore areas applicable to Marion County.

H. Monitoring and Decontamination

Monitoring stations and wash down sites will be set up in predetermined locations to inspect the evacuation traffic for radioactive contamination and to decontaminate vehicles as identified in **Figure 7**. Emergency traffic control personnel will divert traffic when necessary to ensure the inspection of vehicles in the event that all stations cannot be utilized.

Monitoring will be performed by trained personnel utilizing CD V-777-1 (or equivalent) emergency response kits in accordance with established county procedures. The limits of contamination that determine the need for decontamination of personnel and vehicles are listed in **Chapter 10, Figure 10-2** (Radiological Exposure Control) of the State Annex.

Uncontaminated passengers in uncontaminated vehicles will be instructed to proceed to designated reception centers and shelters.

1. Vehicle Decontamination

Vehicles determined to be contaminated will be directed from monitoring stations to adjacent wash down facilities and will be decontaminated by trained personnel. Emergency personnel will follow established county procedures to decontaminate exterior vehicle surfaces. Vehicles which cannot be decontaminated to acceptable radiation levels or vehicles that are contaminated on the interior will be impounded under the direction of the County Sheriffs and Health Departments. Transportation to shelters will be provided for the occupants of the contaminated vehicles.

2. Personnel Decontamination

Evacuees inspected at monitoring and washdown stations in Marion County who are suspected of being contaminated will be decontaminated at that location. A personnel decontamination station will be set up adjacent to the monitoring and wash down stations shown on **Figure 7**. Monitors will thoroughly check the evacuees for radiation levels in excess of the established limits. Contaminated evacuees will shower and exchange contaminated clothing for uncontaminated clothing.

The names, addresses and contamination information of evacuees requiring decontamination will be recorded and submitted to the Marion County Health Department, which will forward the data to the Radiological Safety Officer and the Florida Department of Health.

3. Waste Disposal

Tools and equipment will be monitored and all contaminated tools, clothing, equipment and other material found to be contaminated will be placed in plastic bags, tagged, and placed in suitable containers for later disposition, under the direction of the County Health Department and the Florida Department of Health.

Water used for tool and vehicle decontamination will be allowed to run into suitable collection ditches, holding ponds, and other secure areas. Areas used for decontamination will be monitored for residual contamination. Any site found to retain contamination will be sealed off under the control of the County Health and law enforcement agencies and decontaminated with the assistance of the Department of Health personnel and other appropriate federal and state agencies.

I. Reception and Care

1. Registration

Registration of evacuees will be conducted at all reception centers/shelters in Marion County. Registration personnel will use shelter registration forms in accordance with established county procedures. Registration data will be tabulated and submitted to the County Emergency Operations Centers and the State Emergency Operations Center.

2. Reception

Reception centers/registration centers will be established to provide food, medical and health care services, and temporary shelter to evacuees. The locations for these centers are shown in **Figure 7**. After a previously agreed upon length of stay at a reception center, evacuees may be relocated to other shelter facilities.

J. Shelter Facilities

Designated shelter facilities in Marion County that are at least five miles outside of the 10-mile Emergency Planning Zone are shown in **Figure 7**. The facilities will be used to shelter persons with special needs.

K. Control of Foodstuffs

A radiological emergency at the Levy Nuclear Plant can adversely affect the safety of the food supply for humans and livestock. Human and animal foods may become contaminated. The health and productivity of farm livestock may be adversely affected through exposure to radioactive contamination. The physical boundary of these adverse situations cannot be defined in advance of an emergency; however, for the purpose of this plan, a geographical area within a circle having a 50-mile radius from the Levy Nuclear Plant will be defined as the Ingestion Pathway Zone.

In the event of a radiological emergency at the Levy Nuclear Plant, Emergency Support Function 8 and its support agencies will continuously monitor the area within the 50-mile Ingestion Pathway Zone. Emergency Support Function 8 and its support agencies will advise the agricultural community of protective actions necessary to reduce the risk of contamination of farm livestock and farm products. Monitoring and laboratory analysis will be performed to determine the degree of contamination to human foods and livestock foods. If necessary, control of the food chain will be initiated and continued until cessation of undesirable conditions.

Emergency Support Function 8 will advise the agricultural community through the affected county's organizations, such as the U.S.D.A., State and County Emergency Boards, of protective and precautionary actions required to reduce the risk of radiological contamination to livestock and farm products.

Emergency Support Function 8 and its support agencies will monitor and conduct laboratory tests of human and animal foods. Recommendations will be made to the State Coordinating Officer or designee and the affected counties for protective actions to be taken and will also:

1. Take steps to prevent the spread of contaminated farm livestock feeds and human foods in the Ingestion Pathway Zone, advise the public on acceptability of foodstuffs for consumption, and determine the degree of protective control needed until unacceptable conditions have ceased.
2. During recovery, continue to evaluate radiological contamination of livestock feeds and human foods in the Ingestion Pathway Zone, advise the public on acceptability of foodstuffs for consumption, and determine the degree of protective control needed until unacceptable conditions have ceased.

3. Test open sources of potable water and recommend protective action to the State Coordinating Officer or designee so the public can be fully informed.

XIII. Medical and Public Health Support

Citrus Memorial Hospital Systems and Seven Rivers Regional Medical Center are the local hospitals where medical services for radiological injuries can be received. Both Hospitals are equipped and staffed to care for individuals with major radiation contamination.

The Department of Health has obtained agreements with Citrus Memorial Hospital Systems and Seven Rivers Regional Medical Center to ensure proper medical services for persons who are injured or become sick during a radiological emergency in the Levy Nuclear Plant site area. Nature Coast Emergency Medical Services will provide ambulance services.

The Nature Coast Regional Hospital and Levy County Health Department will provide general health care for evacuees. Medical response personnel will be dispatched to hosting facilities as needed. Refer to **Chapter 12** (Medical and Public Health Support) of the State Annex for additional information.

XIV. Recovery and Reentry

Decisions to relax protective actions and begin recovery operations will be made jointly by the state and county in accordance with procedures outlined in **Chapter 13** (Recovery and Return) of the State Annex. Evacuees will be allowed to reenter the affected area under the direction of the County Emergency Operations/Management Director, or their designee.

XV. Exercises and Drills

Exercises and drills will be conducted and scheduled in accordance with the guidelines outlined in **Chapter 14** (Exercises and Drills) of the State Annex.

XVI. Radiological Emergency Response Training

The County Emergency Operations/Management Director, or their designee are responsible for assuring that appropriate county emergency response personnel are adequately trained, in accordance with the training levels and standards outlined in **Chapter 15** (Radiological Emergency Response Training) of the State Annex.

In addition, the Radiological Emergency Planner/Coordinator should receive continuous Radiological Planning Course specific training that consist of industry, event or other activity courses deemed appropriate to enhance his or her skills.

XVII. Radiological Emergency Plan Administration

The Marion County Emergency Management Director, through the designation of a REP Coordinator, is responsible for the establishment and maintenance of the Marion County Radiological Emergency Preparedness (REP) Program. He or she will be responsible for the following preparedness activities:

1. STAFFING AND RESOURCES

Assure adequate staff and resources are available to the Marion County Division of

Emergency Management to facilitate implementation of the REP Program.

2. REP COORDINATOR

The designation of a REP Coordinator will implement all aspects of the REP Program, update and improve the program as necessary, review and update the REP Plan and Procedures (SOPs) with its supporting plans and their sources on an annual basis, and keep the Emergency Management Director or designee informed of all information associated with the REP Program.

3. REP COORDINATOR RESPONSIBILITIES

Assure the individual County Emergency Response Agencies accomplish appropriate preparedness activities within their own agencies and coordinate these activities with the **REP Coordinator**.

The **REP Coordinator** is responsible for maintaining, updating, improving and the implementation of the REP Program. He or she is responsible for the following activities:

3.1 Administration

3.1.1 Distribution of this REP Plan and SOPs

Control the distribution of copies of this plan and REP SOPs.

3.1.2 Prompt distribution of Plan updates

Provide for the prompt distribution of amendments and updates of this plan and REP SOPs to each Emergency Response Organization or agency. Revised pages shall be dated and marked to show where changes have been made.

3.1.3 Annual Letter of Certification

Conduct reviews and updates of this plan and the REP Program annually. An "Annual Letter of Certification" will be written to the Florida Division of Emergency Management to testify that the plan is current and the REP Program is compliant with FEMA and DHS Standards.

3.1.4 Submit revisions of this REP Plan to the Florida Division of Emergency Management

Submit revisions of this plan and REP SOPs to the Florida Division of Emergency Management and the Florida Department of Health/Bureau of Radiation Control. The Florida Division of Emergency Management should coordinate the revisions of the plan with appropriate State and Federal agencies. Each revised section should be dated and marked to show where the latest changes have been made. Revisions should also be noted on the Table of Contents.

3.1.5 Coordinate with other Emergency Response Agencies

Coordinate with other County Radiological Emergency Response Agencies to ensure the completeness and correctness of their individual REP SOPs for the applicability of this plan.

- A). All REP SOPs must be reviewed by the REP Coordinator, Emergency Management Director and by the appropriate agency head.
- B). Each REP SOP assigned to an agency shall be reviewed by that agency head. Acknowledgement of the procedure contents shall be documented by the designated authorized agency head by signing the first sheet, (Approval Sheet), of the REP SOP in the space provided.

3.1.6 Update all Emergency Response Agency contact phone numbers at least quarterly.

Continuously monitor for any change in Emergency Response Agency contact phone numbers. The list of numbers should be updated at least quarterly.

3.1.7 Letters of Agreement

Maintain up-to-date Letters of Agreement with appropriate facilities, resources and support organizations. Annual letters of Agreement for Citrus Memorial Hospital, Seven Rivers Regional Medical Center, and Nature Coast EMS are updated annually per the Citrus County Crystal River and Levy Nuclear Plant Radiological Emergency Plan. Separate Letters of Agreement are not needed in the Marion County Radiological Emergency Plan since the functions are the same. No additional medical or emergency sources letters of agreement are needed for this Plan. By virtue of Marion County Emergency Management being associated with the Sheriff's Department no additional law enforcement or county fire letters of agreement are needed. In addition, no non-governmental organizations are needed in support of this Plan.

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Figure 1 – Levy Nuclear Plant 10-Mile Emergency Planning Zone (EPZ)

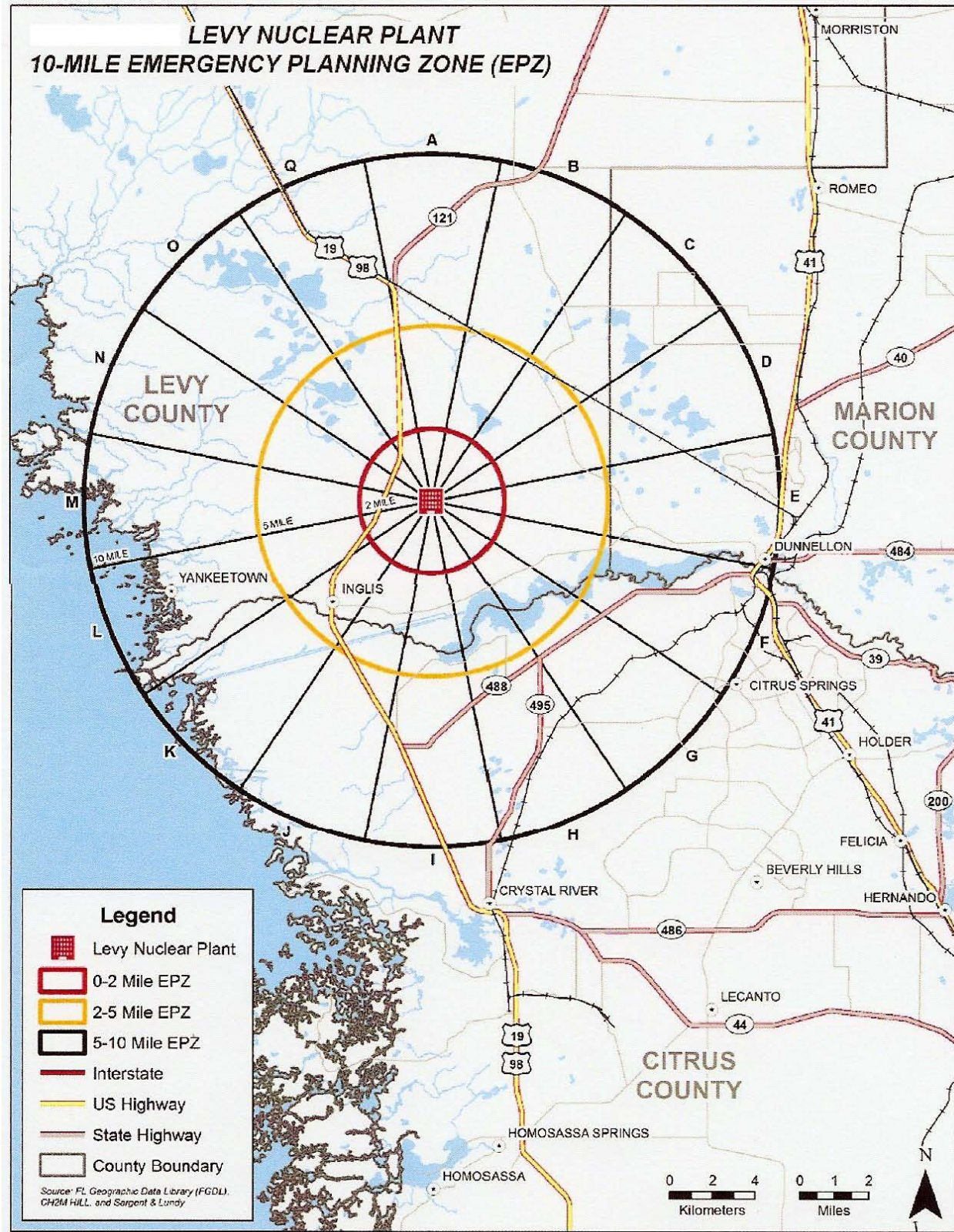


Figure 2 - Levy Nuclear Plant 50-Mile Ingestion Pathway Zone (IPZ)



FIGURE 3: MARION COUNTY PRIMARY/SUPPORT RESPONSIBILITIES

Command and Control	<u>Primary:</u> Board of County Commissioners and Department of Emergency Management <u>Support:</u> State of Florida
Emergency Alert and Notification	<u>Primary:</u> Department of Emergency Management <u>Support:</u> State of Florida
Communications	<u>Primary:</u> Department of Emergency Management <u>Support:</u> Sheriff's Office, Municipal Police Department, and Road Department
Accident Assessment	<u>Primary:</u> State of Florida and Licensee <u>Support:</u> Department of Emergency Management
Protective Response	<u>Primary:</u> Board of County Commissioners and Department of Emergency Management <u>Support:</u> City Fire Department, State of Florida, and Licensee
Public Alert and Notification	<u>Primary:</u> Board of County Commissioners <u>Support:</u> Department of Emergency Management, Sheriff's Office, Municipal Police Department, Road Department, City Fire Department
Public Information	<u>Primary:</u> Department of Emergency Management <u>Support:</u> Board of County Commissioners, State of Florida and Licensee
Radiological Exposure Control	<u>Primary:</u> Department of Emergency Management and State of Florida <u>Support:</u> Board of County Commissioners

FIGURE 3: (continued)

Decontamination	<u>Primary:</u> City Fire Department <u>Support:</u> Department of Emergency Management
Control of Access to the Evacuated area	<u>Primary:</u> Sheriff's Office <u>Support:</u> Municipal Police Department and State of Florida
Field Monitoring and Sampling	<u>Primary:</u> State of Florida <u>Support:</u> Licensee and Department of Emergency Management
Fire and Rescue	<u>Primary:</u> City Fire Department
Emergency Medical Services	<u>Primary:</u> Department of Human Services <u>Support:</u> City Fire Department, Health Department and State of Florida
Law Enforcement	<u>Primary:</u> Sheriff's Office <u>Support:</u> Municipal Police Department and State of Florida
Transportation	<u>Primary:</u> School Board <u>Support:</u> Hospital and Department of Human Services
Food Quality	<u>Primary:</u> State of Florida
Potable Water Quality	<u>Primary:</u> State of Florida
Shelter and Sanitation	<u>Primary:</u> School Board <u>Support:</u> Health Department, Department of Human Services and American Red Cross
Social Services	<u>Primary:</u> Health Department and Department of Human Services <u>Support:</u> State of Florida
Road Passage and Maintenance	<u>Primary:</u> Road Department <u>Support:</u> State of Florida

FIGURE 3: (continued)

Security

Primary: Sheriff's Office

Support: Municipal Police Department,
Road Department and State of Florida

Traffic Control

Primary: Sheriff's Office

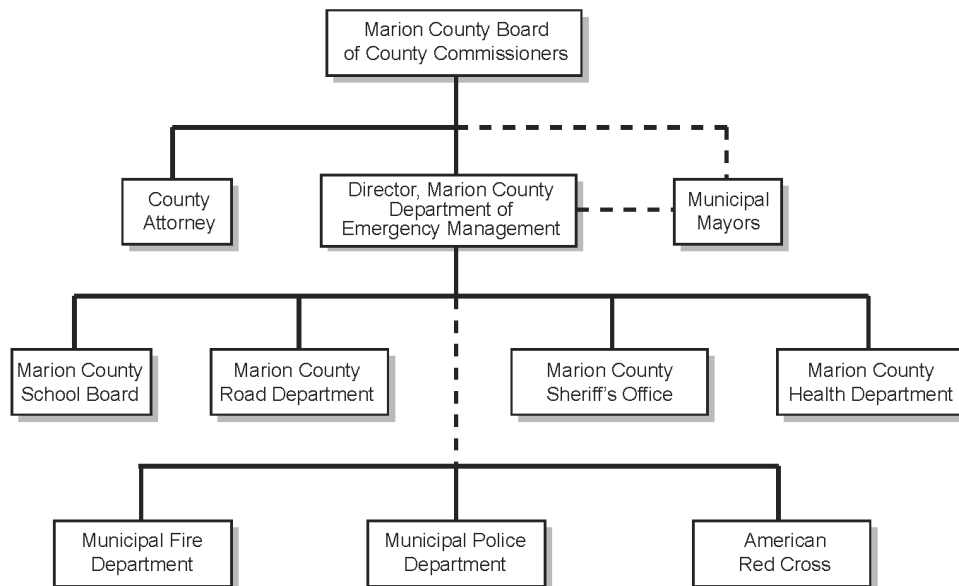
Support: Municipal Police Department
and State of Florida

Recovery and Reentry

Primary: State of Florida

Support: Board of County
Commissioners and Department of
Emergency Management

FIGURE 4: MARION COUNTY ORGANIZATIONAL CHART



Command and Control: _____
 Coordination: _____

Figure 5 – Emergency Operations Centers and Facilities

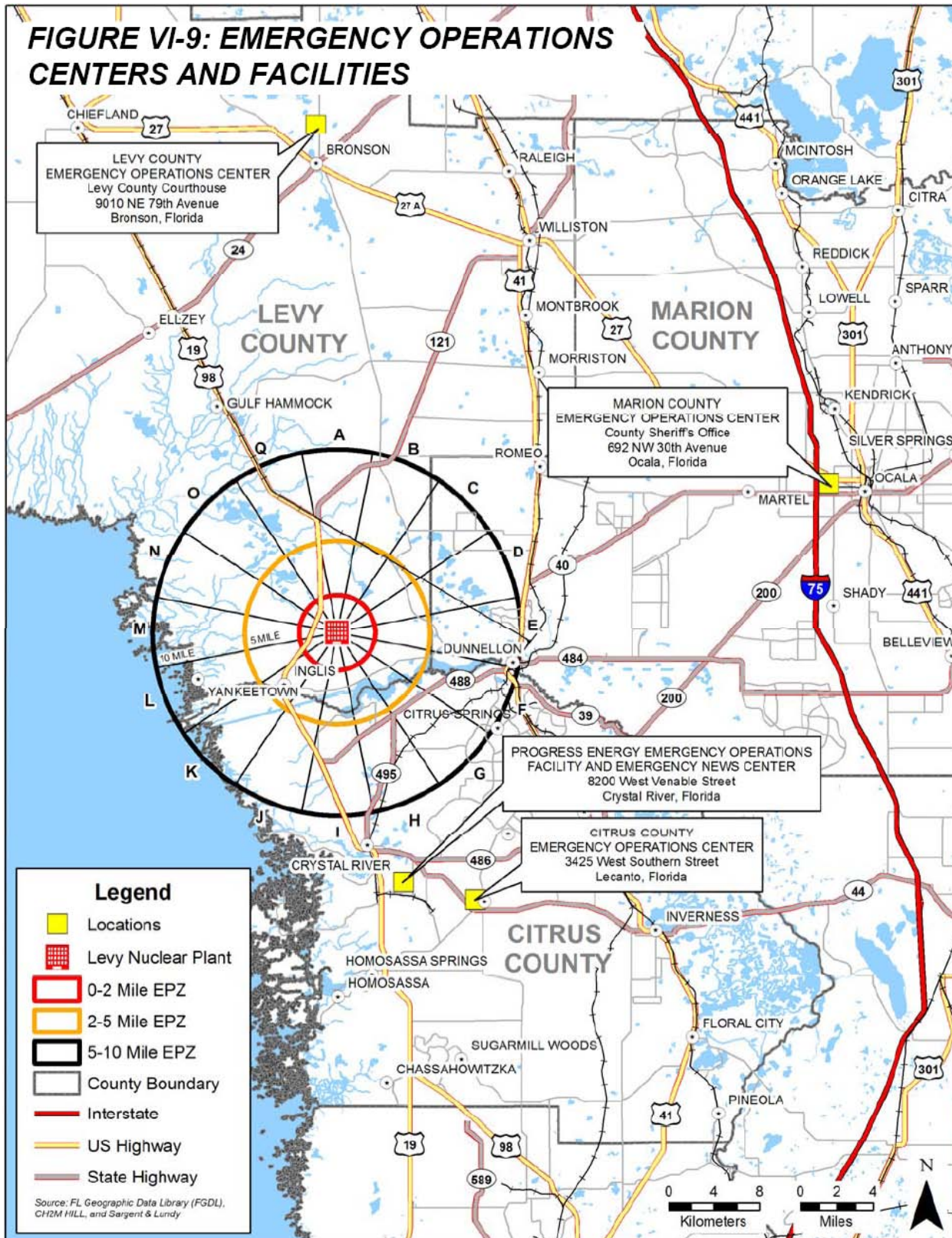


FIGURE 6: MARION COUNTY RADIOLOGICAL EMERGENCY EQUIPMENT AND SUPPLIES

RADIOLOGICAL MONITORING EQUIPMENT

(50) CD V-777-1 Radiological emergency response kits which include:

- 3733 CD V-700 Low range survey meter
- 1 - CD V-715 High range survey meter
- 6 - CD V-742 High range dosimeters
- 1 - CD V-750 Dosimeter charger

(10) CD V-700 Pancake probe converted

(100) CD V-138 Low range dosimeters (0-200 mR)

(120) CD V-742 High range dosimeters (0-200 R)

(40) CD V-730 Medium range dosimeters (0-20 R)

(100) Dosimeter Badges

PROTECTIVE EQUIPMENT:

All weather protective clothing

COMMUNICATIONS EQUIPMENT:

Hot Ring Down dedicated telephone system
Local Government Radio-Frequency Modulation
Commercial telephone
Commercial telephone for Emergency Use Only
Fire Department radio system
Sheriff's Office high frequency single side band
Emergency Medical Service Radio
Emergency Satellite Communication System

EMERGENCY SUPPLIES:

Decontamination equipment and supplies
Food
First Aid Kits

Figure 7 - Marion County Reception Centers, Shelters and Monitoring/Washdown Stations



FIGURE 7: (continued)

<u>MARION COUNTY SHELTERS and RECEPTION CENTERS</u>	<u>CAPACITY</u>
1. Dunnellon High School 10055 SW 180 th Avenue Road Dunnellon, FL 34432	750
2. Horizon Academy 365 Marion Oaks Drive Ocala, FL 34473	755
3. Marion County Sheriff's Office Interim Building 692 NW 30 th Avenue Ocala, FL 34478	250
4. West Port High School 3733 SW 80 th Avenue Ocala, FL 34481	500*

MARION COUNTY MONITORING/WASHDOWN STATIONS

1. Intersection of HWY 40 and HWY 41/45
2. Marion County Fire Rescue Station #25
Lake Tropicana, 17700 SW 36th Loop
Dunnellon, FL
3. Marion County Fire Rescue Station #31
11240 SW, Highway 484
Dunnellon, FL

- * Special Annotations Dependent on Facility
Shelter for mobility impaired residents who require special evacuation. Capacity is 122 special needs.
- * Designated shelter for all Day Care Centers and School relocations in the 10-mile Emergency Planning Zone

CAPACITY – Capacity so as not to interfere with normal operations

FIGURE 8: POPULATION DISTRIBUTION, LEVY NUCLEAR PLANT 10-MILE EPZ

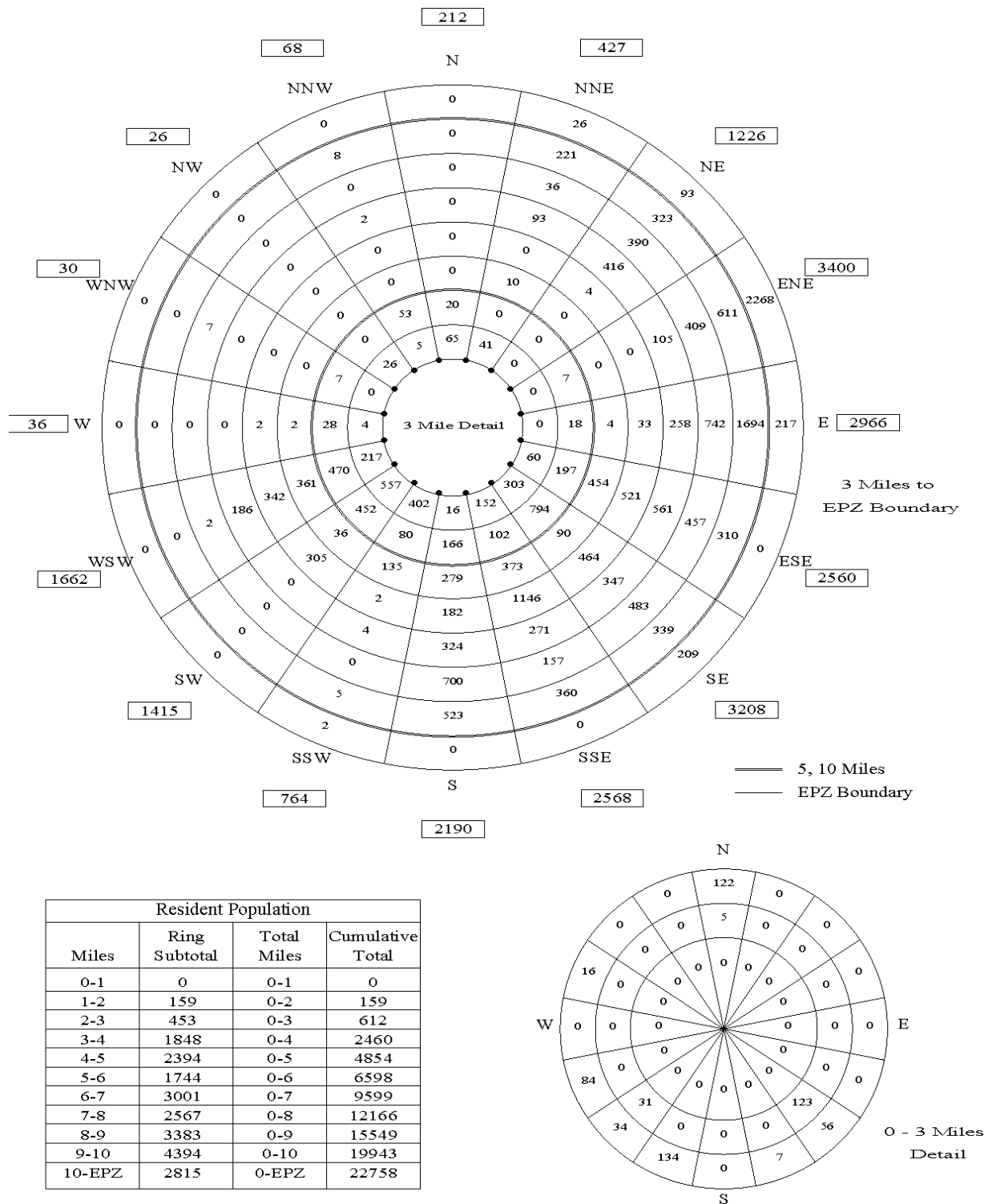


Figure 9 – Evacuation Routes, Levy Nuclear Plant 10-Mile Emergency Planning Zone

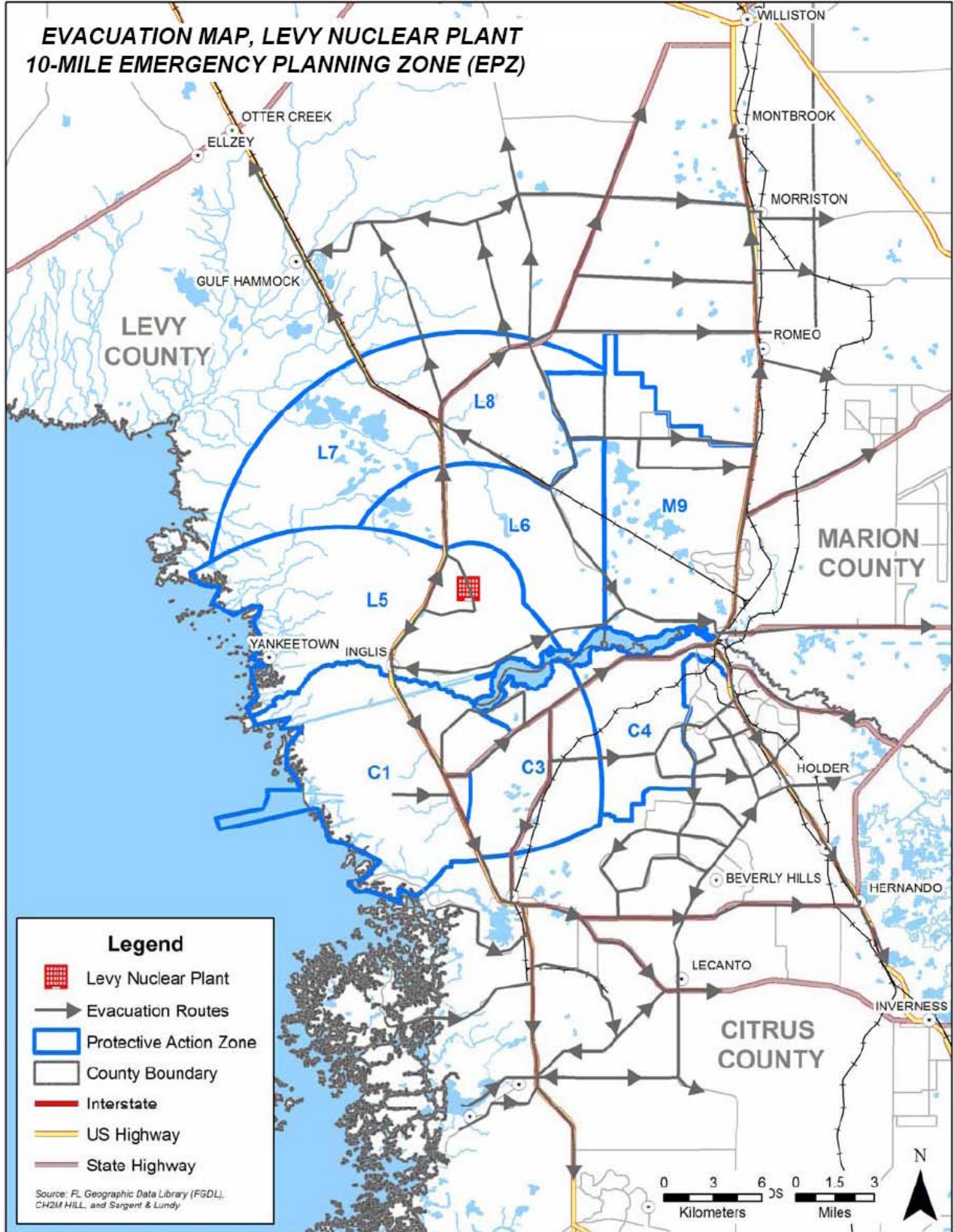


FIGURE 10: TIME TO CLEAR THE INDICATED AREAS OF 95 PERCENT OF THE AFFECTED POPULATION

	Summer		Summer		Summer		Winter			Winter		Winter		Summer
	Midweek		Weekend		Midweek Weekend		Midweek			Weekend		Midweek Weekend		Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	(11)	Scenario:	(12)
Region	Midday		Midday		Evening	Region	Midday			Midday		Evening	Region	Midday
Wind Toward:	Good Weather	Rain	Good Weather	Rain	Good Weather	Wind Toward:	Good Weather	Rain	Ice	Good Weather	Rain	Good Weather	Wind Toward:	New Plant Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01 2-mile ring	2:10	2:20	1:50	1:50	2:10	R01 2-mile ring	2:10	2:10	2:10	1:50	1:50	2:20	R01 2-mile ring	2:35
R02 5-mile ring	2:20	2:20	2:40	2:50	2:10	R02 5-mile ring	2:30	2:30	2:30	2:00	2:00	2:10	R02 5-mile ring	3:30
R03 Entire EPZ	2:55	3:00	2:40	2:50	2:30	R03 Entire EPZ	3:00	3:05	3:20	2:30	2:40	2:30	R03 Entire EPZ	4:00
2-Mile Ring and Downwind to 5 Miles														
R04 N, NW, NNW	2:20	2:20	2:40	2:50	2:10	R04 N, NW, NNW	2:30	2:30	2:30	1:50	1:50	2:10	R04 N, NW, NNW	3:40
R05 NNE	2:20	2:20	1:50	1:50	2:10	R05 NNE	2:20	2:20	2:20	1:50	1:50	2:10	R05 NNE	3:10
R06 NE, ENE	2:20	2:20	2:00	2:00	2:10	R06 NE, ENE	2:20	2:20	2:30	2:00	2:00	2:10	R06 NE, ENE	3:10
R07 E	2:30	2:30	2:00	2:00	2:10	R07 E	2:30	2:30	2:30	2:00	2:00	2:10	R07 E	3:10
R08 ESE	2:30	2:30	2:00	2:00	2:10	R08 ESE	2:30	2:30	2:30	2:00	2:00	2:10	R08 ESE	2:40
R09 SE	2:30	2:30	2:10	2:10	2:20	R09 SE	2:40	2:40	2:40	2:10	2:10	2:20	R09 SE	2:40
R10 SSE, S	2:30	2:30	2:00	2:00	2:20	R10 SSE, S	2:30	2:30	2:30	2:00	2:00	2:20	R10 SSE, S	2:35
R11 SSW, SW	2:20	2:20	2:00	2:00	2:20	R11 SSW, SW	2:20	2:20	2:20	2:00	2:00	2:20	R11 SSW, SW	2:30
R12 WSW, W, WNW	2:20	2:20	2:40	2:50	2:20	R12 WSW, W, WNW	2:30	2:30	2:30	2:00	2:00	2:20	R12 WSW, W, WNW	3:10
5-Mile Ring and Downwind to EPZ Boundary														
R13 N, NNE	2:50	2:50	2:30	2:40	2:30	R13 N, NNE	2:50	2:50	3:05	2:30	2:30	2:30	R13 N, NNE	3:40
R14 NE	2:55	3:00	2:30	2:45	2:30	R14 NE	2:55	3:05	3:20	2:30	2:40	2:30	R14 NE	4:00
R15 ENE, E	2:55	3:00	2:30	2:45	2:30	R15 ENE, E	2:55	3:05	3:20	2:30	2:40	2:30	R15 ENE, E	4:00
R16 ESE	2:50	2:55	2:40	2:40	2:30	R16 ESE	2:50	3:00	3:10	2:30	2:30	2:30	R16 ESE	3:50
R17 SE	2:50	2:50	2:40	2:40	2:30	R17 SE	2:50	3:00	3:10	2:20	2:30	2:30	R17 SE	3:45
R18 SSE	2:50	2:50	2:40	2:40	2:30	R18 SSE	2:50	3:00	3:10	2:20	2:30	2:30	R18 SSE	3:45
R19 S	2:40	2:40	2:40	2:40	2:20	R19 S	2:50	2:50	2:50	2:10	2:10	2:20	R19 S	3:20
R20 SSW	2:50	2:50	2:40	2:50	2:20	R20 SSW	2:50	2:50	2:50	2:20	2:20	2:20	R20 SSW	3:30
R21 SW	2:40	2:40	2:40	2:50	2:20	R21 SW	2:40	2:40	2:40	2:10	2:10	2:20	R21 SW	3:30
R22 WSW	2:40	2:40	2:40	2:50	2:20	R22 WSW	2:40	2:40	2:40	2:10	2:10	2:20	R22 WSW	3:30
R23 W, WNW	2:30	2:30	2:40	2:50	2:20	R23 W, WNW	2:40	2:40	2:40	2:00	2:00	2:20	R23 W, WNW	3:30
R24 NW	2:30	2:30	2:40	2:40	2:20	R24 NW	2:40	2:40	2:40	2:00	2:00	2:20	R24 NW	3:30
R25 NNW	2:50	2:50	2:40	2:40	2:30	R25 NNW	2:50	2:50	3:05	2:30	2:30	2:30	R25 NNW	3:40

FIGURE 11: PROTECTIVE ACTION MAPS DATA

PAR	CITRUS		LEVY		MARION		POPULATION	
	Evacuate	Shelter	Evacuate	Shelter	Evacuate	Shelter	Evacuate	Shelter
1	None	None	L5, L6	None	None	None	4,254	N/A
2	None	C1, C3, C4	L5, L6	L7, L8	None	M9	4,254	18,504
3	C1, C3, C4	None	L5, L6, L7, L8	None	M9	None	22,758	N/A
4	C1, C3, C4	None	L5, L6	None	M9	None	22,447	N/A
5	C1, C3, C4	None	L5, L6, L7, L8	None	None	None	15,278	N/A
6	None	None	L5, L6, L7, L8	None	M9	None	12,045	NA
7	None	None	L5, L6	None	M9	None	11,734	N/A
8	C1, C3, C4	None	L5, L6	L7, L8	M9	None	22,447	311
9	C1, C3, C4	None	L5, L6, L7, L8	None	None	M9	15,278	7,480
10	None	C1, C3, C4	L5, L6, L7, L8	None	M9	None	12,045	10,713
11	C1, C3, C4	None	L5, L6	L7, L8	M9	None	22,447	311
12	None	C1, C3, C4	L5, L6, L7, L8	None	None	M9	4,565	18,193
13	C1, C3, C4	None	L5, L6	L7, L8	None	M9	14,967	7791
14	C1, C3, C4	None	L5, L6	None	None	None	14,967	N/A
15	None	C1, C3, C4	L5, L6	L7, L8	None	None	4,254	11,024
16	None	C1, C3, C4	L5, L6	None	None	M9	4,254	18,193
17	None	None	L5, L6	L7, L8	None	M9	4,254	7,791

Figure 12 – Schools and Daycare Centers, Levy Nuclear Plant 10-Mile Emergency Planning Zone

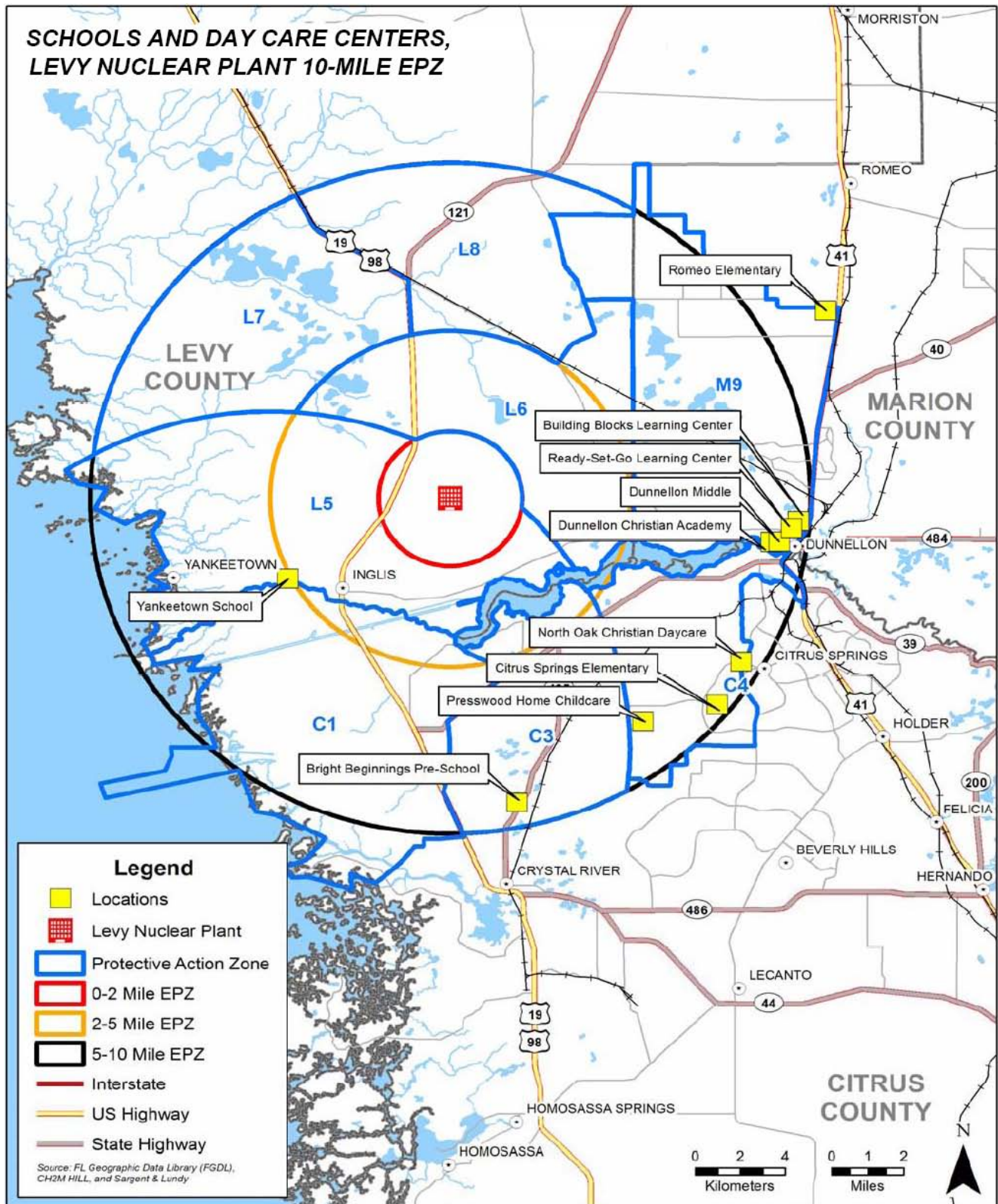


FIGURE 12: (continued)

<u>MARION COUNTY SCHOOLS</u>	<u>EVACUATION ZONE</u>
1. Dunnellon Middle School 21005 Chestnut Street Dunnellon, FL 34431	M9
2. Dunnellon Christian Academy 20831 Powell Road Dunnellon, FL 34431	M9
3. Romeo Elementary School 19550 SW 36 th Street Dunnellon, FL 34431	M9

<u>MARION COUNTY DAY CARE CENTERS</u>	<u>EVACUATION ZONE</u>
1. Ready-Set-Go Learning Center 20660 Powell Road Dunnellon, FL 34431	M9
2. Building Blocks Learning Center 11364 Robinson Road Dunnellon, FL 34431	M9

FIGURE 13: PUBLIC/PRIVATE AIRPORTS AND EMERGENCY HOSPITAL HELIPADS

NAME	LOCATION	RUNWAY	LIGHTS
<u>PUBLIC</u>			
CRYSTAL RIVER HOMASSASSA AIR TERMINAL	3 MILES S.E. OF CRYSTAL RIVER	3,000' TURF 4,300' PAVED	NO YES
INVERNESS AIRPORT	2 MILES S.E. OF INVERNESS	3,062' PAVED	YES
GEORGE T. LEWIS	1 MILE W. OF CEDAR KEY	2,400' PAVED	NO
WILLISTON MUNICIPAL	2 MILES S.W. OF WILLISTON	5,000' PAVED 5,000' PAVED	NO NO
DUNELLON MUNICIPAL	5 MILES E. OF DUNELLON	5,000' PAVED ROUGH 5,000' PAVED ROUGH	NO NO
OCALA MUNICIPAL/ JIM TAYLOR FIELD	2 MILES W. OF OCALA	5,007' PAVED 3,009' PAVED	YES NO
HERNANDO COUNTY AIRPORT	7 MILES S.W. OF BROOKSVILLE	5,000' PAVED 7,000' PAVED	YES YES
PILOT COUNTRY AIRPORT	15 MILES S.W. OF BROOKSVILLE	3,700' PAVED	YES
TAMPA EXECUTIVE	7 MILES S.W. OF TAMPA	5,000' PAVED	YES
FLYING TEN AIRPORT	10 MILES E. OF LEESBURG	2,800' TURF	NO
LEESBURG MUNICIPAL	4 MILES E. OF LEESBURG	4,162' PAVED 4,984' PAVED	YES YES
ARROW HEAD AIRPORT	6 MILES N. OF HERNANDO	2,800' TURF	NO
TWELVE OAKS	5 MILES N. OF HERNANDO	2,655' TURF	NO
CEDAR KEY FLYING CLUB	8 MILES N.E. OF CEDAR KEY	2,370' TURF	NO

FIGURE 13: (continued)

NAME	LOCATION	RUNWAY	LIGHTS
WHITE FARMS AIRPORT	2 MILES N. OF CHIEFLAND	3,900' ASPHALT	NO
CHINSEQUT AIRPORT	8 MILES N. OF BROOKSVILLE	2,500' TURF	NO
CROSSWIND FARM AIRPORT	15 MILES N.W. OF OCALA	2,700' TURF	NO
MCGINLEY AIRPORT	10 MILES S.W. OF OCALA	3,115' TURF	NO
OKLAWAHA FARMS AIRPORT	4 MILES N.E. OF OCALA	2,940' TURF	NO
SEVEN SPRINGS RANCH	16 MILES S.W. OF OCALA	2,300' TURF	NO
SHADY INTERNATIONAL AIRPORT	7 MILES S.W. OF OCALA	4,300' TURF	NO
HIDDEN LAKE AIRPORT	6 MILES N.E. OF NEW PORT RICHEY	2,730' ASPHALT	NO
FT. CLARK ESTATES AIRPORT	5 MILES W. OF GAINESVILLE	2,385' TURF	NO
FLYING BARON ESTATES	3 MILES S.W. OF LEESBURG	2,500' ASPHALT	NO
KO-KEE	6 MILES S.S.W. OF BUSHNELL	2,550' TURF	NO

FIGURE 13: (continued)

NAME	LOCATION	RUNWAY	LIGHTS
<u>HOSPITAL HELIPADS</u>			
VETERANS ADMINISTRATION HOSPITAL	ARCHER ROAD S.R. 23 GAINESVILLE		
TAMPA GENERAL HOSPITAL	DAVIS ISLAND TAMPA		
ST. JOSEPH'S HOSPITAL	3001 W. BUFFALO AVE., TAMPA		
CITRUS MEMORIAL HOSPITAL	INVERNESS		
SHANDS	GAINESVILLE		
SEVEN RIVERS REGIONAL MEDICAL CENTER	U.S. 19 N. CRYSTAL RIVER		

XIX. Authority and References

Federal

- Nuclear/Radiological Incident Annex, 2004 National Response Plan.
- Federal Emergency Management Agency (FEMA) - Executive Order 12148 outlines FEMA as lead in State, tribal and local emergency planning and preparedness activities with respect to nuclear power facilities.
- Nuclear Regulatory Commission (NRC) - NRC Authorization Acts for 1980 [Public Law (PL) 96-295] and 1982-1983 (PL 97-415) links off-site emergency preparedness and facility licensing. The acts prohibit the NRC from issuing an operating license for a power plant until it determines that plans are in place which provide for reasonable assurance to public health and safety.
- Executive Order of the President, Number 12241, transfers responsibility for review and concurrence of State plans from the NRC to FEMA, establishes planning criteria, assistance priorities, off-site and funding responsibilities.
- NUREG-0654, FEMA-REP-1, Rev.1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.
- Title 10 of the Code of Federal Regulations (10 CFR 50).
- Atomic Energy Act of 1954, as amended, Public Law 83-703.
- Title 44 of the Code of Federal Regulations (44 CFR 350).

State

- Florida State Statute Chapter 252, Division of Emergency Management.
- The State of Florida Comprehensive Emergency Management Plan-Annex A,
- The State of Florida Radiological Emergency Management Plan.
- Florida Radiological Protection Act, Florida Nuclear Code and Southern Industrial Nuclear Compact Law, as amended (Chapter 404, Florida Statutes).
- Governor's Executive Order 80-29, April 14, 1980.
- Southern Mutual Radiological Assistance Plan (SMRAP), Southern States Emergency Response Council.
- State of Florida Bureau of Radiation
- Control Department of Health - Radiological Emergencies, Standard Operating Procedures.

Local

- Marion County Administrative Regulations
- Marion County Board of County Commissioners current Resolution on Disaster Preparedness

- Citrus County Board of County Commissioners current Resolution on Disaster Preparedness
- Levy County Board of County Commissioners current Resolution on Disaster Preparedness
- Existing Mutual Aid Agreements

Marion County Radiological Emergency Plan Standard Operating Procedures (SOPs)

- SOP 1 Unusual Event
- SOP 2 Alert
- SOP 3 Site Area Emergency
- SOP 4 General Emergency
- SOP 5 Special Needs
- SOP 6 Red Cross
- SOP 7 Citizens Information
- SOP 8 County PIO
- SOP 9 PIO in the EOC
- SOP 10 Coordinating Siren Activation
- SOP 11 Operation of the Emergency Sirens
- SOP 12 *Reserved*
- SOP 13 EOC Activation
- SOP 14 REP Coordinator
- SOP 15 *Reserved*
- SOP 16 Health Department
- SOP 17 Storage and Distribution of Potassium Iodide (KI)
- SOP 18 *Reserved*
- SOP 19 Public Works
- SOP 20 School Board
- SOP 21 Fire Rescue
- SOP 22 *Reserved*
- SOP 23 County Warning Point/Hot Ring Down
- SOP 24 *Reserved*
- SOP 25 EMS
- SOP 26 Recovery
- SOP 27 Personal and Vehicle Monitoring and Decontamination for the Reception Center and Wash Down Stations

SOP 28 Backup Route Alerting
SOP 29 County Ag. Agent
SOP 30 *Reserved*
SOP 31 Control of Food Stuffs
SOP 32 FWC

XX. NUREG-0654 Cross Reference

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Section A: Assignment of Responsibility (Organization Control)</p> <p><i>Primary responsibilities for emergency response by the nuclear facility licensee, and by State and local organizations within the Emergency Planning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis. (10 CFR 50.47[b][1])</i></p>		
<p>Criteria A.1.a.</p> <p><i>Each plan shall identify the State, local, Federal, and private sector organizations (including utilities), that are intended to be part of the overall response organization for Emergency Planning Zones.</i></p>	Section II	
<p>Criteria A.1.b.</p> <p><i>Each organization and sub-organization having an operational role shall specify its concept of operations, and its relationship to the total effort.</i></p>	Section II.A.1-11	
<p>Criteria A.1.c.</p> <p><i>Each plan shall illustrate these interrelationships in a block diagram.</i></p>	Figure 4	
<p>Criteria A.1.d.</p> <p><i>Each organization shall identify a specific individual by title who shall be in charge of the emergency response.</i></p>	Section II.A Section III.A	
<p>Criteria A.1.e.</p> <p><i>Each organization shall provide for 24-hour per day emergency response, including 24-hour per day manning of communications links.</i></p>	Section II Section II.A	
<p>Criteria A.2.a.</p> <p><i>Each organization shall specify the functions and responsibilities for major elements and key individuals by</i></p>	Section II Figure 3	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p><i>title, of emergency response, including the following: Command and Control, Alerting and Notification, Communications, Public Information, Accident Assessment, Public Health and Sanitation, Social Services, Fire and Rescue, Traffic Control, Emergency Medical Services, Law Enforcement, Transportation, Protective Response (including authority to request Federal assistance and to initiate other protective actions), and Radiological Exposure Control. The description of these functions shall include a clear and concise summary such as a table of primary and support responsibilities using the agency as one axis, and the function as the other. (See Section B for licensee).</i></p>		
<p>Criteria A.2.b. <i>Each plan shall contain (by reference to specific acts, codes or statutes) the legal basis for such authorities.</i></p>	<p>Section II Section XIX</p>	
<p>Criteria A.3 <i>Each plan shall include written agreements referring to the concept of operations developed between Federal, State, and local agencies and other support organizations having an emergency response role within the Emergency Planning Zones. The agreements shall identify the emergency measures to be provided and the mutually acceptable criteria for their implementation, and specify the arrangements for exchange of information. These agreements may be provided in an appendix to the plan or the plan itself may contain descriptions of these matters and a signature page in the plan may serve to verify the agreements. The signature page format is appropriate for organizations where response functions are covered by laws, regulations or executive orders where separate written agreements are not necessary.</i></p>	<p>Section II.3.1.7</p>	
<p>Criteria A.4 <i>Each principal organization shall be capable of continuous (24-hour) operations for a protracted period. The individual in the principal organization who will be responsible for assuring continuity of resources (technical, administrative, and material) shall be specified by title.</i></p>	<p>Section II.A.1</p>	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Section B: On-site Emergency Organization</p> <p><i>On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available, and the interfaces among various on-site response activities and off-site support and response activities are specified. (10 CFR 50.47[b][2])</i></p>	Not applicable	
<p>Section C: Emergency Response Support and Resources</p> <p><i>Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's near-site Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified. (10CFR 50.47[b][3])</i></p>		
<p>Criteria C.1.</p> <p><i>The Federal government maintains in-depth capability to assist licensees, States, and local governments through the Federal Radiological Monitoring and Assessment Plan (formerly Radiological Assistance Plan (RAP) and Interagency Radiological Assistance Plan (IRAP). Each State and licensee shall make provisions for incorporating the Federal response capability into its operation plan, including the following:</i></p>	Not applicable	
<p>Criteria C.1.a.</p> <p><i>Specific persons by title authorized to request Federal assistance.</i></p>	Not applicable	
<p>Criteria C.1.b.</p> <p><i>Specific Federal resources expected, including expected times of arrival at specific nuclear facility sites.</i></p>	Not applicable	
<p>Criteria C.1.c.</p> <p><i>Specific licensee, State, and local resources available to support the Federal response, e.g., air fields, command posts, telephone lines, radio frequencies, and telecommunications centers.</i></p>	Section IX.F	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria C.2.a. <i>Each principal offsite organization may dispatch representatives to the licensee's near-site Emergency Operations Facility.</i>	Section IX.B	
Criteria C.2.b. <i>The licensee shall prepare for the dispatch of a representative to principal off-site governmental emergency operations centers.</i>	Not applicable	
Criteria C.3. <i>Each organization shall identify radiological laboratories and their general capabilities and expected availability to provide radiological monitoring and analyses services which can be used in an emergency.</i>	Not applicable	
Criteria C.4. <i>Each organization shall identify nuclear and other facilities, organizations or individuals which can be relied upon in an emergency to provide assistance. Such assistance shall be identified and supported by appropriate letters of agreement.</i>	Section II.3.1.7	
Section D: Emergency Classification System A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial off-site response measures. (10CFR 50.47[b][4])		
Criteria D.1. <i>An emergency classification and emergency action level scheme as set forth in Appendix 1 must be established by the licensee. The specific instruments, parameters, or equipment status shall be shown for establishing each emergency class, in the in-plant emergency procedures. The plan shall identify the parameter values and equipment status for each emergency class.</i>	Not applicable	
Criteria D.2. <i>The initiating conditions shall include the example conditions found in Appendix I and all postulated</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<i>accidents in the Final Safety Analysis Report (FSAR) for the nuclear facility.</i>		
Criteria D.3. <i>Each State and local organization shall establish an emergency classification and emergency action level scheme consistent with that established by the facility licensee.</i>	Section IV	
Criteria D.4. <i>Each State and local organization should have procedures in place that provide for emergency actions to be taken which are consistent with the emergency actions recommended by the nuclear facility licensee, taking into account local off-site conditions that exist at the time of the emergency.</i>	Section IV Section V	
Section E: Notification Methods and Procedures <i>Procedures have been established for notification, by the licensee of State and local response organizations and for notification of emergency personnel by all response organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established. (10CFR 50.47[b][5])</i>		
Criteria E.1. <i>Each organization shall establish procedures which describe mutually agreeable bases for notification of response organizations consistent with the emergency classification and action level scheme set forth in Appendix 1. These procedures shall include means for verification of messages. The specific details of verification need not be included in the plan.</i>	Section V Section VII	
Criteria E.2. <i>Each organization shall establish procedures for alerting, notifying, and mobilizing emergency response personnel.</i>	Section I Section IV	
Criteria E.3. <i>The licensee in conjunction with State and local</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<i>organizations shall establish the contents of the initial emergency messages to be sent from the plant. These measures shall contain information about the class of emergency, whether a release is taking place, potentially affected population and areas, and whether protective measures may be necessary.</i>		
Criteria E.4. <i>Each licensee shall make provisions for follow-up messages from the facility to off-site authorities, which shall contain the following information if it is known and appropriate:</i>	Not applicable	
Criteria E.5. <i>State and local government organizations shall establish a system for disseminating to the public appropriate information contained in initial and follow-up messages received from the licensee including the appropriate notification to appropriate broadcast media, e.g., the Emergency Broadcast System (EBS).</i>	Section VI	
Criteria E.6. <i>Each organization shall establish administrative and physical means, and the time required for notifying and providing prompt instructions to the public within the plume exposure pathway EPZ. (See Appendix 3.) It shall be the licensee's responsibility to demonstrate that such means exist, regardless of who implements this requirement. It shall be the responsibility of the State and local governments to activate such a system.</i>	Section VI	
Criteria E.7 <i>Each organization shall provide written messages intended for the public, consistent with the licensee's classification scheme. In particular, draft messages to the public giving instruction with regard to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and local plans. Such messages should include the appropriate aspects of sheltering, ad hoc, respiratory protection, e.g., handkerchief over mouth, thyroid blocking or evacuation. The role of the licensee is to provide supporting information for the messages. For ad hoc respiratory protection, see "Respiratory Protective</i>	Section XXI Appendix 1	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<i>Devices Manual" American Industrial Hygiene Association, 1963, pp. 123-126.</i>		
Section F: Emergency Communications <i>Provisions exist for prompt communications among principal response organizations to emergency Personnel and to the public. (10CFR 50.47[b][6])</i>		
Criteria F.1. <i>The communication plans for emergencies shall include organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local, and State response organizations. Such systems should be selected to be compatible with one another. Each plan shall include:</i>	Section VII	
Criteria F.1.a. <i>Provision for 24-hour,per day notification to and activation of the State/local emergency response network; and at a minimum, a telephone link and alternate, including 24-hour per day manning of communications links that initiate emergency response actions.</i>	Section VII.A	
Criteria F.1.b. <i>Provision for communications with continuous State/local governments within the Emergency Planning Zones.</i>	Section VII.A	
Criteria F.1.c. <i>Provision for communications as needed with Federal emergency response organizations.</i>	Section VII.A	
Criteria F.1.d. <i>Provision for communications between the nuclear facility and the licensee's near-site Emergency Operations Facility, State and local emergency operations center, and radiological monitoring teams.</i>	Section VII.A	
Criteria F.1.e. <i>Provision for alerting or activating emergency personnel in each response organization.</i>	Section VII.A	
Criteria F.1.f. <i>Provision for communication by the licensee with NRC</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<i>headquarters and NRC Regional Office Emergency Operations Centers and the licensee's near-site Emergency Operations Facility and radiological monitoring team assembly area.</i>		
Criteria F.2. <i>Each organization shall ensure that a coordinated communication link for fixed and mobile medical support facilities exists.</i>	Section VII.A	
Criteria F.3. <i>Each organization shall conduct periodic testing of the entire emergency communications system (see evaluation criteria H.10, N.2.a and Appendix 3).</i>	Section VII.B	
Section G: Public Education and Information <i>Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance, and procedures for coordinated dissemination of information to the public are established. (10CFR 50.47[b][7])</i>		

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Criteria G.1. <i>Each organization shall provide a coordinated periodic (at least annually) dissemination of information to the public regarding how they will be notified and what their actions should be in an emergency. This information shall include, but not necessarily be limited to, the following:</i></p> <ul style="list-style-type: none"> <i>a. Educational information on radiation;</i> <i>b. Contact for additional information;</i> <i>c. Protective measures, e.g., evacuation routes and relocation centers, sheltering, respiratory protection, radioprotective drugs; and</i> <i>d. Special needs of the handicapped.</i> <p><i>Means for accomplishing this dissemination may include, but are not necessarily limited to information in the telephone book, periodic information in utility bills, posting in public areas, and publications distributed on an annual basis.</i></p>	Section VIII.A	
<p>Criteria G.2. <i>The public information program shall provide the permanent and transient adult population within the plume exposure EPZ an adequate opportunity to become aware of the information annually. The programs should include provision for written material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. Signs or other measures (e.g., decals, posted notices or other means, placed in hotels, motels, gasoline stations and phone booths) shall also be used to disseminate to any transient population within the plume exposure pathway EPZ appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies.</i></p>	Section VIII.A	
<p>Criteria G.3.a. <i>Each principal organization shall designate the points of contact and physical locations for use by news media during an emergency.</i></p>	Section VIII.C Section VIII.D	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria G.3.b. <i>Each licensee shall provide space which may be used for a limited number of the news media at the near-site Emergency Operations Facility.</i>	Not applicable	
Criteria G.4.a. <i>Each principal organization shall designate a spokesperson who should have access to all necessary information.</i>	Section VIII.C Section VIII.D	
Criteria G.4.b. <i>Each organization shall establish arrangements for timely exchange of information among designated spokespersons.</i>	Section VIII.C Section IX.C	
Criteria G.4.c. <i>Each organization shall establish coordinated arrangements for dealing with rumors.</i>	Section VIII.D	
Criteria G.5. <i>Each organization shall conduct coordinated programs at least annually to acquaint news media with the emergency plans, information concerning radiation, and points of contact for release of public information in an emergency.</i>	Section VIII.B	
Section H: Emergency Facilities and Equipment Adequate emergency facilities and equipment to support the emergency response are provided and maintained. (10CFR 50.47[b][8])		
Criteria H.1. <i>Each licensee shall establish a Technical Support Center and an on-site operations support center (assembly area) in accordance with NUREG-0696, Revision 1.</i>	Not applicable	
Criteria H.2. <i>Each licensee shall establish an Emergency Operations Facility from which evaluation and coordination of all licensee activities related to an emergency is to be carried out and from which the licensee shall provide information to Federal, State and local authorities responding to radiological emergencies in accordance with NUREG-0696, Revision 1.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria H.3. <i>Each organization shall establish an emergency operations center for use in directing and controlling response functions.</i>	Section II.A.2 Section IV	
Criteria H.4. <i>Each organization shall provide for timely activation and staffing of the facilities and centers described in the plan.</i>	Section IV Section IX.A	
Criteria H.5. <i>Each licensee shall identify and establish on-site monitoring systems that are to be used to initiate emergency measures in accordance with Appendix 1, as well as those to be used for conducting assessment.</i> <i>The equipment shall include the following:</i>	Not applicable	
Criteria H.6. <i>Each licensee shall make provision to acquire data from or for emergency access to off-site monitoring and analysis equipment including:</i>	Not applicable	
Criteria H.7. <i>Each organization, where appropriate, shall provide for off-site radiological monitoring equipment in the vicinity of the nuclear facility.</i>	Section II.D Section IV.C Section IX.E Figure 6	
Criteria H.8. <i>Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.</i>	Not applicable	
Criteria H.9. <i>Each licensee shall provide for an on-site operations support center (assembly area) which shall have adequate capacity, and supplies, including, for example, respiratory protection, protective clothing, portable lighting, portable radiation monitoring equipment, cameras and communications equipment for personnel present in the assembly area.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria H.10. <i>Each organization shall make provisions to inspect, inventory, and operationally check emergency equipment/instruments at least once each calendar quarter and after each use. There shall be sufficient reserves of instruments/equipment to replace those which are removed from emergency kits for calibration or repair. Calibration of equipment shall be at intervals recommended by the supplier of the equipment.</i>	Section IX.E Figure 6	
Criteria H.11. <i>Each plan shall, in an appendix, include identification of emergency kits by general category (protective equipment, communications equipment, radiological monitoring equipment and emergency supplies).</i>	Section IX.E Figure 6	
Criteria H.12. <i>Each organization shall establish a central point (preferably associated with the licensee's near-site Emergency Operations Facility), for the receipt and analysis of all field monitoring data and coordination of sample media.</i>	Section IV.C Section V.C Section X	
Section I: Accident Assessment Adequate methods, systems, and equipment for assessing and monitoring actual or potential off-site consequences of a radiological emergency condition are in use. (10CFR 50.47[b][9])		
Criteria I.1. <i>Each licensee shall identify plant system and effluent parameter values characteristic of a spectrum of off-normal conditions and accidents, and shall identify the plant parameter values or other information which correspond to the example initiating conditions of Appendix 1. Such parameter values and the corresponding emergency class shall be included in the appropriate facility emergency procedures. Facility emergency procedures shall specify the kinds of instruments being used and their capabilities.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria I.2. <i>On-site capability and resources to provide initial values and continuing assessment throughout the course of an accident shall include post-accident sampling capability, radiation and effluent monitors, in-plant iodine instrumentation, and containment radiation monitoring in accordance with NUREG-0578, as elaborated in the NRC letter to all power reactor licensees dated October 30, 1979.</i>	Not applicable	
Criteria I.3. <i>Each licensee shall establish methods and techniques to be used for determining:</i>	Not applicable	
Criteria I.4. <i>Each licensee shall establish the relationship between effluent Monitor readings and on-site and off-site exposures and contamination for various meteorological conditions.</i>	Not applicable	
Criteria I.5. <i>Each licensee shall have the capability of acquiring and evaluating meteorological information sufficient to meet the criteria of Appendix 2. There shall be provisions for access to meteorological information by at least the near-site Emergency Operations Facility, the Technical Support Center, the Control Room and an off-site NRC center. The licensee shall make available to the State suitable meteorological data processing interconnections which will permit independent analysis by the State, of facility generated data in those States with the resources to effectively use this information.</i>	Not applicable	
Criteria I.6. <i>Each licensee shall establish the methodology for determining the release rate/projected doses if the instrumentation used for assessment are offscale or inoperable.</i>	Not applicable	
Criteria I.7. <i>Each organization shall describe the capability and resources for field monitoring within the plume exposure EPZ which are an intrinsic part of the concept of operations for the facility.</i>	Section IV.C Section V.C Section X	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria I.8. <i>Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment, and estimated deployment times.</i>	Section IV.C Section V.C Section X	
Criteria I.9. <i>Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} $\mu\text{Ci}/\text{cm}^3$ (microcuries per cubic centimeter) under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detectable activity.</i>	Not applicable	
Criteria I.10. <i>Each organization shall establish means for relating the various measured parameters (e.g., contamination levels, water and air activity levels) to dose rates for key isotopes (i.e., those given in Table 3, Page 18) and gross radioactivity measurements. Provisions shall be made for estimating integrated dose from the projected and actual dose rates and for comparing these estimates with the protective action guides. The detailed provisions shall be described in separate procedures.</i>	Not applicable	
Criteria I.11. <i>Arrangements to locate and track the airborne radioactive plume shall be made, using either or both Federal and State resources.</i>	Not applicable	See respective state plan.

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Section J: Protective Response</p> <p><i>A range of protective actions have been developed for the plume exposure pathway EPZ for emergency Workers and the public. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed. (10CFR 50.47[b][10])</i></p>		
<p>Criteria J.1.</p> <p><i>Each licensee shall establish the means and time required to warn or advise on-site individuals and individuals who may be in areas controlled by the operator, including:</i></p>	Not applicable	
<p>Criteria J.2.</p> <p><i>Each licensee shall make provisions for evacuation routes and transportation for on-site individuals to some suitable off-site location, including alternatives for inclement weather, high traffic density and specific radiological conditions.</i></p>	Not applicable	
<p>Criteria J.3.</p> <p><i>Each licensee shall provide for radiological monitoring of people evacuated from the site.</i></p>	Not applicable	
<p>Criteria J.4.</p> <p><i>Each licensee shall provide for the evacuation of on-site non-essential personnel in the event of a Site or General Emergency and shall provide a decontamination capability at or near the monitoring point specified in J.3.</i></p>	Not applicable	
<p>Criteria J.5.</p> <p><i>Each licensee shall provide for a capability to account for all individuals on-site at the time of the emergency and ascertain the names of missing individuals within 30 minutes of the start of an emergency and account for all on-site individuals continuously thereafter.</i></p>	Not applicable	
<p>Criteria J.6.</p> <p><i>Each licensee shall, for individuals remaining or arriving on-site during the emergency, make provisions for:</i></p>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria J.7. <i>Each licensee shall establish a mechanism for recommending protective actions to the appropriate State and local authorities. These shall include Emergency Action Levels corresponding to projected dose to the population-at-risk, in accordance with Appendix 1 and with the recommendations set forth in Tables 2.1 and 2.2 of the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (EPA-520/1-75-001). As specified in Appendix 1, prompt notification shall be made directly to the off-site authorities responsible for implementing protective measures within the plume exposure pathway Emergency Planning Zone.</i>	Not applicable	
Criteria J.8. <i>Each licensee's plan shall contain time estimates for evacuation within the plume exposure EPZ. These shall be in accordance with Appendix 4.</i>	Not applicable	
Criteria J.9. <i>Each State and local organization shall establish a capability for implementing protective measures based upon protective action guides and other criteria. This shall be consistent with the recommendations of EPA regarding exposure resulting from passage of radioactive airborne plumes, (EPA-520/1-75-001) and with those of DHEW (DHHS)/FDA regarding radioactive contamination of human food and animal feeds as published in the Federal Register of December 15, 1978 (43 FR 58790).</i>	Section XII.A	
Criteria J.10. <i>The organization's plans to implement protective measures for the plume exposure pathway shall include:</i>	Section VI Section XII	
Criteria J.10.a. <i>Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas; (identification of radiological sampling and monitoring points shall include the designators in Table J-1 or an equivalent uniform system described in the plan);</i>	Figure 7 Figure 8 Figure 10 Figure 11 Figure 12	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria J.10.b. <i>Maps showing population distribution around the nuclear facility. This shall be by evacuation areas (licensees shall also present the information in a sector format);</i>	Figure 8 Figure 12	
Criteria J.10.c. <i>Means for notifying all segments of the transient and resident population;</i>	Section VI	
Criteria J.10.d. <i>Means for protecting those persons whose mobility may be impaired due to such factors as institutional or other confinement;</i>	Section XII.G	
Criteria J.10.e. <i>Provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the plume exposure EPZ whose immediate evacuation may be infeasible or very difficult, including quantities, storage, and means of distribution;</i>	Section XII.B	
Criteria J.10.f. <i>State and local organizations' plans should include the method by which decisions by the State Health Department for administering radioprotective drugs to the general population are made during an emergency and the pre-determined conditions under which such drugs may be used by off-site emergency workers;</i>	Section XII.B	
Criteria J.10.g. <i>Means of relocation;</i>	Section XII.E Section XII.F Section XII.G	
Criteria J.10.h. <i>Relocation centers in host areas, which are at least 5 miles, and preferably 10 miles, beyond the boundaries of the plume exposure emergency planning zone; (See K.8)</i>	Section XII.I Section XII.J	
Criteria J.10.i. <i>Projected traffic capacities of evacuation routes under emergency conditions;</i>	Figure 10	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria J.10.j. <i>Control of access to evacuated areas and organization responsibilities for such control;</i>	Section XII.C Section XII.E	
Criteria J.10.k. <i>Identification of and means for dealing with potential impediments (e.g., seasonal impassability of roads) to use of evacuation routes, and contingency measures;</i>	Section XII.E	
Criteria J.10.l <i>Time estimates for evacuation of various sectors and distances based on a dynamic analysis (time-motion study under various conditions) for the plume exposure pathway emergency planning zone (see Appendix 4); and</i>	Section XII.F	
Criteria J.10.m. <i>The bases for the choice of recommended protective actions from the plume exposure pathway during emergency conditions. This shall include expected local protection afforded in residential units or other shelter for direct and inhalation exposure, as well as evacuation time estimates.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Criteria J.11.</p> <p><i>Each State shall specify the protective measures to be used for the ingestion pathway, including the methods for protecting the public from consumption of contaminated food stuffs. This shall include criteria for deciding whether dairy animals should be put on stored feed. The plan shall identify procedures for detecting contamination, for estimating the dose commitment consequences of uncontrolled ingestion, and for imposing protection procedures such as impoundment, decontamination, processing, decay, product diversion, and preservation. Maps for recording survey and monitoring data, key land use data (e.g., farming), dairies, food processing plants, water sheds, water supply intake and treatment plants and reservoirs shall be maintained. Provisions for maps showing detailed crop information may be by including reference to their availability and location and a plan for their use. The maps shall start at the facility and include all of the 50-mile ingestion pathway EPZ. Up-to-date lists of the name and location of all facilities which regularly process milk products and other large amounts of food or agricultural products originating in the ingestion pathway Emergency Planning Zone, but located elsewhere, shall be maintained.</i></p>	Not applicable	
<p>Criteria J.12.</p> <p><i>Each organization shall describe the means for registering and monitoring of evacuees at relocation centers in host areas. The personnel and equipment available should be capable of monitoring within about a 12-hour period all residents and transients in the plume exposure EPZ arriving at relocation centers.</i></p>	<p>Section XII.H.2</p> <p>Section XII.I.1</p>	
<p>Section K: Radiological Exposure Control</p> <p><i>Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides. (10CFR 50.47[b][11])</i></p>		

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria K.1. <i>Each licensee shall establish on-site exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective</i>	Not applicable	
Criteria K.2. <i>Each licensee shall provide an on-site radiation protection program to be implemented during emergencies, including methods to implement exposure guidelines. The plan shall identify individual(s), by position or title, who can authorize emergency workers to receive doses in excess of 10 CFR Part 20 limits. Procedures shall be worked out in advance for permitting on-site volunteers to receive radiation exposures in the course of carrying out lifesaving and other emergency activities. These procedures shall include expeditious decision making and a reasonable consideration of relative risks.</i>	Not applicable	
Criteria K.3.a. <i>Each organization shall make provision for 24-hour-per-day capability to determine the doses received by emergency personnel involved in any nuclear accident, including volunteers. Each organization shall make provisions for distribution of dosimeters, both self-reading and permanent record devices.</i>	Section XI	
Criteria K.3.b. <i>Each organization shall ensure that dosimeters are read at appropriate frequencies and provide for maintaining dose records for emergency workers involved in any nuclear accident.</i>	Section XI	
Criteria K.4. <i>Each State and local organization shall establish the decision chain for authorizing emergency workers to incur exposures in excess of the EPA General Public Protective Action Guides (i.e., EPA PAGs for emergency workers and lifesaving activities).</i>	Section XI	See respective state and county plans.
Criteria K.5.a. <i>Each organization as appropriate shall specify action levels for determining the need for decontamination.</i>	Section XII.H	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria K.5.b. <i>Each organization, as appropriate, shall establish the means for radiological decontamination of emergency personnel wounds, supplies, instruments and equipment, and for waste disposal.</i>	Section XI.H.1 Section XI.H.2 Section XI.H.3	
Criteria K.6. <i>Each licensee shall provide on-site contamination control measures including:</i>	Not applicable	
Criteria K.7. <i>Each licensee shall provide the capability for decontaminating relocated on-site personnel, including provisions for extra clothing and decontaminants suitable for the type of contamination expected, with particular attention given to radioiodine contamination of the skin.</i>	Not applicable	
Section L: Medical and Public Health Support Arrangements are made for medical services for contaminated injured individuals. (10 CFR 50.47[b][12])		
Criteria L.1. <i>Each organization shall arrange for local and backup hospital and medical services having the capability for evaluation of radiation exposure and uptake, including assurance that persons providing these services are adequately prepared to handle contaminated individuals.</i>	Section XIII	
Criteria L.2. <i>Each licensee shall provide for on-site first aid capability.</i>	Not applicable	
Criteria L.3. <i>Each State shall develop lists indicating the location of public, private and military hospitals and other emergency medical services facilities within the State or contiguous States considered capable of providing medical support for any contaminated injured individual. The listing shall include the name, location, type of facility and capacity and any special radiological capabilities. These emergency medical services should be able to radiologically monitor contamination personnel, and have facilities and trained personnel able to care for contaminated injured persons.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria L.4. <i>Each organization shall arrange for transporting victims of radiological accidents to medical support facilities.</i>	Section XII	
Section M: Recover and Reentry Planning and Post accident Operations General plans for recovery and reentry are developed. (10CFR 50.47(b)(13))		
Criteria M.1. <i>Each organization, as appropriate, shall develop general plans and procedures for reentry and recovery and describe the means by which decisions to relax protective measures (e.g., allow reentry into an evacuated area) are reached. This process should consider both existing and potential conditions.</i>	Section XIV	
Criteria M.2. <i>Each licensee plan shall contain the position/title, authority and responsibilities of individuals who will fill key positions in the facility recovery organization. This organization shall include technical personnel with responsibilities to develop, evaluate and direct recovery and reentry operations. The recovery organization recommended by the Atomic Industrial Forum's "Nuclear Power Plant Emergency Response Plan" dated October 11, 1979, is an acceptable framework.</i>	Not applicable	
Criteria M.3. <i>Each licensee and State plan shall specify means for informing members of the response organizations that a recovery operation is to be initiated, and of any changes in the organizational structure that may occur.</i>	Not applicable	
Criteria M.4. <i>Each plan shall establish a method for periodically estimating total population exposure.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Section N: Exercises and Drills</p> <p><i>Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected. (10CFR 50.47[b][14])</i></p>		
<p>Criteria N.1.a.</p> <p><i>An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within emergency preparedness plans and organizations. The emergency preparedness exercise shall simulate an emergency that results in off-site radiological releases which would require response by off-site authorities. Exercises shall be conducted as set forth in NRC and FEMA rules.</i></p>	Section XV	
<p>Criteria N.1.b.</p> <p><i>An exercise shall include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident scenario requiring response. The organization shall provide for a critique of the annual exercise by Federal and State observers/evaluators. The scenario should be varied from year to year such that all major elements of the plans and preparedness organizations are tested within a 5-year period. Each organization should make provisions to start an exercise between 6:00 p.m. and midnight, and another between midnight and 6:00 a.m. once every 6 years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced.</i></p>	Section XV	
<p>Criteria N.2.</p> <p><i>A drill is a supervised instruction period aimed at testing, developing and maintaining skills in a particular operation. A drill is often a component of an exercise. A drill shall be supervised and evaluated by a qualified drill instructor. Each organization shall conduct drills, in addition to the annual exercise at the frequencies indicated below:</i></p>	Section XV	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria N.2.a. <i>Communication Drills</i> <i>Communications with State and local governments within the plume exposure pathway EPZ shall be tested monthly. Communications with Federal emergency response organizations and States within the ingestion pathway shall be tested quarterly. Communications between the nuclear facility, State and local emergency operations centers, and field assessment teams shall be tested annually. Communication drills shall also include the aspect of understanding the content of messages.</i>	Section XV	
Criteria N.2.b. <i>Fire Drills</i> <i>Fire drills shall be conducted in accordance with the plant (nuclear facility) technical specifications.</i>	Not applicable	
Criteria N.2.c. <i>Medical Emergency Drills</i> <i>A medical emergency drill involving a simulated contaminated individual which contains provisions for participation by the local support services agencies (i.e., ambulance and off-site medical treatment facility) shall be conducted annually. The off-site portions of the medical drill may be performed as part of the required annual exercise.</i>	Section XV	
Criteria N.2.d. <i>Radiological Monitoring Drills</i> <i>Plant environs and radiological monitoring drills (on-site and off-site) shall be conducted annually. These drills shall include collection and analysis of all sample media (e.g., water, vegetation, soil and air), and provisions for communications and record keeping. The State drills need not be at each site. Where appropriate, local organizations shall participate.</i>	Section XV	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Criteria N.2.e. <i>Health Physics Drills</i> (1) <i>Health Physics drills shall be conducted semi-annually which involve response to, and analysis of, simulated elevated airborne and liquid samples and direct radiation measurements in the environment. The State drills need not be at each site.</i> (2) <i>Analysis of in plant liquid samples with actual elevated radiation levels including use of the post-accident sampling system shall be included in Health Physics drills by licensees annually.</i></p>	Not applicable	
<p>Criteria N.3. <i>Each organization shall describe how exercises and drills are to be carried out to allow free play for decision making and to meet the following objectives. Pending the development of exercise scenarios and exercise evaluation guidance by NRC and FEMA, the scenarios for use in exercises and drills shall include, but not be limited to, the following:</i></p>	Section XV	
<p>Criteria N.3.a. <i>The basic objective(s) of each drill and exercise and appropriate evaluation criteria;</i></p>	Section XV	
<p>Criteria N.3.b. <i>The date(s), time period, place(s) and participating organizations;</i></p>	Section XV	
<p>Criteria N.3.c. <i>The simulated events;</i></p>	Section XV	
<p>Criteria N.3.d. <i>A time schedule of real and simulated initiating events;</i></p>	Section XV	
<p>Criteria N.3.e. <i>A narrative summary describing the conduct of the exercises or drills to include such things as simulated casualties, off-site fire department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams, and public information activities; and</i></p>	Section XV	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria N.3.f. <i>A description of the arrangements for and advance materials to be provided to official observers.</i>	Section XV	
Criteria N.4. <i>Official observers from Federal, State or local governments will 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 should result from the critique.</i>	Section XV	
Criteria N.5. <i>Each organization shall establish means for evaluating observer and participant comments on areas needing improvement, including emergency plan procedural changes, and for assigning responsibility for implementing corrective actions. Each organization shall establish management control used to ensure that corrective actions are implemented.</i>	Section XV	
Section O: Radiological Emergency Response Training <i>Radiological emergency response training is provided to those who may be called on to assist in an emergency. (10CFR 50.47[b][15])</i>		
Criteria O.1. <i>Each organization shall ensure the training of appropriate individuals.</i>	Section XVI	
Criteria O.1.a. <i>Each facility to which the plant applies shall provide site specific emergency response training for those off-site emergency organizations who may be called upon to provide assistance in the event of an emergency.</i>	Not applicable	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria O.1.b. <i>Each off-site response organization shall participate in and receive training. Where mutual aid agreements exist between local agencies such as fire, police and ambulance/rescue, the training shall also be offered to the other departments who are members of the mutual aid district.</i>	Section XVI	
Criteria O.2. <i>The training program for members of the on-site emergency organization shall, besides classroom training, include practical drills in which each individual demonstrates ability to perform his assigned emergency function. During the practical drills, on-the-spot correction of erroneous performance shall be made and a demonstration of the proper performance offered by the instructor.</i>	Not applicable	
Criteria O.3. <i>Training for individuals assigned to licensee first aid teams shall include courses equivalent to Red Cross Multi-Media.</i>	Not applicable	
Criteria O.4. <i>Each organization shall establish a training program for instructing and qualifying personnel who will implement radiological emergency response plans. The specialized initial training and periodic retraining programs (including the scope, nature and frequency) shall be provided in the following categories:</i>	Section XVI	
Criteria O.4.a. <i>Directors or coordinators of the response organizations;</i>	Section XVI	
Criteria O.4.b. <i>Personnel responsible for accident assessment;</i>	Section X Section XVI	
Criteria O.4.c. <i>Radiological monitoring teams and radiological analysis personnel;</i>	Section X Section XVI	
Criteria O.4.d. <i>Police, security and fire fighting personnel;</i>	Section XVI	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria O.4.e. <i>Repair and damage control/correctional action teams (on-site);</i>	Not applicable	
Criteria O.4.f. <i>First aid and rescue personnel;</i>	Section XVI	
Criteria O.4.g. <i>Local support services personnel including Civil Defense/Emergency Service personnel;</i>	Section XVI	
Criteria O.4.h. <i>Medical support personnel;</i>	Section XVI	
Criteria O.4.i. <i>Licensee's headquarters support personnel; and</i>	Not applicable	
Criteria O.4.j. <i>Personnel responsible for transmission of emergency information and instructions.</i>	Section XVI	
Criteria O.5. <i>Each organization shall provide for the initial and annual retraining of personnel with emergency response responsibilities.</i>	Section XVI	
Section P: Responsibility for the Planning Effort: Periodic Review and Distribution of Emergency Plans <i>Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained. (10CFR 50.47[b][16])</i>		
Criteria P.1. <i>Each organization shall provide for the training of individuals responsible for the planning effort.</i>	Section XVI	
Criteria P.2. <i>Each organization shall identify by title the individual with the overall authority and responsibility for radiological emergency response planning.</i>	Section II.A.1	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
Criteria P.3. <i>Each organization shall designate an Emergency Planning Coordinator with responsibility for the development and updating of emergency plans and coordination of these plans with other response organizations.</i>	Section XVII	
Criteria P.4. <i>Each organization shall update its plan and agreements as needed, review and certify it to be current on an annual basis. The update shall take into account changes identified by drills and exercises.</i>	Section XVII.3.1.3	
Criteria P.5. <i>The emergency response plans and approved changes to the plans shall be forwarded to all organizations and appropriate individuals with responsibility for implementation of the plans. Revised pages shall be dated and marked to show where changes have been made.</i>	Section XVII.3.1	
Criteria P.6 <i>Each plan shall contain a detailed listing of supporting plans and their source.</i>	Section XIX	
Criteria P.7. <i>Each plan shall contain as an appendix listing, by title, procedures required to implement the plan. The listing shall include the section(s) of the plan to be implemented by each procedure.</i>	Section XIX	
Criteria P.8. <i>Each plan shall contain a specific table of contents. Plans submitted for review should be cross-referenced to these criteria.</i>	See Table of Contents	

NUREG 0654 Criteria (10 CFR 50.47(b))	Levy Emergency Plan Section(s)	Comments
<p>Criteria P.9.</p> <p><i>Each licensee shall arrange for and conduct independent reviews of the emergency preparedness program at least every 12 months. (An independent review is one conducted by any competent organization either internal or external to the licensees' organization, but who are not immediately responsible for the emergency preparedness program). The review shall include the emergency plan, its implementing procedures and practices, training, readiness testing, equipment, and interfaces with State and local governments. Management controls shall be implemented for evaluation and correction of review findings. The result of the review, along with recommendations for improvements, shall be documented, reported to appropriate licensee corporate and plant management, and involved Federal, State and local organizations, and retained for a period of five years.</i></p>	Not applicable	
<p>Criteria P.10</p> <p><i>Each organization shall provide for updating telephone numbers in emergency procedures at least quarterly.</i></p>	Section XVII.3.1.6	

MARION COUNTY RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN TABLE OF CONTENTS

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3. Alert	Termination	Marion, Citrus and Levy
4. A) Site Area Emergency B) Site Area Emergency C) Site Area Emergency	No Protective Actions No Protective Actions Schools-Relocation of School children	Marion, Citrus and Levy Marion Marion, Citrus and Levy
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9. A) General Emergency B) General Emergency C) General Emergency	No Evacuation Shelter Farm/Milk Producing Animals Schools	Marion, Citrus and Levy Marion, Citrus and Levy Marion, Citrus and Levy
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EAS-1

EAS MESSAGE - SIREN TEST

At approximately _____ A.M. or P.M. (circle one) the sirens in Levy Nuclear Plant area will be tested. Sirens are located in the Counties of Citrus, Levy and Marion.

REPEAT: The siren you will hear at approximately _____ is part of a test.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and Time of Issuance _____

Issued by _____

EAS-2A

EAS - ALERT DECLARATION

The Emergency Management Director and the Chairperson of the Citrus, Levy, and Marion County Board of Commissioners have authorized the following announcement: Progress Energy Corporation has declared that an "Alert" condition exists at the Levy Nuclear Plant.

There is no danger to the public at the present time. There is no need to take any type of protective measures. For further information refer to the Emergency Planning Brochure that was mailed to you. Please stay tuned to your EAS station for further developments.

REPEAT: An "Alert" condition exists at the Levy Nuclear Plant. No action on your part is required at this time. Stay tuned for further announcements.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-2B

EAS - ALERT SCHOOL RELOCATION

The Emergency Management Director and the Chairperson of the Citrus, Levy and Marion County Board of Commissioners have authorized the following announcement:

Progress Energy Corporation has declared that an “Alert” condition exists at the Levy Nuclear Plant.

There is no danger to the public at this time. There is no need to take any type of protective measures.

School officials are making the decision to relocate:

- **All Crystal River Schools,**
- **Yankeetown School,**
- **Dunnellon Middle School,**
- **Dunnellon Christian Academy, and**
- **Romeo Elementary School**

Do not attempt to pick up your child at the schools being relocated, as they will be priority bussed to the following locations:

- **Crystal River Primary, Crystal River High School, Academy of Environmental Science and Marine Science Station will be relocated to the Citrus County Fairground Auditorium on Hwy 41 south of Inverness.**
- **Crystal River Middle school will be relocated to Citrus Springs Middle School.**
- **Yankeetown School will be relocated to Bronson High School.**
- **Dunnellon Middle School, Dunnellon Christian Academy, and Romeo Elementary School will be relocated to the West Port High School at 3733 SW 80th Avenue Ocala.**

We advise you to maintain contact with your EAS station and refer to the Emergency Planning Brochure that was mailed to you.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued By _____

EAS-3

EAS - ALERT TERMINATION

The Emergency Management Director and the Chairperson of the Citrus, Levy and Marion County Board of Commissioners have just been informed that the situation at the Levy Nuclear Plant that caused an “Alert” Notification has been corrected. The Emergency Action Level is now normal.

REPEAT: The condition at the Levy Nuclear Plant has returned to normal. No further announcements will be made.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-4A

EAS - SITE AREA EMERGENCY NO PROTECTIVE ACTIONS – CITRUS, LEVY AND MARION

The Emergency Management Director and the Chairperson of the Citrus, Levy and Marion County Board of Commissioners have received a report from officials at Progress Energy Corporation that a “Site Area Emergency” exists at the Levy Nuclear Plant.

If a release of radioactive material should occur, it is expected to be of extremely low level and limited to the company property.

No specific action is necessary at this time to insure public health or safety.

The Florida Department of Health Bureau of Radiation Control is monitoring the situation near the plant.

Stay tuned for further information.

For more emergency information refer to the Emergency Planning Brochure that was mailed to you.

REPEAT: No action is required on your part at this time.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-4B

EAS - SITE AREA EMERGENCY NO PROTECTIVE ACTIONS - MARION

The Emergency Management Director and the Marion County Board of County Commissioners in conjunction with State, Federal and Levy Nuclear Plant officials have reported that they have received a report of

Any release of radioactive materials is expected to be limited to small fractions of exposure levels approved by the Environmental Protection Agency and limited to the nuclear plant boundary. It has been determined that no protective actions are required at this time to ensure and maintain public health and safety. The Department of Health, Bureau of Radiation Control will continuously monitor and assess the radiation levels near the Levy Nuclear Power Plant to confirm earlier reports.

As monitoring results become available, protective actions will be recommended as needed.

Stay tuned to this station for further information.

For more emergency information, refer to the Emergency Planning brochure that was mailed to you.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-4C

EAS - SITE AREA EMERGENCY SCHOOLS –RELOCATION OF SCHOOL CHILDREN– CITRUS, LEVY & MARION

The Emergency Management Director and the Chairperson for the Board of Commissioners in Citrus, Levy and Marion Counties have received a report from officials of Progress Energy Corporation that a “Site Area Emergency” exists at the Levy Nuclear Plant.

If a release of radioactive material should occur, it is expected to be of extremely low levels and limited to the company property. No specific action is necessary at this time to insure public health or safety.

School officials have made the decision to relocate the following schools:

CITRUS COUNTY

All Crystal River Schools to Inverness as follows:

Crystal River Primary, Crystal River High School, Academy of Environmental Science and Marine Science Station will relocate to the Citrus County Fairground Auditorium on Hwy. 41 south of Inverness.

Crystal River Middle School will relocate to Citrus Springs Middle School.

LEVY COUNTY

Yankeetown School will relocate to the Bronson High School at 350 School St. Bronson.

MARION COUNTY

Dunnellon Middle School, Dunnellon Christian Academy, and Romeo Elementary School will relocate to the West Port High School at 3733 SW 80th Avenue Ocala.

Do not attempt to pick up your child at the schools being relocated, as they will have priority bussing out of the area.

Stay tuned to this station for further information.

For more emergency information refer to the Emergency Planning Brochure that was mailed to you.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issue _____

Issued By _____

EAS-5

EAS - SITE AREA EMERGENCY SHELTER FARM / MILK PRODUCING ANIMALS – CITRUS, LEVY & MARION

The Emergency Management Director and the Chairperson for the Board of Commissioners in Citrus, Levy and Marion Counties have received a report from officials at Progress Energy Corporation that a “Site Area Emergency” exists at the Levy Nuclear Plant.

The declared “Site Area Emergency” at the Levy Nuclear Plant does not present a problem for humans at this time. However, as a precaution, it is recommended that all milk cows that are in pasture within 2 miles of the Levy Nuclear Plant,

(Comments – If necessary)

be placed on stored feed to prevent ingestion of radioactive contamination that could accumulate in their milk. The Florida Department of Agriculture will begin surveys of all milk products to insure purity. For assistance in obtaining stored feed, farmers and dairymen should contact your local Extension Agent.

REPEAT: Any release of radioactive materials is confined to the Levy Nuclear Plant site boundary and is less than the Environmental Protection Agency guidelines.

Stay tuned to this station for further information.

For more emergency planning information refer to the Emergency Planning Brochure that was mailed to you.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR
OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

EAS-6A

EAS - SITE AREA EMERGENCY IN- HOME SHELTER– CITRUS, LEVY & MARION COUNTIES

The Emergency Management Director and the Chairperson for the Board of Commissioners in Citrus, Levy and Marion Counties have received a report from officials at Progress Energy Corporation that a “Site Area Emergency” exists at the Levy Nuclear Plant.

The Emergency Management Director and the Chairperson for the Board of Commissioners for Citrus, Levy and Marion Counties, in conjunction with State, Federal and Levy Nuclear Plant officials recommend that people residing in the area of the Levy Nuclear Plant, avoid radiation exposure in the following area by taking shelter indoors. (Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

**SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE
AREAS TO IN-HOME SHELTER** _____

There has been a release of radioactive material at the Levy Nuclear Plant but it is of such low magnitude that evacuation is not considered necessary at this time. You are advised to remain indoors, close all doors and windows, shut off your air conditioning or ventilation systems.

REPEAT: You are **NOT** being told to evacuate. Simply limit your outdoor activity and remain indoors. Exclude as much outside air as possible.

Stay tuned to this station for further information.

For more emergency information refer to the Emergency Planning Brochure that was mailed to you.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE
HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

EAS-6B

EAS - SITE AREA EMERGENCY IN-HOME SHELTER OF ZONE M9 - MARION

The Emergency Management Director and the Marion County Board of Commissioners have received a report from officials at Progress Energy Corporation that a "Site Area Emergency" exists at the Levy Nuclear Plant.

The Emergency Management Director and the Marion County Board of County Commissioners, in conjunction with State, Federal and Levy Nuclear Plant officials, has issued a warning to all residents within a _____ mile radius of the Levy Nuclear Plant, to avoid radiation exposure in the area described by taking shelter indoors.

SEE THE ACCOMPANIED M9 PAD EAS MESSAGE DESCRIBING THE AREAS TO IN-HOME SHELTER _____

You are advised to seek shelter immediately, go indoors, close windows and doors, and stay inside until you receive further instructions. There has been a release of radioactive materials at the Levy Nuclear Plant. At present, it is confined to the Levy Nuclear Plant site, and a release, if any, to the public will be within Environmental Protection Agency guidelines.

Evacuation has NOT been recommended at this time.

Stay tuned to this station for further information.

Refer to the Emergency Planning Brochure that was mailed to you.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

**EAS - SITE AREA EMERGENCY
EVACUATION PREPARATION – CITRUS, LEVY & MARION**

The Emergency Management Director and the Chairperson for the Board of Commissioners in Citrus, Levy and Marion Counties have received a report from officials at Progress Energy Corporation that a “Site Area Emergency” exists at the Levy Nuclear Plant.

The Emergency Management Director and the Board of County Commissioners for Citrus, Levy and Marion Counties, after consultation with State of Florida and Progress Energy Corporation officials, suggests that people residing within _____ miles in a _____ direction from the Levy Nuclear Plant should consider preparing for an evacuation.

Refer to the Emergency Planning Brochure that was mailed to you.

This area includes: (Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS TO EVACUATE. _____

If the present situation at the Levy Nuclear Plant was to deteriorate, and release of radioactive material becomes a significant amount, we could ask you to evacuate. Radioactive materials released would decay very rapidly. Your stay away from home should be short. It is recommended you give consideration to where you would go and what you would take with you. It might be advisable to locate your recommended evacuation supplies. Consider the following items.

1. Toilet articles
2. Blankets and/or sleeping bag
3. Important papers
4. Prescription medicine and essential medical supplies
5. Change of Clothing
6. Discuss evacuation problems with your neighbor
7. Dietary foods and/or baby supplies

REPEAT: These are precautionary messages: You are NOT, repeat NOT being told to evacuate at this time.

Stay tuned to this station for further information.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and Time of Issuance _____

Issued by _____

**EAS - SITE AREA EMERGENCY
EVACUATION PREPARATION - MARION**

The Emergency Management Director and the Marion County Board of Commissioners have received a report from officials at Progress Energy Corporation that a “Site Area Emergency” exists at the Levy Nuclear Plant.

The Chairperson of the Marion County Board of Commissioners after consultation with State of Florida and Progress Energy Corporation officials suggests that people residing within _____ miles in a _____ direction from the Levy Nuclear Plant should consider preparing for an evacuation.

Refer to the Emergency Planning Brochure that was mailed to you.

This area includes Marion County Zone M9.

If the present situation at the Levy Nuclear Plant was to deteriorate, and release of radioactive material becomes a significant amount, we could ask you to evacuate. Radioactive materials released would decay very rapidly. Your stay away from home should be short. It is recommended you give consideration to where you would go and what you would take with you. It might be advisable to locate your recommended evacuation supplies. Consider the following items.

1. Toilet articles
2. Blankets and/or sleeping bag
3. Important papers
4. Prescription medicine and essential medical supplies
5. Change of Clothing
6. Discuss evacuation problems with your neighbor
7. Dietary foods and/or baby supplies

REPEAT: These are precautionary messages: You are **NOT**, repeat **NOT** being told to evacuate at this time.

Stay tuned to this station for further information.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-8A

EAS - SITE AREA EMERGENCY TERMINATION – CITRUS, LEVY & MARION

The Emergency Management Director and the Chairperson of the Board of County Commissioners for Citrus, Levy and Marion Counties have been notified by officials of Progress Energy Corporation that the emergency at the Levy Nuclear Plant has been terminated. State of Florida and Federal officials agree that conditions are stable and there is no threat to the public safety.

REPEAT: The emergency is over. The Levy Nuclear Plant is now stable and safe. You are free to return to all normal activity. The emergency is over.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and Time of Issuance _____

Issued by _____

EAS-8B

EAS - SITE AREA EMERGENCY TERMINATION - MARION

The Emergency Management Director and the Marion County Board of Commissioners, in conjunction with State, Federal and Levy Nuclear Plant officials has reported that the “Site Area Emergency” at the Levy Nuclear Plant has been terminated. Plant conditions are now stable and pose no threat of danger to the public.

REPEAT: The emergency is over. The Levy Nuclear Plant is now stable and safe. You are free to return to all normal activity. The emergency is over.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-9A

EAS - GENERAL EMERGENCY NO EVACUATION – CITRUS, LEVY & MARION

The Emergency Management Director and the Chairperson of the Board of County Commissioners for Citrus, Levy and Marion Counties have received a report from officials at Progress Energy Corporation that a “General Emergency” at the Levy Nuclear Plant has been declared.

Radioactive material releases are possible due to the existing condition at the Levy Nuclear Plant. You are advised to remain calm. The situation is being monitored by Local and State officials. There is no danger at the present time.

We advise you to stay tuned to your Emergency Alert Station and refer to the Emergency Planning Brochure that was mailed to you. Be sure your neighbors are aware of the emergency.

REPEAT: A “General Emergency” has been declared for the Levy Nuclear Plant. Take no special action at this time. Remain calm and stay tuned to Emergency Alert Station for further instructions.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-9B

EAS –GENERAL EMERGENCY

SHELTER FARM / MILK PRODUCING ANIMALS – CITRUS, LEVY & MARION

The Emergency Management Director and the Board of County Commissioner for Citrus, Levy and Marion Counties, after consultation with State and Federal health officials, make the following announcement due to the General Emergency at the Levy Nuclear Plant.

It is recommended that all milk cows that are in pasture within 10 miles of the Levy Nuclear Plant be placed on stored feed to prevent ingestion of radioactive contamination that could accumulate in their milk. The Florida Department of Agriculture will begin surveys of all milk products to insure purity. For assistance in obtaining stored feed, farmers and dairymen should contact your local Extension Agent.

The areas of concern are described as out to 10 miles in all directions from the Progress Energy Levy Nuclear Plant as described by the following:

CITRUS COUNTY - ZONES C1, C3 AND C4:

- Areas south of the Withlacoochee River and Lake Rousseau;
- West of, but not including Citrus Springs and Pine Ridge;
- West of the intersection of Rt. 44 and Rt. 486;
- All residents north of the intersection of Ozello Trail (Rt. 494) and U.S. 19;
- All recreational and commercial boaters in the Gulf of Mexico out to 10 miles from the Progress Energy Complex.

LEVY COUNTY - ZONE L5, L6, L7 AND L8:

- Areas north of the Withlacoochee River and Lake Rousseau and south of the Levy County Sheriff's Substation (the old Highway Patrol Station on U.S. 19).

MARION COUNTY - ZONE M9:

- Areas north of Lake Rousseau and south of a line between STHY 337 and the west end of 95th St, 95th St, Ridgewood Rd, County Rd 545, Buena Vista Rd, Falcon Ave, Terrapin Dr, Amberjack Ave, Timberlake Rd, Indian Hill Dr, Viburnum Rd, Pine Bluffs Rd, and a line from the western end of Pine Bluffs Rd to Sea Cliff Ave, 210th Ave, and 36th St.
- Areas west of USHY 41, and east of Marion County boundary, Halfmoon Dr, 120th St, and STHY 337.

EAS-9B (CONTINUED)

CITRUS COUNTY AREAS AFFECTED INCLUDE:

- River Road Area (south of Inglis/Yankeetown)
 - Hollingswood Ranch
 - Crystal River City Limits
 - Ozello
 - Garden Hills
 - Seven Rivers Country Club area
 - Crystal River Airport area
 - Plantation Golf Club area
 - Palm Springs
 - Crystal Shores
 - The Islands
 - Dixie Shores
 - Paradise Point
 - Woods 'N Waters
 - Crystal Manor
 - Crystal River Elementary School
 - Crystal River Manor
 - Crystal River Oaks
 - Indian Waters
 - Crystal River Archeological Site (Indian Mounds Park)
 - Crystal River Yacht Club area
 - Shamrock Acres
 - Holiday Acres
 - Holiday Heights
 - DeRosa Village
 - Woodridge Country Estates
 - Lake Rousseau Country Estates
 - Whitehall Estates
 - Seven Rivers Heights
 - Rainbow Estates
 - Highland Heights
 - Seven Rivers Farms
 - Crystal Pointe
 - Citronelle
 - Sunshine Gulf Estates
 - Crystal River High School
 - Crystal River Middle School
 - Indian Mounds
 - Cedar Lakes Estates
 - Country Oaks
 - Fort Island Gulf Beach
 - Greenwood Estates
- All recreational and commercial boaters in surrounding waterways and in the Gulf of Mexico out to 10 miles from the Progress Energy Complex.

LEVY COUNTY AREAS AFFECTED INCLUDE:

- Yankeetown
- Inglis
- Gulf Hammock area (south of the Levy County Sheriff's Office Substation, the old Highway Patrol Station)
- Peaceful Acres
- All recreational and commercial boaters in the Gulf of Mexico out to 10 miles from the Progress Energy Complex.

MARION COUNTY AREAS AFFECTED INCLUDE:

- Dunnellon Middle School
- Dunnellon Christian Academy
- All recreational and commercial boaters in surrounding waterways out to 10 miles from the Progress Energy Complex.
- Romeo Elementary School

EAS-9B (CONTINUED)

(Comments – If necessary)

REPEAT: It is recommended that all milk cows that are in pasture within 10 miles of the Levy Nuclear Plant be placed on stored feed.

Stay tuned to this station for further information.

For more emergency planning information refer to the Emergency Planning Brochure that was mailed to you.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-9C

EAS - GENERAL EMERGENCY SCHOOLS – CITRUS, LEVY & MARION

The Emergency Management Director and Chairperson of the Board of County Commissioners for Citrus, Levy and Marion Counties have announced that a “General Emergency” has been declared at the Levy Nuclear Plant.

Radioactive material releases are possible due to the existing conditions of the Levy Nuclear Plant. You are advised to remain clam. The situation is being monitored by local and state officials. There is no danger at the present time.

School officials have made the decision to relocate all Crystal River and select Citrus, Levy and Marion County schools as follows:

CITRUS COUNTY

Crystal River Primary, Crystal River High School, Academy of Environmental Science and Marine Science Station will relocate to the Citrus County Fairground Auditorium on Hwy 41 south of Inverness.

Crystal River Middle School will relocate to Citrus Springs Middle School.

LEVY COUNTY

In Levy County, Yankeetown students will be bussed to Bronson High School.

MARION COUNTY

In Marion County Dunnellon Middle School, Dunnellon Christian Academy, and Romeo Elementary School will relocate to the West Port High School at 3733 SW 80th Avenue Ocala.

DO NOT attempt to pick up your child at their school, as they will be priority bussed out of the area.

Stay tuned to your local EAS station and refer to the Emergency Planning Brochure that was mailed to you.

REPEAT: A “General Emergency” has been declared at Levy Nuclear Plant. All school children have been priority bussed out of the area.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time issued _____

Issued By _____

EAS-10A

EAS - GENERAL EMERGENCY IN-HOME SHELTER– CITRUS, LEVY & MARION COUNTIES

The Emergency Management Director and the Chairperson of the Board of Commissioners in Citrus, Levy and Marion Counties have been notified by officials of Progress Energy Corporation that conditions exist at the Levy Nuclear Plant which required them to declare a “General Emergency”. This is a warning to all people who live in the areas described to seek shelter immediately.
(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

**SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS
TO IN-HOME SHELTER.**_____

**You are advised to seek indoor shelter immediately, close your doors and windows,
shut off ventilation and air conditioning systems.**

Refer to the Emergency Planning Brochure that was mailed to you.

Be sure your neighbor knows of this warning.

**There has been a release of radioactive material but is confined to the company
property and there is no immediate danger to the public at this time.**

Stay tuned to this station for further information.

**REPEAT: At this time we recommend you stay indoors. Keep your radio tuned to
this station for further information.**

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE
HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time issuance _____

Issued by _____

EAS-10B

EAS – GENERAL EMERGENCY IN-HOME SHELTER – MARION COUNTY

The Emergency Management Director and the Marion County Board of Commissioners have received a report from officials at Progress Energy Corporation that a “General Emergency” was declared at the Levy Nuclear Plant.

The Emergency Management Director and the Marion County Board of County Commissioners, in conjunction with State, Federal and Levy Nuclear Plant officials, has issued a warning to all residents within a _____ mile radius of the Levy Nuclear Plant, to avoid radiation exposure in the area by taking shelter indoors. (Refer to Figure 12 to get description of the PAD # to implement.)

**SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE
AREAS TO IN-HOME SHELTER.** _____

You are advised to seek shelter immediately, go indoors, close windows and doors, and stay inside until you receive further instructions. There has been a release of radioactive materials from the Levy Nuclear Plant. At present, it is confined to the Levy Nuclear Plant site, and a release, if any, to the public will be within Environmental Protection Agency guidelines.

Evacuation has NOT been recommended at this time.

Stay tuned to this station for further information.

Refer to the Emergency Planning Brochure that was mailed to you.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE
HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and Time of Issuance _____

Issued by _____

EAS-11

EAS - GENERAL EMERGENCY GOVERNORS DECLARATION

The Emergency Management Director and the Chairperson of the Board of County Commissioners for Citrus, Levy and Marion Counties have announced that a “General Emergency” has been declared by the Progress Energy Corporation at the Levy Nuclear Plant. The Governor of Florida, the Honorable _____ has declared that an emergency exists in Citrus, Levy and Marion Counties. His /her authorized representative is now in charge of all Protective Actions to be taken to protect the health and property of the citizens of Citrus, Levy and Marion Counties.

The evacuated areas include:

(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS
EVACUATE. _____

Stay tuned to this station for further announcements and instructions.

Refer to the Emergency Planning Brochure that was mailed to you for emergency information.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE
HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

EAS-12

EAS - GENERAL EMERGENCY FOLLOW-UP / ACCESS CONTROL

The Emergency Management Director and the Chairperson of the Board of Commissioners in Citrus, Levy and Marion Counties have been notified by officials of Progress Energy Corporation that conditions exist at the Levy Nuclear Plant which required them to declare a “General Emergency”.

The Emergency Management Director and the Chairperson of the Board of County Commissioners in cooperation with the Governor's authorized representative have ordered all personnel to evacuate from the area affected by the “General Emergency”.

During the period of evacuation, law enforcement officers will control access to the evacuated homes and businesses.

The evacuated areas include:

(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS THAT WERE EVACUATED. _____

No unauthorized persons will be allowed in the evacuated zones. Fire Department personnel will be available for fire suppression activities.

Officials of the Florida Department of Health, Bureau of Radiation Control, will monitor radiation levels in the affected areas continuously.

Depending upon their findings, you may be allowed to return home from time to time to care for pets and farm animals or to pick up additional clothes or necessities. When conditions are determined safe, you will be notified to return home.

Stay tuned to this station for further information.

Refer to the Emergency Planning Brochure that was mailed to you.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-13A

GENERAL EMERGENCY

EVACUATION OF ALL ZONES – CITRUS, LEVY & MARION

The Emergency Management Director and the Chairperson of the Board of Commissioners in Citrus, Levy and Marion Counties have been notified by officials of Progress Energy Corporation that conditions exist at the Levy Nuclear Plant which required them to declare a “General Emergency”.

The Emergency Management Director and the Chairperson of the Board of County Commissioners in cooperation with the Governor's authorized representative, have ordered all personnel to evacuate from the area affected by the “General Emergency” previously announced.

The Emergency Management Director and the Chairperson of the County Board of Commissioners in Citrus, Levy and Marion Counties, in conjunction with State, Federal and Nuclear Plant officials have issued an order directing the immediate evacuation of all personnel in the affected area(s). Those personnel hearing the warning sirens should consider themselves in the affected area and refer to the Emergency Planning Brochure that was mailed to you for more information.

The areas to be evacuated are as follows:

(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement.
Marion – Refer to Figure 12 for PAD descriptions.)

SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS TO EVACUATE

We recommend you take the following items with you.

1. Toilet articles
2. Blankets and/or sleeping bag
3. Important papers
4. Prescription medicine/baby supplies
5. Change of clothing
6. Discuss evacuation problem with your neighbor.

Lock your home securely. Turn off gas, water and electric.

We request you evacuate via routes as outlined in the Emergency Planning Brochure distributed to area residents and as directed by local law enforcement officers. The recommended evacuation routes are as follows:

EAS-13A (CONTINUED)

**SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE
RECOMMENDED ROUTES OUT OF THE AREA.**_____

Please keep on the main road. Many of the smaller roads may be closed.

Time is important but move safely. Accidents will only slow everything down.

Persons registered with the Citrus, Levy or Marion County Human Services "Special Needs" program will be transported by the agency if required.

Farmers are advised to shelter animals if feasible and put milk cows on stored feed. For obtaining stored feed, farmers and dairymen should contact the County Extension Office .

Persons immediately outside of the affected area are not subject to a direct hazard. However, these persons should remain alert to any possible changes in instructions resulting from changes in wind direction, or accident conditions.

Persons outside the affected area are also asked not to travel on or near routes being used for evacuation.

Stay tuned to your radio or TV EAS stations for further information.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE
HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

**GENERAL EMERGENCY
PARTIAL EVACUATION AND PARTIAL IN-HOME SHELTER–
CITRUS, LEVY & MARION**

The Emergency Management Director and the Chairperson of the Board of Commissioners in Citrus, Levy and Marion Counties have been notified by officials of Progress Energy Corporation that conditions exist at the Levy Nuclear Plant which required them to declare a “General Emergency”.

The Emergency Management Director and the Chairperson of the Board of County Commissioners in cooperation with the Governor's authorized representative, have ordered all personnel to either evacuate from certain areas and in home shelter other areas affected by the “General Emergency” previously announced. Please refer to the accompanied PAD EAS Message describing the areas to evacuate and the areas to in-home shelter. In areas you are told to in-home shelter, you are advised to seek indoor shelter immediately, close your doors and windows, shut off ventilation and air conditioning systems.

Those personnel hearing the warning sirens should consider themselves in the affected area and refer to the Emergency Planning Brochure that was mailed to you for more information.

The area to be evacuated and in-home shelter is as follows:
(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

**SEE THE ACCOMPANIED PAD EAS MESSAGE DISCRIBING THE AREAS TO
EVACUATE AND THE AREAS TO IN-HOME SHELTER_____**

We recommend you take the following items with you.

1. Toilet articles
2. Blankets and/or sleeping bag
3. Important papers
4. Prescription medicine/baby supplies
5. Change of clothing
6. Discuss evacuation problem with your neighbor.

Lock your home securely. Turn off gas, water and electric.

We request you evacuate via routes as outlined in the Emergency Planning Brochure distributed to area residents and as directed by local law enforcement officers. The recommended evacuation routes are as follows:

EAS-13B (CONTINUED)

(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE RECOMMENDED ROUTES OUT OF THE AREA_____.

Please keep on the main road. Many of the smaller roads may be closed.

Time is important but move safely. Accidents will only slow everything down.

Persons registered with the Citrus, Levy or Marion County Human Services "Special Needs" program will be transported by the agency if required.

Farmers are advised to shelter animals if feasible and put milk cows on stored feed. For obtaining stored feed, farmers and dairymen should contact the County Extension Office.

Persons immediately outside of the affected area are not subject to a direct hazard. However, these persons should remain alert to any possible changes in instructions resulting from changes in wind direction, or accident conditions.

Persons outside the affected area are also asked not to travel on or near routes being used for evacuation.

Stay tuned to your radio or TV EAS stations for further information.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15
MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC
INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

**EAS - GENERAL EMERGENCY
TEMPORARY RE-ENTRY**

The Emergency Management Director and the Chairperson of the Board of County Commissioners for Citrus, Levy and Marion Counties in cooperation with the Governor's authorized representative, have ordered all personnel to evacuate from the area affected by the Levy Nuclear Plant's declared "General Emergency" previously announced.

The Emergency Management Directors of and the Board of County Commissioners for Citrus, Levy and Marion Counties have been informed by the Governor's authorized representative that residents in the following area:

(Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

**SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS
THAT WERE EVACUATED** _____

may on a temporary basis, return to their homes and/or businesses to check on pets, livestock and equipment. Only one person per household or business shall enter the area. Entry will be permitted only at _____ between the hours of _____ and you must clear the area no later than _____.

Those persons entering the area must be prepared to identify themselves and the purpose of their trip.

Stay tuned to your radio and TV EAS stations for further information and the Emergency Planning Brochure that was mailed to you.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE
HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

EAS-15

EAS - GENERAL EMERGENCY ALL CLEAR

The Emergency Management Director and the Chairperson of the Citrus, Levy and Marion County Board of Commissioners have been informed by the Governor's authorized representative that the "General Emergency" at the Levy Nuclear Plant has ended. It is now safe to return to your residence and/or business.

REPEAT.... The "General Emergency" conditions in the area of the Levy Nuclear Plant have now ended. You may return home and resume normal activities. There is no longer any threat to health and safety of persons in the area.

**THIS MESSAGE SHOULD BE REPEATED THEN EVERY 15 MINUTES
FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION
OFFICER.**

Date and time of issuance _____

Issued by _____

EAS-16

EAS - GENERAL EMERGENCY SPECIAL NEEDS - EVACUATION

The Chairperson of Citrus, Levy and Marion County Board of Commissioners announced that because of the Levy Nuclear Plant's declared "General Emergency" it has been decided that all people with Special Needs should be evacuated from the following area: (Citrus and Levy - Refer to Appendix 4B to get description of the PAD # to implement. Marion – Refer to Figure 12 for PAD descriptions.)

SEE THE ACCOMPANIED PAD EAS MESSAGE DESCRIBING THE AREAS TO

EVACUATE._____

Assistance in evacuation is being provided by the Community Affairs Department, the Emergency Medical Services and the School Board. If you have registered your needs with either Emergency Management or Human Services, you will be called to arrange pickup for evacuation. If you are not registered and need assistance, call Citrus County Emergency Management at 746-6555.

In Citrus County, call 352-746-6555. In Levy County, call _____.

In Marion County, call _____.

There is no need to be alarmed. The evacuation is a precautionary measure to insure that people with a special need receive priority treatment.

REPEAT: As a precaution due to the existing General Emergency at the Levy Nuclear Plant only those people with Special Needs are being evacuated from the area around the Nuclear Plant

There is no cause for alarm. This action is being taken as a precautionary measure only.

Stay tuned to this station for further information.

Refer to the Emergency Planning Brochure that was mailed to you for additional information.

THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.

Date and time of issuance _____

Issued by _____

EAS-17

EAS - DRILL - EXERCISE NOTICE DRILL/EXERCISE

In compliance with Local, State and Federal regulations an exercise is being conducted today in our area regarding the Levy Nuclear Power Plant. The exercise is being coordinated through the combined efforts of the Emergency Management Agency of Citrus County, Levy County, Marion County, State, Federal and the Levy Nuclear Plant officials.

Periodically throughout the day news releases may be made through the general news media as this exercise progresses.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR
OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance _____

Issued by _____

EAS-18

GENERAL KI DISTRIBUTION

The Emergency Management Director and the Chairperson of the Board of County Commissioners in Citrus, Levy and Marion Counties have been notified by officials of Progress Energy Corporation that conditions exist at the Levy Nuclear Plant which required them to declare a “General Emergency”.

The Emergency Management Director and the Board of County Commissioners from Citrus, Levy, and Marion counties with coordination with the Florida Department of Health / Bureau of Radiation Control Operations Officer, has determined that individuals directed to evacuate the 10-mile Emergency Planning Zone should report to Reception Centers for screening and distribution of Potassium Iodide as needed.

Potassium Iodide pills are available at the Reception Centers in Citrus, Levy and Marion Counties.

Residents should consult their Emergency Planning Brochure that was mailed to them for additional information.

Please stay tuned to this station for additional information giving specific locations of the reception centers.

**THIS MESSAGE SHOULD BE REPEATED EVERY 15 MINUTES FOR ONE HOUR
OR AS DIRECTED BY THE PUBLIC INFORMATION OFFICER.**

Date and time of issuance_____

Issued by_____



47 Mall Drive, Suite 8
Commack, NY 11725 USA
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Fax: 631.543.4330

www.kldassociates.com

April 1, 2008

Mr. John Stephenson
Emergency Preparedness Supervisor
Progress Energy Crystal River EOF
8200 West Venable Street
Crystal River, FL 34429-5492

Ref: Revisions to the Levy Nuclear Plant Final ETE Report

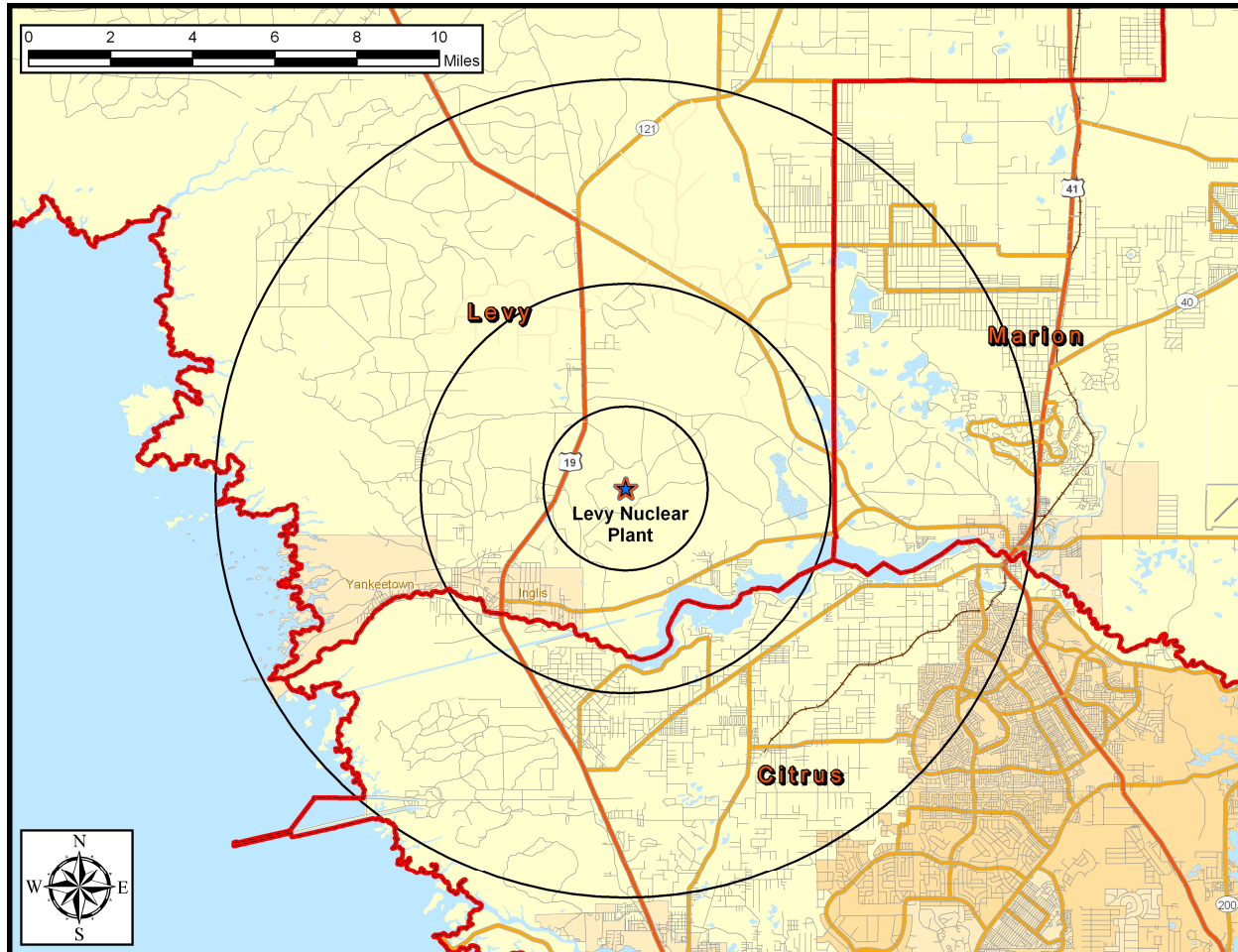
Dear John:

Enclosed is a PDF file containing the revised final version of the Levy Nuclear Plant ETE Report, marked Rev. 3. All cases were re-run due to the error in the input stream identified in the deficiency report e-mailed to you on March 5th. Changes have been made to the Executive Summary, Section 7, Section 8, Appendix I and Appendix J based on the changes in ETE in the new runs. The date of the report has been updated to April, 2008 on the Cover Page. We sincerely apologize for any inconvenience this may have caused.

Respectfully submitted,

Kevin Weinisch, P.E.
Senior Traffic Engineer

***Levy Nuclear Plant
Development of Evacuation Time Estimates***



Prepared for:

Progress Energy

by:

**KLD Associates, Inc.
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<mailto:kweinisch@kldassociates.com>**

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12-1	Estimated Number of Telephone Calls Required for Confirmation of Evacuation-----	12-2

EXECUTIVE SUMMARY

This report describes the analyses undertaken and the results obtained by a study to develop Evacuation Time Estimates (ETE) for the Levy Nuclear Plant (LNP) located in Levy County, Florida. ETE are part of the required planning basis and provide LNP and State and local governments with site-specific information needed for Protective Action decision-making.

In the performance of this effort, all available prior documentation published by Federal Government agencies and relevant to ETE was reviewed. Most important of these are:

- Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG 0654/FEMA-REP-1, Rev. 1, November 1980.
- Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones, NUREG/CR-1745, November 1980.
- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/CR-6863, January 2005.

Overview of Project Activities

This project began in February, 2007 and extended over a period of 7 months. The major activities performed are briefly described in chronological sequence:

- Attended “kick-off” meetings with Progress Energy personnel and emergency management personnel representing state and local governments.
- Reviewed prior ETE reports prepared for the Crystal River Nuclear Plant, which is located within 10 miles of the proposed LNP location.
- Accessed U.S. Census Bureau data files for the year 2000. Studied Geographical Information Systems (GIS) maps of the area in the vicinity of LNP, then conducted a detailed field survey of the highway network.
- Synthesized this information to create an analysis network representing the highway system topology and capacities within the Emergency Planning Zone (EPZ), plus a “Shadow” area extending 15 miles radially from the plant.
- Designed and sponsored a telephone survey of residents within the EPZ to gather focused data needed for this ETE study that were not contained within the census database. The survey instrument was reviewed and modified by State and county personnel prior to the survey.
- Data collection forms (provided to the counties at the kickoff meeting) were returned with data pertaining to employment, transients, and special facilities in each county.

- The traffic demand and trip-generation rates of evacuating vehicles were estimated from the gathered data. The trip generation rates reflected the estimated mobilization time (i.e., the time required by evacuees to prepare for the evacuation trip) computed using the results of the telephone survey of EPZ residents.
- Following Federal guidelines, the EPZ is subdivided into 8 Protective Action Zones (PAZ). These PAZ are then grouped within circular areas or “keyhole” configurations (circles plus radial sectors) that define a total of 13 Evacuation Regions.
- The time-varying external circumstances are represented as Evacuation Scenarios, each described in terms of the following factors: (1) Season (Summer, Winter); (2) Day of Week (Midweek, Weekend); (3) Time of Day (Midday, Evening); and (4) Weather (Good, Rain). One special scenario involving the completion of construction on Unit 2 when Unit 1 becomes operational in June 2016 at the LNP site was considered.
- The Planning Basis for the calculation of ETE is:
 - A rapidly escalating accident at LNP that quickly assumes the status of General Emergency such that the Advisory to Evacuate is virtually coincident with the siren alert.
 - While an unlikely accident scenario, this planning basis will yield ETE, measured as the elapsed time from the Advisory to Evacuate until the last vehicle exits the impacted Region, that represent “upper bound” estimates. This conservative Planning Basis is applicable for all initiating events.
- If the emergency occurs while schools are in session, the ETE study assumes that the children will be evacuated by bus directly to specified host schools located outside the EPZ. Parents, relatives, and neighbors are advised to not pick up their children at school prior to the arrival of the buses dispatched for that purpose. The ETE for school children are calculated separately.
- Evacuees who do not have access to a private vehicle will either ride-share with relatives, friends or neighbors, or be evacuated by buses provided as specified in the county evacuation plans. Those in special facilities will likewise be evacuated with public transit, as needed: bus, van, or ambulance, as required. Separate ETE are calculated for the transit-dependent evacuees and for those evacuated from special facilities.

Computation of ETE

A total of 143 ETE were computed for the evacuation of the general public. Each ETE quantifies the aggregate evacuation time estimated for the population within one of the 13 Evacuation Regions to completely evacuate from that Region, under the circumstances defined for one of the 11 Evacuation Scenarios (13 x 11 =143). Separate

ETE are calculated for transit-dependent evacuees, including school children for applicable scenarios.

Except for Region R03, which is the evacuation of the entire EPZ, only a portion of the people within the EPZ would be advised to evacuate. That is, the Advisory to Evacuate applies only to those people occupying the specified impacted region. It is assumed that 100 percent of the people within the impacted region will evacuate in response to this Advisory. The people occupying the remainder of the EPZ outside the impacted region may be advised to take shelter.

The computation of ETE assumes that a portion of the population within the EPZ but outside the impacted region, will elect to “voluntarily” evacuate. In addition, a portion of the population in the “Shadow” region beyond the EPZ that extends a distance of 15 miles from LNP, will also elect to evacuate. These voluntary evacuees could impede those who are evacuating from within the impacted region. The impedance that could be caused by voluntary evacuees is considered in the computation of ETE for the impacted region.

The computational procedure is outlined as follows:

- A link-node representation of the highway network is coded. Each link represents a unidirectional length of highway; each node usually represents an intersection or merge point. The capacity of each link is estimated based on the field survey observations and on established procedures.
- The evacuation trips are generated at locations called “zonal centroids” located within the EPZ. The trip generation rates vary over time reflecting the mobilization process, and from one location (centroid) to another depending on population density and on whether a centroid is within, or outside, the impacted area.
- The computer models compute the routing patterns for evacuating vehicles that are compliant with federal guidelines (outbound relative to the location of LNP), then simulate the traffic flow movements over space and time. This simulation process estimates the rate that traffic flow exits the impacted region.
- The ETE statistics provide the elapsed times for 50 percent, 90 percent, 95 percent and 100 percent, respectively, of the population within the impacted region, to evacuate from within the impacted region. These statistics are presented in tabular and graphical formats.

Traffic Management

This study includes the development of a comprehensive traffic management plan designed to expedite the evacuation of people from within an impacted region. This

plan, which was reviewed with State and local law enforcement personnel, is also designed to control access into the EPZ after returning commuters have rejoined their families.

The plan is documented in the form of detailed schematics specifying: (1) the directions of evacuation travel to be facilitated, and other traffic movements to be discouraged; (2) the traffic control personnel and equipment needed (cones, barricades) and their deployment; (3) the locations of these “Traffic Control Points” (TCP); (4) the priority assigned to each traffic control point indicating its relative importance and how soon it should be manned relative to others; and (5) the number of traffic control personnel required.

Selected Results

A compilation of selected information is presented on the following pages in the form of Figures and Tables extracted from the body of the report; these are described below.

- Figure 3-1 displays a map of the LNP site showing the layout of the 8 PAZ that comprise, in aggregate, the Emergency Planning Zone (EPZ).
- Table 3-1 presents the estimates of permanent resident population in each PAZ based on the 2000 Census data. Extrapolation to the year 2007 reflects population growth rates in each county obtained from the County Planning Departments.
- Table 6-1 defines each of the 13 Evacuation Regions in terms of their respective groups of PAZ.
- Table 6-2 lists the 11 Evacuation Scenarios.
- Tables 7-1C and 7-1D are compilations of ETE. These data are the times needed to *clear the indicated regions* of 95 and 100 percent of the population occupying these regions, respectively. These computed ETE include consideration of mobilization time, and of estimated voluntary evacuations from other regions within the EPZ and from the shadow region.
- Table 8-5A presents ETE for the schoolchildren in good weather.
- Table 8-7A presents ETE for the transit-dependent population in good weather.

Conclusion

This report presents the methodological details supporting the results obtained and recommendations for consideration by local emergency responders.

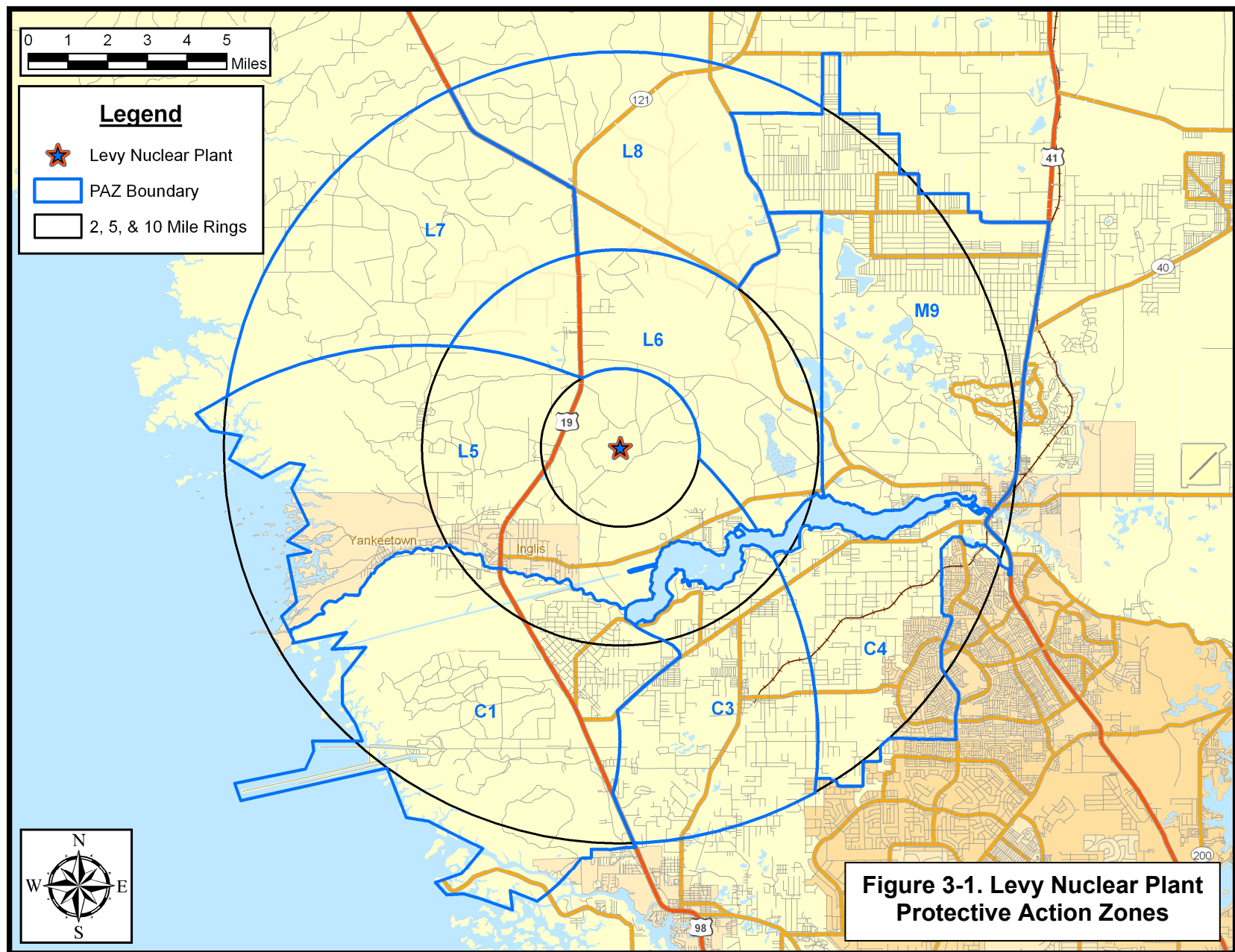


Table 3-1. EPZ Permanent Resident Population		
PAZ	2000 Population	2007 Population
C1	1,434	1,776
C3	4,422	5,476
C4	2,795	3,461
L5	3,004	3,601
L6	545	653
L7	14	17
L8	245	294
M9	5,866	7,480
TOTAL	18,325	22,758
Population Growth:		24%

Table 6-1. Description of Evacuation Regions									
Region	Description	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
R01	2 mile ring								
R02	5-mile ring								
R03	Full EPZ								
Evacuate 2 mile ring and 5 miles downwind									
Region	Wind Direction Towards:	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
Refer to R02	WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE								
Refer to R01	SSE, S, SSW, SW, WSW, W								
Evacuate 5 mile ring and downwind to EPZ boundary									
Region	Wind Direction Towards:	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
R04	N								
R05	NNE, NE								
R06	ENE, E								
R07	ESE, SE								
R08	SSE								
R09	S, SSW								
R10	SW, WSW								
R11	W								
R12	WNW								
R13	NW, NNW								

Table 6-2. Evacuation Scenario Definitions					
Scenarios	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Weekend	Midday	Good	New Plant Construction

Table 7-1C Time To Clear The Indicated Area of 95 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter		Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend		Weekend
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	Scenario:	(11)
Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather		New Plant Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ													
R01 2-mile ring	3:20	3:20	2:50	2:50	3:00	R01 2-mile ring	3:20	3:20	2:50	2:50	3:00	R01 2-mile ring	3:20
R02 5-mile ring	3:30	3:30	2:50	2:50	3:00	R02 5-mile ring	3:30	3:30	2:50	2:50	3:00	R02 5-mile ring	3:20
R03 Entire EPZ	3:40	3:50	3:10	3:10	3:10	R03 Entire EPZ	3:40	3:40	3:10	3:10	3:10	R03 Entire EPZ	3:30
2-Mile Ring and Downwind to 5 Miles													
Same As R01 SSE, S, SSW, SW, WSW, W	3:20	3:20	2:50	2:50	3:00	Same As R01 SSE, S, SSW, SW, WSW, W	3:20	3:20	2:50	2:50	3:00	Same As R01 SSE, S, SSW, SW, WSW, W	3:20
Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	3:30	3:30	2:50	2:50	3:00	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	3:30	3:30	2:50	2:50	3:00	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	3:20
5-Mile Ring and Downwind to EPZ Boundary													
R04 N	3:40	3:40	3:10	3:10	3:10	R04 N	3:40	3:40	3:00	3:10	3:10	R04 N	3:30
R05 NNE, NE	3:40	3:40	3:10	3:10	3:10	R05 NNE, NE	3:40	3:40	3:00	3:10	3:10	R05 NNE, NE	3:30
R06 ENE, E	3:40	3:40	3:10	3:10	3:10	R06 ENE, E	3:40	3:40	3:10	3:10	3:10	R06 ENE, E	3:30
R07 ESE, SE	3:40	3:40	3:10	3:10	3:10	R07 ESE, SE	3:40	3:40	3:10	3:10	3:10	R07 ESE, SE	3:30
R08 SSE	3:30	3:30	3:00	3:00	3:00	R08 SSE	3:30	3:30	2:50	2:50	3:00	R08 SSE	3:20
R09 S, SSW	3:30	3:30	3:00	3:00	3:00	R09 S, SSW	3:30	3:30	2:50	2:50	3:00	R09 S, SSW	3:20
R10 SW, WSW	3:30	3:30	2:50	2:50	3:00	R10 SW, WSW	3:30	3:30	2:50	2:50	3:00	R10 SW, WSW	3:20
R11 W	3:30	3:30	3:00	3:00	3:00	R11 W	3:30	3:30	3:00	3:00	3:00	R11 W	3:20
R12 WNW	3:30	3:30	3:00	3:00	3:00	R12 WNW	3:30	3:30	3:00	3:00	3:00	R12 WNW	3:20
R13 NW,NNW	3:30	3:30	3:00	3:00	3:00	R13 NW,NNW	3:30	3:30	3:00	3:00	3:00	R13 NW,NNW	3:20

Table 7-1D Time To Clear The Indicated Area of 100 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter		Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend		Weekend
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	Scenario:	(11)
Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather		New Plant Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ													
R01 2-mile ring	5:00	5:00	5:00	5:00	5:00	R01 2-mile ring	5:00	5:00	5:00	5:00	5:00	R01 2-mile ring	5:00
R02 5-mile ring	5:10	5:10	5:00	5:10	5:10	R02 5-mile ring	5:10	5:10	5:10	5:10	5:10	R02 5-mile ring	5:10
R03 Entire EPZ	5:10	5:10	5:10	5:10	5:10	R03 Entire EPZ	5:10	5:10	5:10	5:10	5:10	R03 Entire EPZ	5:10
2-Mile Ring and Downwind to 5 Miles													
Same As R01 SSE, S, SSW, SW, WSW, W	5:00	5:00	5:00	5:00	5:00	Same As R01 SSE, S, SSW, SW, WSW, W	5:00	5:00	5:00	5:00	5:00	Same As R01 SSE, S, SSW, SW, WSW, W	5:00
Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	5:10	5:10	5:00	5:10	5:10	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	5:10	5:10	5:10	5:10	5:10	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	5:10
5-Mile Ring and Downwind to EPZ Boundary													
R04 N	5:10	5:10	5:10	5:10	5:10	R04 N	5:10	5:10	5:10	5:10	5:10	R04 N	5:10
R05 NNE, NE	5:10	5:10	5:10	5:10	5:10	R05 NNE, NE	5:10	5:10	5:10	5:10	5:10	R05 NNE, NE	5:10
R06 ENE, E	5:10	5:10	5:10	5:10	5:10	R06 ENE, E	5:10	5:10	5:10	5:10	5:10	R06 ENE, E	5:10
R07 ESE, SE	5:10	5:10	5:10	5:10	5:10	R07 ESE, SE	5:10	5:10	5:10	5:10	5:10	R07 ESE, SE	5:10
R08 SSE	5:10	5:10	5:00	5:10	5:10	R08 SSE	5:10	5:10	5:10	5:10	5:10	R08 SSE	5:10
R09 S, SSW	5:10	5:10	5:00	5:10	5:10	R09 S, SSW	5:10	5:10	5:10	5:10	5:10	R09 S, SSW	5:10
R10 SW, WSW	5:10	5:10	5:00	5:10	5:10	R10 SW, WSW	5:10	5:10	5:10	5:10	5:10	R10 SW, WSW	5:10
R11 W	5:10	5:10	5:10	5:10	5:10	R11 W	5:10	5:10	5:10	5:10	5:10	R11 W	5:10
R12 WNW	5:10	5:10	5:10	5:10	5:10	R12 WNW	5:10	5:10	5:10	5:10	5:10	R12 WNW	5:10
R13 NW,NNW	5:10	5:10	5:10	5:10	5:10	R13 NW,NNW	5:10	5:10	5:10	5:10	5:10	R13 NW,NNW	5:10

Table 8-5A. School Evacuation Time Estimates - Good Weather								
School	Driver Mobilization Time(min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)	Travel Time to EPZ Bndry (min)	ETE (hr:min)	Dist. EPZ Bndry to R.C. (mi.)	Travel Time EPZ Bndry to RC (min)	ETE to R.C. (hr:min)
Levy County Schools								
Yankeetown School	90	5	9.7	12	1:50	20.7	25	2:15
Citrus County Schools								
Citrus Springs Elementary School	90	5	2.0	3	1:40	2.9	4	1:45
Marion County Schools								
Dunnellon Middle School	90	5	7.8	10	1:45	27.7	34	2:20
Dunnellon Christian Academy	90	5	7.6	10	1:45	27.7	34	2:20
Romeo Elementary School	90	5	0.3	1	1:40	27.7	34	2:10
Average for EPZ:					1:45	Average:		2:05

Table 8-7A. Transit Dependent Evacuation Time Estimates - Good Weather													
Route Number	Bus Number	Single Wave					Second Wave						
		Mobilization (min.)	Route Length (mi.)	Route Travel Time ¹ (min)	Pickup Time (min)	ETE (hr:min)	Mobilization (min.)	Unload (min.)	Driver Rest (min.)	Return time to EPZ (min.)	Route Travel Time ² (min.)	Pickup Time (min.)	ETE (hr:min)
1	1,2	120	13.1	15	15	2:30	125	5	10	20	15	15	3:10
	3,4	120	15.6	17	15	2:35							
2	1	120	10	11	15	2:30	125	5	10	20	11	15	3:10
	2	150	10	11	15	3:00							
	3	180	10	11	15	3:30							
3	1	120	14.2	16	15	2:35	125	5	10	20	16	15	3:15
	2	150	14.2	16	15	3:05							
	3	180	14.2	16	15	3:35							
4	1	120	18.2	20	15	2:35	125	5	10	20	20	15	3:15
	2	150	18.2	20	15	3:05							
5	1	120	18.2	20	15	2:35	125	5	10	20	20	15	3:15
	2	150	18.2	20	15	3:05							
6	1	120	11.3	13	15	2:30	125	5	10	20	13	15	3:10
7	1	120	19.2	21	15	2:40	125	5	10	20	21	15	3:20
Average for EPZ:						2:50	Average for EPZ:						3:15

¹ Average speed output by PC-DYNEV at 125 minutes for good weather is 53.9 mph.

² Average speed output by PC-DYNEV at 160 minutes (mobilization time + unload + driver rest + return time to EPZ) for good weather is 53.8 mph.

1. INTRODUCTION

This report describes the analyses undertaken and the results obtained in preparing the Evacuation Time Estimates (ETE) for the proposed Levy Nuclear Plant (LNP), located in Levy County, Florida. ETE are part of the required planning basis and provide State and local governments with site-specific information needed for Protective Action decision-making.

In the performance of this effort, all available documentation published by Federal Government agencies and relevant to ETE was reviewed. Most important of these are:

- Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG 0654/FEMA-REP-1, Rev. 1, November 1980.
- Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones, NUREG/CR-1745, November 1980.
- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/CR-6863, January 2005.

We wish to express our appreciation to all the directors and staff members of the Levy County, Citrus County, and Marion County emergency management agencies and local and state law enforcement and planning agencies, who provided valued guidance and contributed information contained in this report.

1.1 Overview of the ETE Determination Process

The following outline presents a brief description of the work effort in chronological sequence:

1. Information Gathering:
 - Defined the scope of work in discussion with representatives of Progress Energy.
 - Attended meetings with emergency planners from the three EPZ Counties to identify issues to be addressed.
 - Conducted a detailed field survey of the EPZ highway system and of area traffic conditions.
 - Obtained demographic data from census and state agencies.
 - Conducted a random sample telephone survey of EPZ residents.

- Conducted a data collection effort to identify and describe schools, special facilities, major employers, transportation providers, and other important sources of information.
2. Estimated distributions of Trip Generation times representing the time required by various population groups (permanent residents, employees, and transients) to prepare (mobilize) for the evacuation trip. These estimates are primarily based upon the random sample telephone survey.
 3. Defined Evacuation Scenarios. These scenarios reflect the variation in demand, trip generation distribution and in highway capacities, associated with different seasons, day of week, time of day and weather conditions.
 4. Defined a traffic management strategy. Traffic control is applied at specified Traffic Control Points (TCP) located within the Emergency Planning Zone (EPZ), and at Access Control Points (ACP) located outside the EPZ. Local and state police personnel have reviewed all traffic control plans.
 5. Defined Evacuation Areas or Regions. The EPZ is partitioned into Protective Action Zones (PAZ) which serve as a basis for the ETE analysis presented herein. Evacuation “Regions” are comprised of contiguous PAZ for which ETE are calculated. The configuration of these Regions reflects the fact that the wind can take any direction and that the radial extent of the impacted area depends on accident-related circumstances. Each Region, other than those that approximate circular areas, approximates a “key-hole” configuration within the EPZ as required by NUREG/CR-6863.
 6. Estimated demand for transit services for persons at “Special Facilities” and for transit-dependent persons at home.
 7. Prepared the input streams for the IDYNEV system.
 - Estimated the traffic demand, based on the available information derived from Census data, from data provided by local and state agencies and from the telephone survey.
 - Applied the procedures specified in the 2000 Highway Capacity Manual (HCM¹) to the data acquired during the field survey, to estimate the capacity of all highway segments comprising the evacuation routes.

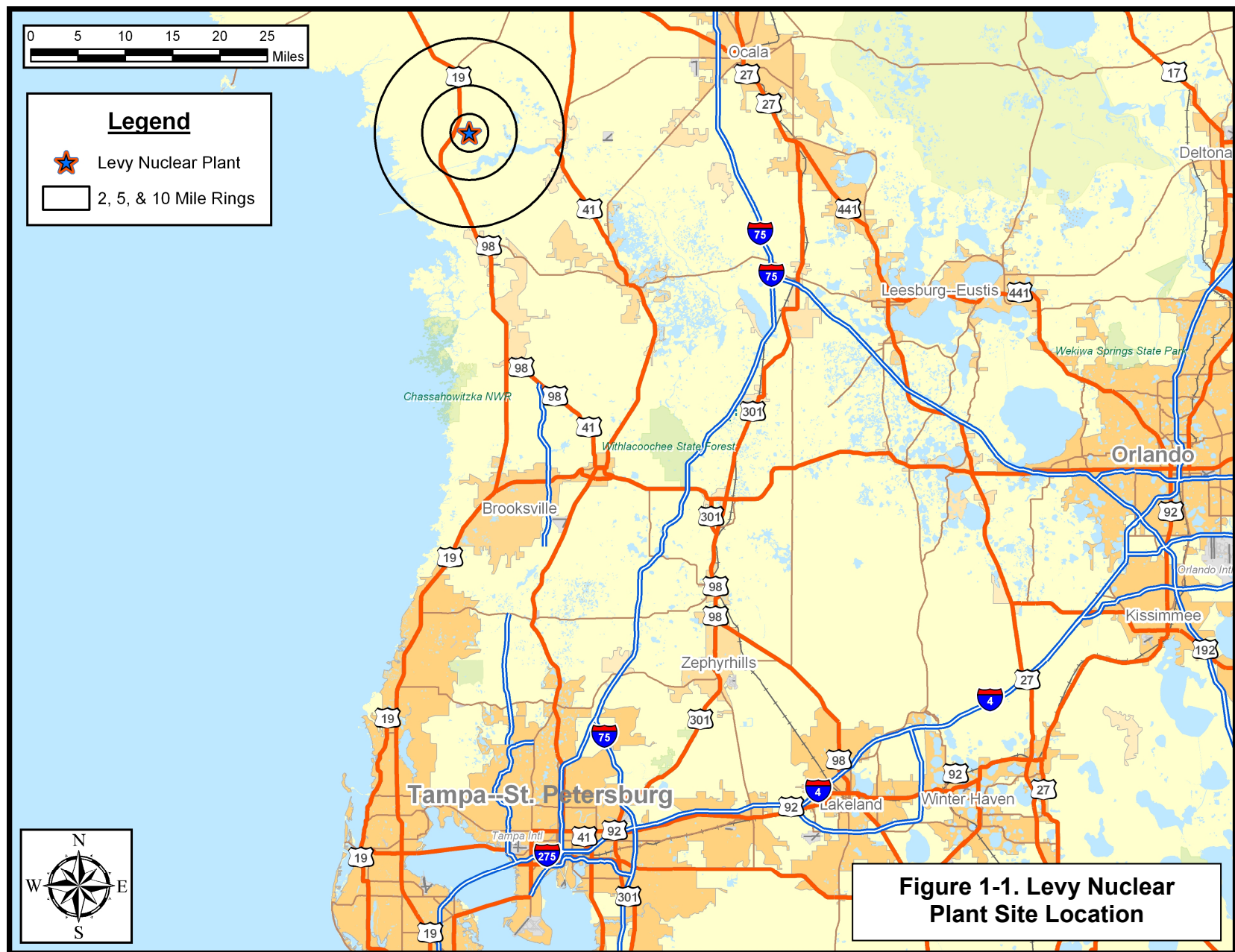
¹ Highway Capacity Manual (HCM2000), Transportation Research Board, National Research Council, 2000.

- Developed the link-node representation of the evacuation network, which is used as the basis for the computer analysis that calculates the ETE.
 - Calculated the evacuating traffic demands for each Region and for each Evacuation Scenario. Considered the effects on demand of “voluntary evacuation” and of the “shadow effect”.
 - Represented the traffic management strategy.
 - Specified the candidate destinations of evacuation travel consistent with outbound movement relative to the location of the LNP.
 - Prepared the input stream for the IDYNEV System.
 - Executed the IDYNEV models to provide the estimates of evacuation routing and ETE.
8. Generated a complete set of ETE for all specified Evacuation Regions and Scenarios.
 9. Documented ETE in formats responsive to the cited NUREG reports.
 10. Calculated the ETE for all transit activities including those for special facilities (schools, health-related facilities, etc.) and for the transit-dependent population.

Steps 4, 7 and 8 are iterated as described in Appendix D.

1.2 The Levy Nuclear Plant Location

The Levy Nuclear Plant is located approximately 85 miles north of Tampa, Florida and 9 miles northeast of the existing Crystal River Nuclear Plant. The Emergency Planning Zone (EPZ) consists of parts of three counties: Levy County, Citrus County, and Marion County. Figure 1-1 displays the area surrounding LNP. This map identifies the communities in the area and the major roads.



1.3 Preliminary Activities

KLD performed preliminary review activities as described below.

Literature Review

KLD Associates reviewed documentation by the federal government on the development of emergency plans and the ETE. We also obtained supporting documents from a variety of sources, which contained information needed to form the database used for conducting evacuation analyses.

Field Surveys of the Highway Network

KLD personnel drove the entire highway system within the EPZ and for some distance outside. The characteristics of each section of highway were recorded. These characteristics include:

• Number of lanes	• Posted speed
• Pavement Width	• Actual free speed
• Shoulder type & width	• Abutting land use
• Intersection configuration	• Control devices
• Lane channelization	• Interchange geometries
• Geometrics: Curves, grades	• Street parking
• Unusual characteristics: Narrow bridges, sharp curves, poor pavement, flood warning signs, inadequate delineations, etc.	

The data were then transcribed; this information was referenced while preparing the input stream for the IDYNEV System. Key highway locations were video archived.

Telephone Survey

A telephone survey was undertaken to gather information needed for the evacuation study. Appendix F presents the survey instrument, the procedures used and tabulations of data compiled from the survey returns.

These data were utilized to develop estimates of vehicle occupancy during an evacuation and to estimate elements of the mobilization process. This database was also referenced to estimate the number of transit-dependent residents.

Developing the Evacuation Time Estimates

The overall study procedure is outlined in Appendix D. Demographic data were obtained from several sources, as detailed later in this report. These data were analyzed and converted into vehicle demand data.

Highway capacity was estimated for each highway segment based on the field surveys and on the principles specified in the 2000 HCM. The link-node representation of the physical highway network was developed using Geographic Information System (GIS) mapping software and the observations obtained from the field survey. This network representation of “links” and “nodes” is shown in Figure 1-2.

Analytical Tools

The IDYNEV System that was employed for this study is comprised of several integrated computer models. One of these is the PC-DYNEV (DYnamic Network EVacuation) macroscopic simulation model that was developed by KLD under contract with the Federal Emergency Management Agency (FEMA).

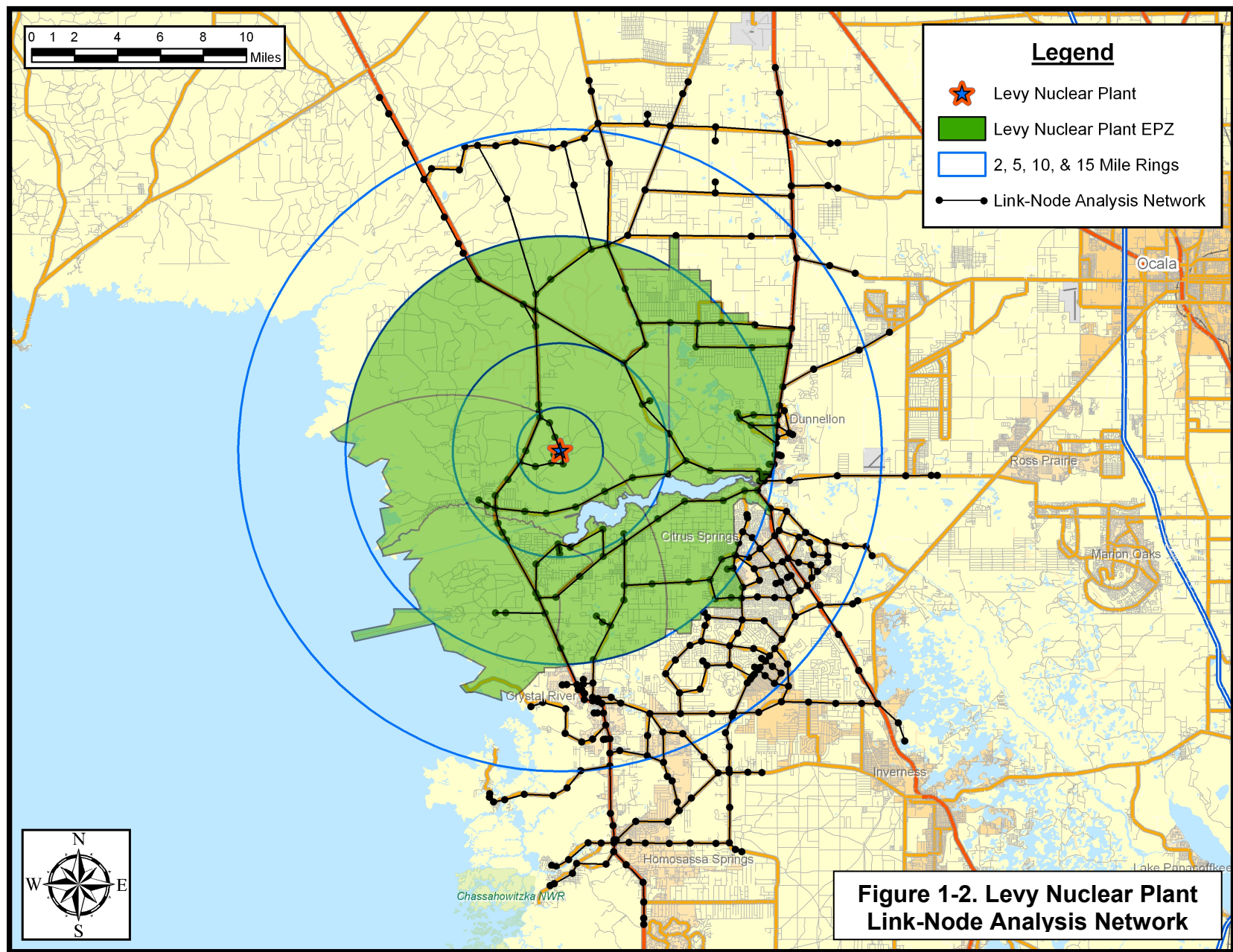
IDYNEV consists of three submodels:

- A macroscopic traffic simulation model (for details, see Appendix C).
- An intersection capacity model (for details, see Highway Research Record No. 772, Transportation Research Board, 1980, papers by Lieberman and McShane & Lieberman).
- A dynamic, node-centric routing model that adjusts the “base” routing in the event of an imbalance in the levels of congestion on the outbound links.

Another model of the IDYNEV System is the TRAD (TRaffic Assignment and Distribution) model. This model integrates an equilibrium assignment model with a trip distribution algorithm to compute origin-destination volumes and paths of travel designed to minimize travel time. For details, see Appendix B.

Still another software product developed by KLD, named UNITES (UNified Transportation Engineering System) was used to expedite data entry.

The procedure for applying the IDYNEV System within the framework of developing ETE is outlined in Appendix D. Appendix A is a glossary of terms.



The evacuation analysis procedures are based upon the need to:

- Route traffic along paths of travel that will expedite their travel from their respective points of origin to points outside the EPZ
- Restrict movement toward LNP to the extent practicable, and disperse traffic demand so as to avoid focusing demand on a limited number of highways
- Move traffic in directions that are generally outbound, relative to the location of LNP.

A set of candidate destination nodes on the periphery of the EPZ is specified for each traffic origin (or centroid) within the EPZ. The TRAD model produces output that identifies the "best" traffic routing, subject to the design conditions outlined above. In addition to this information, rough estimates of travel time are provided, together with turn-movement data required by the PC-DYNEV simulation model.

The simulation model is then executed to provide a detailed description of traffic operations on the evacuation network. This description enables the analyst to identify bottlenecks and to develop countermeasures that are designed to expedite the movement of vehicles. The outputs of this model are the volume of traffic, expressed as vehicles/hour, that exit the Evacuation Region along the various highways (links) that cross the Region boundaries. These outputs are exported into a spreadsheet which contains the ETE. Section 7 presents a further description of this process along with the ETE Tables.

As outlined in Appendix D, this procedure consists of an iterative design-analysis-redesign sequence of activities. If properly done, this procedure converges to yield an evacuation plan which best services the evacuating public.

1.4 ETE Study Overview

Table 1-1 presents an overview of this ETE study. The major factors that make this study and the ETE values obtained reliable can be summarized as follows:

- Vehicle occupancy and Trip-generation rates are based on the results of a telephone survey of EPZ residents.
- Voluntary and shadow evacuations are considered.
- The highway representation is highly detailed.
- Regions developed with guidance from NUREG/CR-6863.
- Traffic management plan included.

Table 1-1. Summary of ETE Study	
Topic	Description
Resident Population Basis	ArcGIS Software using 2000 US Census blocks; block centroid method used; population extrapolated to 2007. Permanent resident population inside the EPZ = 22,758
Resident Population Vehicle Occupancy	2.25 persons/household, 1.32 evacuating vehicles/household yielding: 1.70 persons/vehicle
Employee Population	Employees treated as separate population group. Employee estimates based on information provided by county emergency management offices about major employers in EPZ. 1.03 employees/vehicle based on phone survey results.
Voluntary evacuation from within EPZ in areas outside region to be evacuated	50 percent of population within the specified evacuation radius, but not within the area to be evacuated; 35 percent, in annular ring between the evacuation radius and the EPZ boundary (See Figure 2.1).
Shadow Evacuation	30% of people outside of the EPZ within the Shadow Region (See Figure 7-2).
Network Size	517 Links; 364 Nodes.
Roadway Geometric Data	Field surveys conducted in February, 2007. Major intersections were video archived. GIS shape-files of signal locations and roadway characteristics created during road survey. Road capacities based on 2000 HCM.
School Evacuation	Direct evacuation to designated Reception Center.
Transit Dependent Population	Defined as households with 0 vehicles + households with 1 vehicle with commuters who do not return home + households with 2 vehicles with commuters who do not return home. Telephone survey results used to estimate transit dependent population (See Table 8-1).

Table 1-1. Summary of ETE Study (cont.)	
Ridesharing	50 percent of transit dependent persons will ride out with a neighbor or friend.
Trip Generation for Evacuation	<p>Based on residential telephone survey of specific pre-trip mobilization activities:</p> <p>Residents with commuters returning leave between 30 minutes and 5 hours.</p> <p>Residents without commuters returning leave between 15 minutes and 5 hours.</p> <p>Employees and transients leave between 15 minutes and 2 hours.</p> <p>All times measured from the Advisory to Evacuate.</p>
Traffic and Access Control	Traffic and Access Control used in all scenarios to facilitate the flow of traffic outbound relative to LNP.
Weather	Normal or Rain. The capacity and free flow speed of all links in the network are reduced by 10% in the event of rain.
Modeling	IDYNEV System: TRAD and PC-DYNEV.
Special Events	One considered – new plant construction.
Evacuation Cases	13 Regions (central sector wind direction and each adjacent sector technique used as specified in NUREG/CR-6863) and 11 Scenarios producing 143 unique cases
Evacuation Time Estimates Reporting	ETE reported for 50 th , 90 th , 95 th , and 100 th percentile population. Results presented by Region and Scenario.
Evacuation Time Estimates for the entire EPZ, 100 th percentile.	<p>Winter Weekday Midday Good weather = 5:10</p> <p>Winter Weekend Midday Good weather = 5:10</p>

2. STUDY ESTIMATES AND ASSUMPTIONS

This section presents the estimates and assumptions utilized in the development of the Evacuation Time Estimates (ETE).

2.1 Data Estimates

1. Population estimates are based upon Census 2000 data, projected to year 2007. County-specific projections are based upon growth rates obtained from the county planning departments. Estimates of employees who commute into the EPZ to work are based upon employment data obtained from county emergency management offices.
2. Population estimates at special facilities are based on available data from county emergency management offices.
3. Roadway capacity estimates are based on field surveys and the application of Highway Capacity Manual 2000.
4. Population mobilization times are based on a statistical analysis of data acquired from the telephone survey.
5. The relationship between resident population and evacuating vehicles is developed from the telephone survey. The average values of 2.25 persons per household and 1.32 evacuating vehicles per household are used.
6. The relationship between persons and vehicles for special facilities is as follows:
 - a. Parks/Recreational: 1 vehicle per family
 - b. Employees: 1.03 employees per vehicle (telephone survey results)
7. ETE are presented for the evacuation of the 100th percentile of population for each Region and for each Scenario, and for the 2-mile, 5-mile and 10-mile distances. ETE are presented in tabular format and graphically showing the values of ETE associated with the 50th, 90th and 95th percentiles of population. An Evacuation Region is defined as a group of Protective Action Zones (PAZ) that is issued an Advisory to Evacuate.

2.2 Study Methodological Assumptions

1. The ETE is defined as the elapsed time from the Advisory to Evacuate issued to persons within a specific Region of the EPZ, and the time that Region is clear of the indicated percentile of people.
2. The ETE are computed and presented in a format compliant with the guidance in the cited NUREG documentation. The ETE for each evacuation area ("Region" comprised of included PAZ) is presented in both statistical and graphical formats.

3. Evacuation movements (paths of travel) are generally outbound relative to the power plant to the extent permitted by the highway network, as computed by the computer models. All available evacuation routes are used in the analysis.
4. Regions are defined by the underlying “keyhole” or circular configurations as specified in NUREG/CR-6863. These Regions, as defined, display irregular boundaries reflecting the geography of the PAZ included within these underlying configurations.
5. Voluntary evacuation is considered as indicated in the accompanying Figure 2-1. Within the circle defined by the distance to be evacuated but outside the Evacuation Region, 50 percent of the people not advised to evacuate are assumed to evacuate within the same time-frame. In the annular area between the circle defined by the central “key-hole” of the Evacuation Region and the EPZ boundary, it is assumed that 35 percent of people will voluntarily evacuate. In the area between the EPZ boundary and a 15-mile annular area centered at the plant (the “Shadow Region”), it will be assumed that 30 percent of the people will evacuate voluntarily. Sensitivity studies explored the effect on ETE, of increasing the percentage of voluntary evacuees in the “Shadow Region” (Appendix I).
6. A total of 11 “Scenarios” representing different seasons, time of day, day of week and weather are considered. One special event scenario is studied; the construction period of a new nuclear plant. These Scenarios are tabulated below:

Scenarios	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Weekend	Midday	Good	New Plant Construction

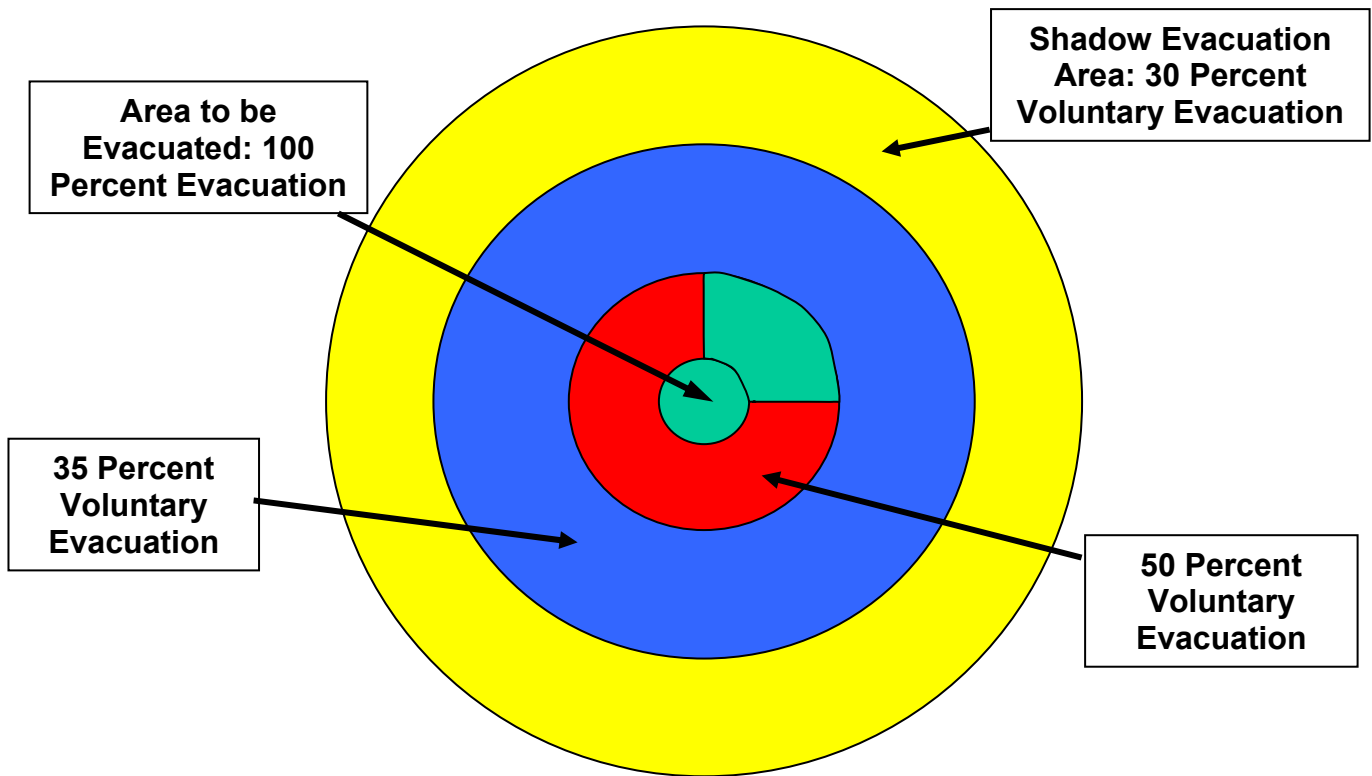


Figure 2-1. Voluntary Evacuation Methodology

7. The models of the IDYNEV System represent the state of the art, and have been recognized as such by the Atomic Safety and Licensing Board (ASLB) in past hearings. (Sources: Atomic Safety & Licensing Board Hearings on Seabrook and Shoreham; Urbanik¹).

2.3 Study Assumptions

1. The Planning Basis Assumption for the calculation of ETE is a rapidly escalating accident that requires evacuation, and includes the following:
 - a. Advisory to Evacuate is announced coincident with the siren notification.
 - b. Mobilization of the general population will commence within 10 minutes of the Advisory to Evacuate.
 - c. ETE are measured relative to the Advisory to Evacuate.
2. It is assumed that everyone within the group of PAZ forming a Region that is issued an Advisory to Evacuate will, in fact, respond in general accord with the planned routes.
3. It is further assumed that:
 - a. Schools may be evacuated prior to notification of the general public, if possible.
 - b. 59 percent of households in the EPZ will await the return of a commuter before beginning their evacuation trip, based on the telephone survey results.
4. A portion of the population outside the evacuated Region will elect to evacuate even though not advised to do so ("voluntary evacuation"). See Figure 2-1.
5. The ETE will also include consideration of "through" (External-External) trips during the time that such traffic is permitted to enter the evacuated Region. "Normal" traffic flow is assumed to be present within the EPZ at the start of the emergency.
6. Access Control Points (ACP) will be staffed within approximately 90 minutes of the siren notifications, to divert traffic attempting to enter the EPZ. Earlier activation of ACP locations could delay returning commuters. It is assumed that no vehicles will enter the EPZ after this 90 minute mobilization time period.
7. Traffic Control Points (TCP) within the EPZ will be staffed over time, beginning at the Advisory to Evacuate. Their number and location will depend on the Region to be evacuated and personnel resources available. It is assumed that drivers will act rationally, travel in the directions identified in the plan (as documented in the public information

¹ Urbanik, T., et. al. Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code, NUREG/CR-4873, Nuclear Regulatory Commission, June, 1988

- material), and obey all control devices and traffic guides.
8. Buses will be used to transport those without access to private vehicles:
 - a. If schools are in session, transport (buses) will evacuate students directly to the assigned Reception Centers.
 - b. Schoolchildren, if school is in session, are given priority in assigning transit vehicles.
 - c. Bus mobilization time is considered in ETE calculations.
 - d. Analysis of the number of required “waves” of transit vehicles used for evacuation is presented.
 9. It is reasonable to assume that some of transit-dependent people will ride-share with family, neighbors, and friends, thus reducing the demand for buses. We assume that the percentage of people who rideshare is 50 percent. This assumption is based upon reported experience for other emergencies², which cites previous evacuation experience. The remaining transit-dependent portion of the general population will be evacuated to reception centers by bus.
 10. An adverse weather scenario is also considered. Rain may occur for either winter or summer scenarios. In the case of rain, it is assumed that the rain begins prior to, or at about the same time as the evacuation advisory is issued. No weather-related reduction in the number of transients who may be present in the EPZ is assumed. Adverse weather scenarios affect roadway capacity, free flow highway speeds and the time required to mobilize the general population. The factors assumed for the ETE study are:

Scenario	Highway Capacity*	Free Flow Speed*	Mobilization Time
Rain	90%	90%	No Effect
*Adverse weather capacity and speed values are given as a percentage of good weather conditions. Roads are assumed to be passable.			

11. School buses used to transport students are assumed to have the capacity to transport 70 children per bus for elementary schools, and 50 children per bus for middle and high schools. Transit buses used to transport the transit-dependent general population are assumed to transport an average of 30 people per bus.

² Institute for Environmental Studies, University of Toronto, THE MISSISSAUGA EVACUATION FINAL REPORT, June 1981. The report indicates that 6,600 people of a transit-dependent population of 8,600 people shared rides with other residents; a ride share rate of 76% (Page 5-10).

3. DEMAND ESTIMATION

The estimates of demand, expressed in terms of people and vehicles, constitute a critical element in developing an evacuation plan. These estimates consist of three components:

1. An estimate of population within the Emergency Planning Zone (EPZ), stratified into groups (resident, employee, transient).
2. An estimate, for each population group, of mean occupancy per evacuating vehicle. This estimate is used to determine the number of evacuating vehicles.
3. An estimate of potential double-counting of vehicles.

Appendix E presents much of the source material for the population estimates. Our primary source of population data, the 2000 Census, however, is not adequate for directly estimating some transient groups.

Throughout the year, vacationers and tourists enter the EPZ. These non-residents may dwell within the EPZ for a short period (e.g. a few days or one or two weeks), or may enter and leave within one day. Estimates of the size of these population components must be obtained, so that the associated number of evacuating vehicles can be ascertained.

The potential for double-counting people and vehicles must be addressed. For example:

- A resident who works and shops within the EPZ could be counted as a resident, again as an employee and once again as a shopper.
- A visitor who stays at a hotel and spends time at a park, then goes shopping could be counted three times.

Furthermore, the number of vehicles at a location depends on time of day. For example, motel parking lots may be full at dawn and empty at noon. Similarly, parking lots at area parks, which are full at noon, may be almost empty at dawn. Estimating counts of vehicles by simply adding up the capacities of different types of parking facilities will tend to overestimate the number of transients and can lead to ETE that are too conservative.

Analysis of the population characteristics of the Levy Nuclear Plant EPZ indicates the need to identify three distinct groups:

- Permanent residents - people who are year-round residents of the EPZ.
- Transients - people who reside outside of the EPZ, who enter the area for a specific purpose (e.g., boating, camping) and then leave the area.
- Commuter-Employees - people who reside outside the EPZ and commute to businesses within the EPZ on a daily basis.

Estimates of the population and number of evacuating vehicles for each of the population groups are presented for each Protective Action Zone (PAZ) and by polar coordinate representation (population rose). The LNP EPZ has been subdivided into 8 PAZ as shown in Figure 3-1.

Permanent Residents

The primary source for estimating permanent population is the latest U.S. Census data. The average household size (2.25 persons/household) and the number of evacuating vehicles per household (1.32 vehicles/household) were adapted from the telephone survey results.

The rate of population change for each County in the EPZ was obtained by KLD from the county planning departments and applied to 2000 Census data to project population to 2007. The data in Table 3-1 show that the EPZ population has increased by 24 percent over the last 7 years.

Permanent resident population and vehicle estimates for 2007 are presented in Table 3-2. Figures 3-2 and 3-3 present the permanent resident population and permanent resident vehicle estimates by sector and distance from LNP. This “rose” was constructed using GIS software.

Construction

A “special event” scenario (Scenario 11) which represents a typical winter, weekend, midday with construction workers on-site at the time of the emergency, is considered. Based on discussions with Progress Energy, there will be two units constructed at the proposed Levy site. The construction plans are offset slightly in that Unit 1 will be operational in June 2016, while construction will persist on Unit 2 which will be operational in June 2017. There will be 565 workers on site at Unit 1 when operational and 150 construction workers will remain at Unit 2, for a total of 715 additional people in the EPZ for this special event. An average vehicle occupancy of 1.03 workers per vehicle (adapted from telephone survey results) is used to convert workers to vehicles – 695 total vehicles. The existing roadway system is used for the construction scenario; no roadway improvements are considered. Permanent resident population and shadow population are extrapolated to 2016 for this scenario.

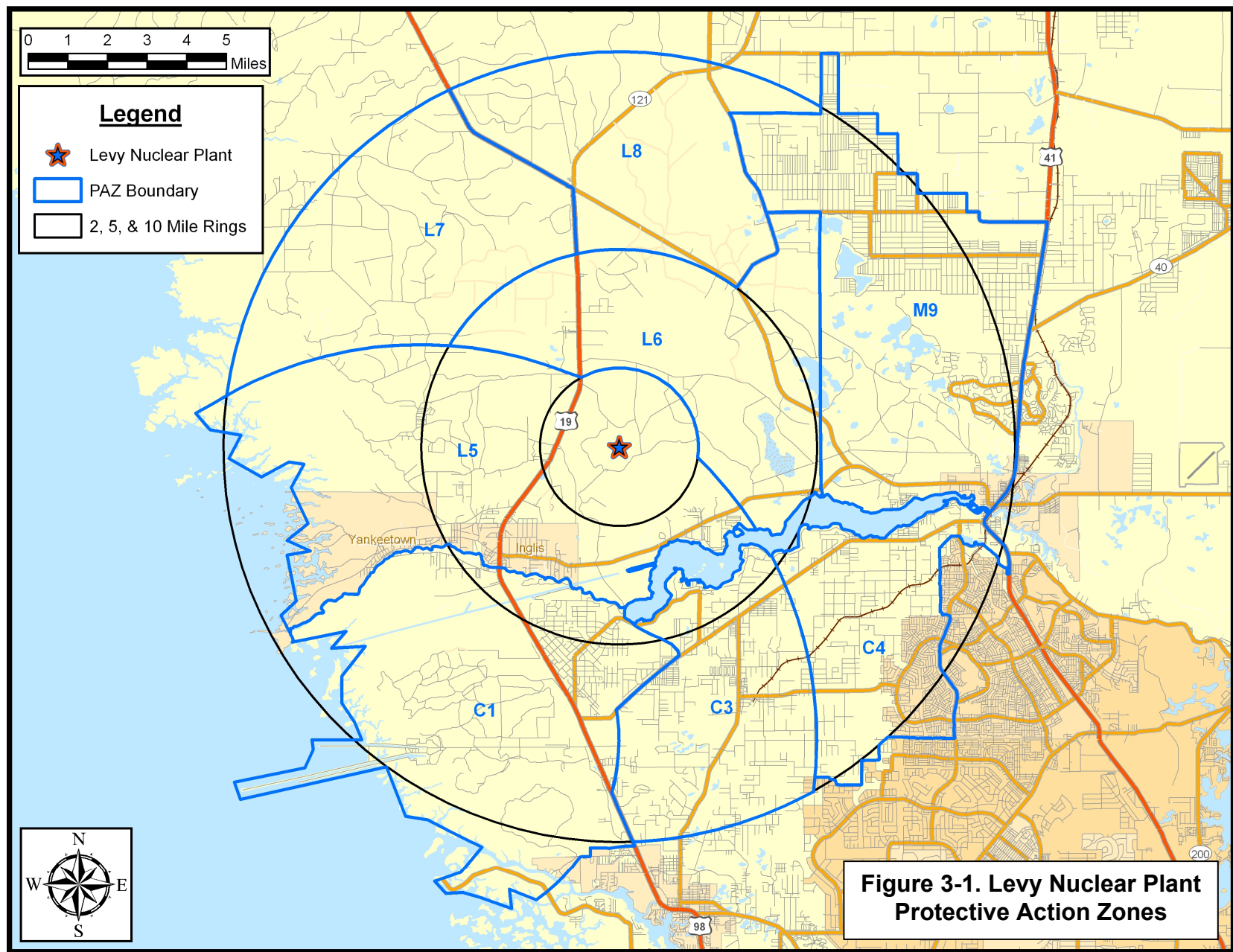
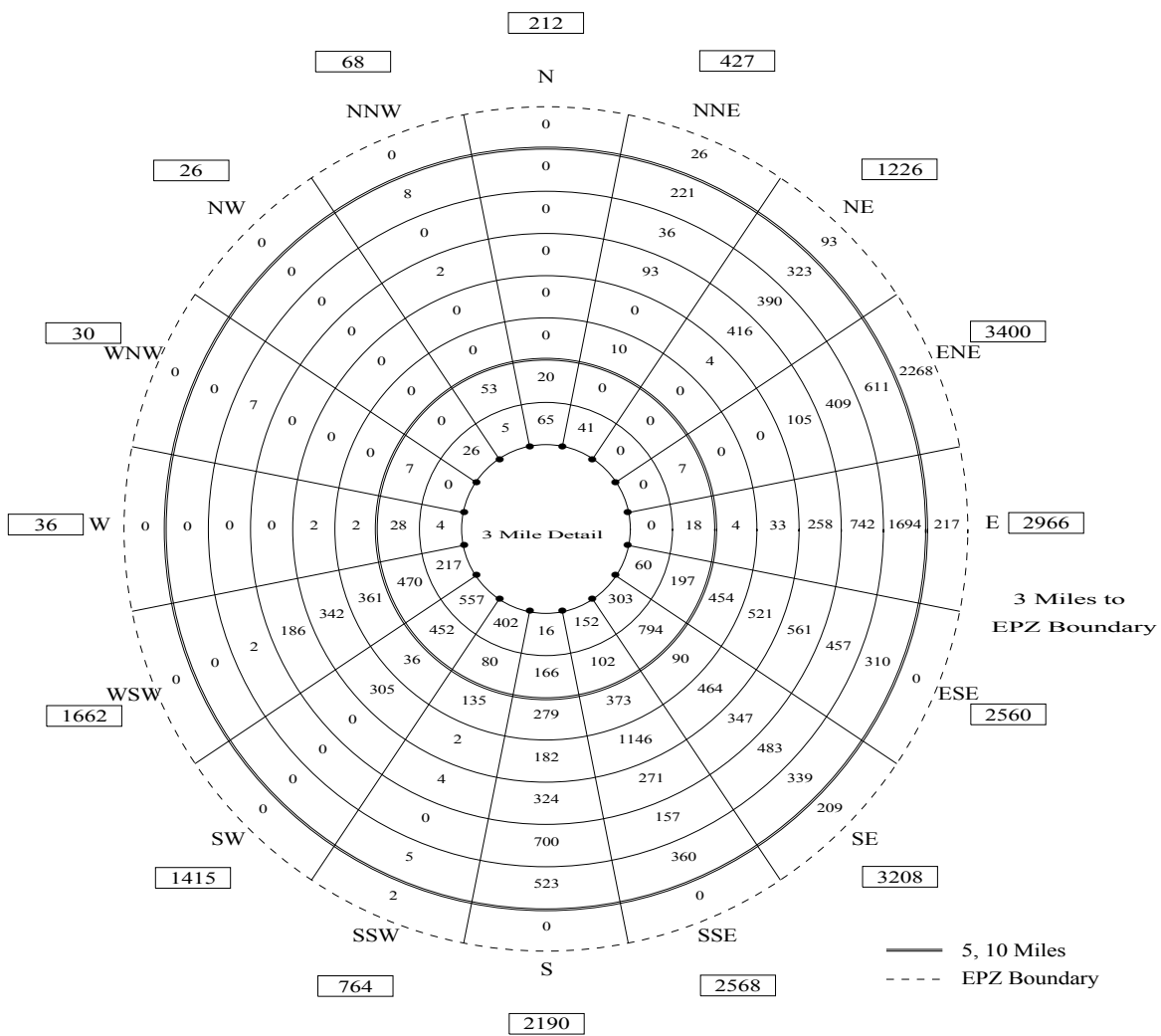


Table 3-1. EPZ Permanent Resident Population		
PAZ	2000 Population	2007 Population
C1	1,434	1,776
C3	4,422	5,476
C4	2,795	3,461
L5	3,004	3,601
L6	545	653
L7	14	17
L8	245	294
M9	5,866	7,480
TOTAL	18,325	22,758
Population Growth:		24%

Table 3-2. Permanent Resident Population and Vehicles by PAZ		
PAZ	2007 Population	2007 Vehicles
C1	1,776	1,040
C3	5,476	3,214
C4	3,461	2,030
L5	3,601	2,112
L6	653	383
L7	17	11
L8	294	172
M9	7,480	4,388
TOTAL	22,758	13,350



Resident Population			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	159	0-2	159
2-3	453	0-3	612
3-4	1848	0-4	2460
4-5	2394	0-5	4854
5-6	1744	0-6	6598
6-7	3001	0-7	9599
7-8	2567	0-8	12166
8-9	3383	0-9	15549
9-10	4394	0-10	19943
10-EPZ	2815	0-EPZ	22758

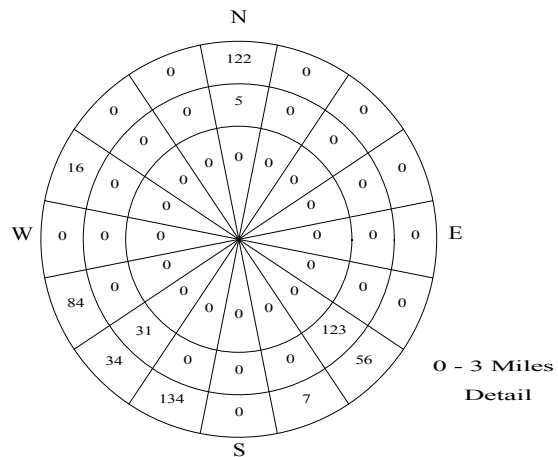
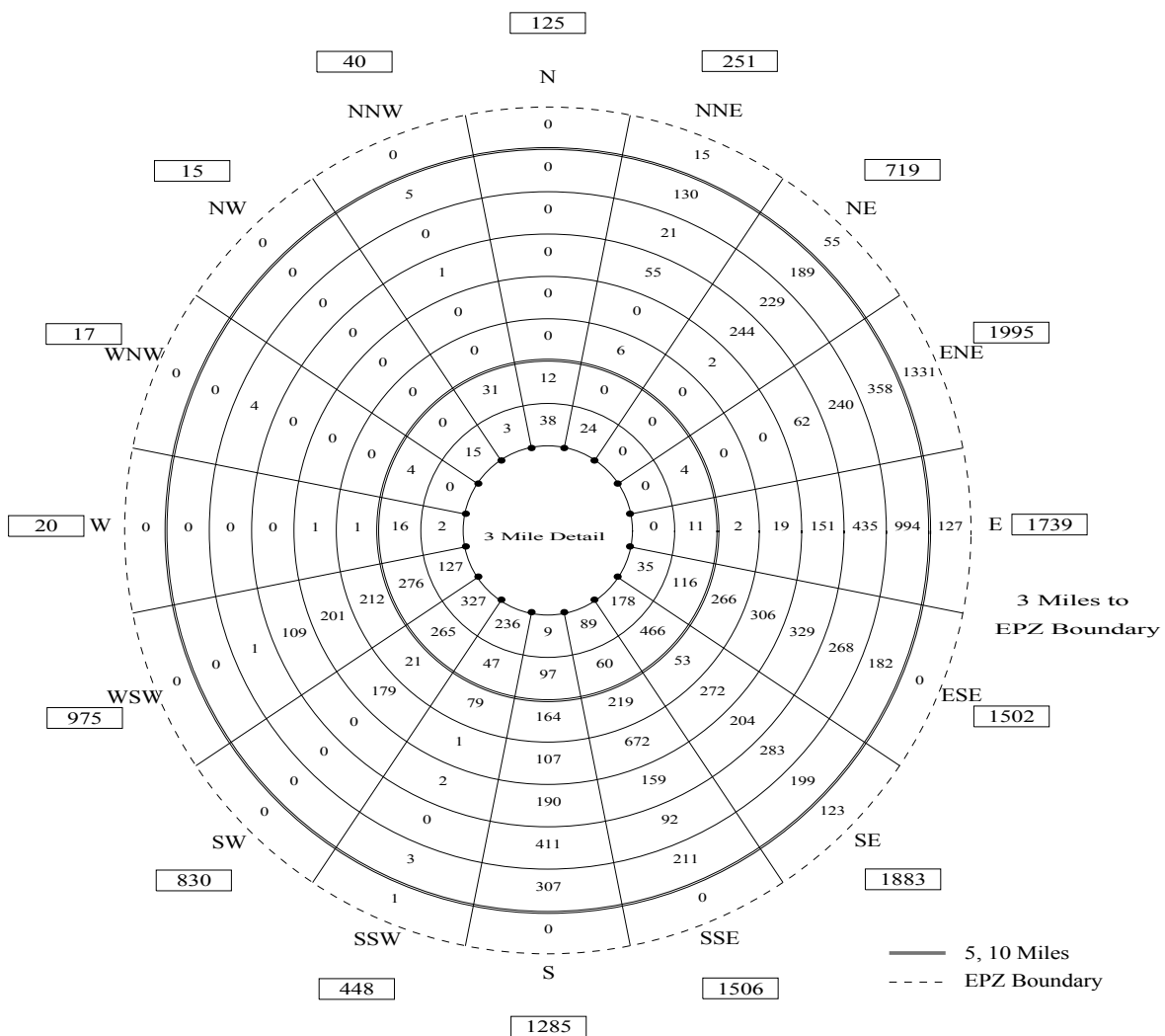


Figure 3-2. Permanent Residents by Sector



Resident Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	93	0-2	93
2-3	266	0-3	359
3-4	1083	0-4	1442
4-5	1405	0-5	2847
5-6	1023	0-6	3870
6-7	1760	0-7	5630
7-8	1506	0-8	7136
8-9	1984	0-9	9120
9-10	2578	0-10	11698
10-EPZ	1652	0-EPZ	13350

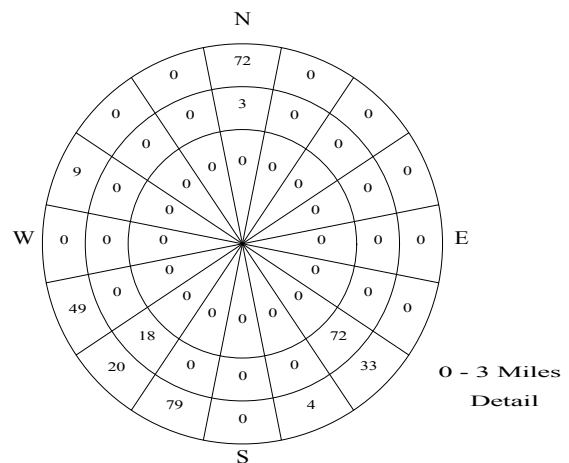


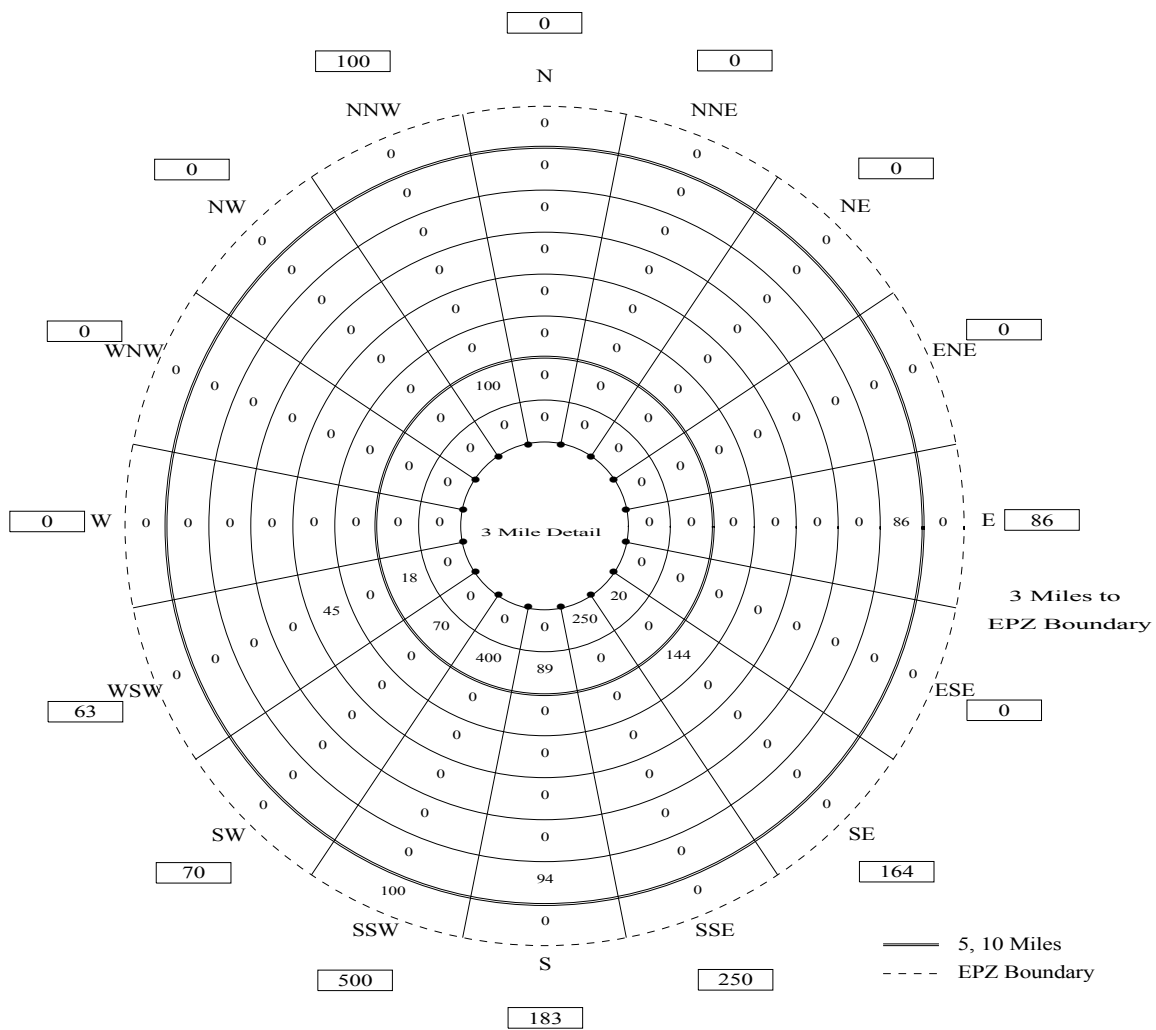
Figure 3-3. Permanent Resident Vehicles by Sector

Transient Population

Transient population groups are defined as those people who are not permanent residents and who enter the EPZ for a specific purpose (camping, boating). Transients may spend less than one day or stay overnight or longer at rented apartments, camping facilities, hotels and motels. There are several locations within the LNP EPZ that offer boating, fishing and camping facilities in and along Lake Rousseau and on the Gulf of Mexico.

A total of 1,416 people could be recreating in the EPZ during the peak season based on data obtained from the survey of the major recreational areas for LNP. This represents about 889 vehicles in the EPZ at an average occupancy rate of 1.63 persons/vehicle. The peak season is winter; 10-15% of transients are assumed to be present during off-peak times. See Appendix E for supporting data.

Figures 3-4 and 3-5 present transient population and transient vehicle data by sector.



Transient Population			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	0	0-3	0
3-4	270	0-4	270
4-5	677	0-5	947
5-6	144	0-6	1091
6-7	45	0-7	1136
7-8	0	0-8	1136
8-9	0	0-9	1136
9-10	180	0-10	1316
10-EPZ	100	0-EPZ	1416

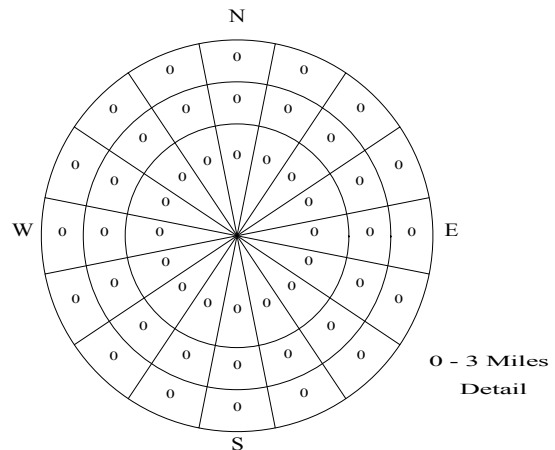
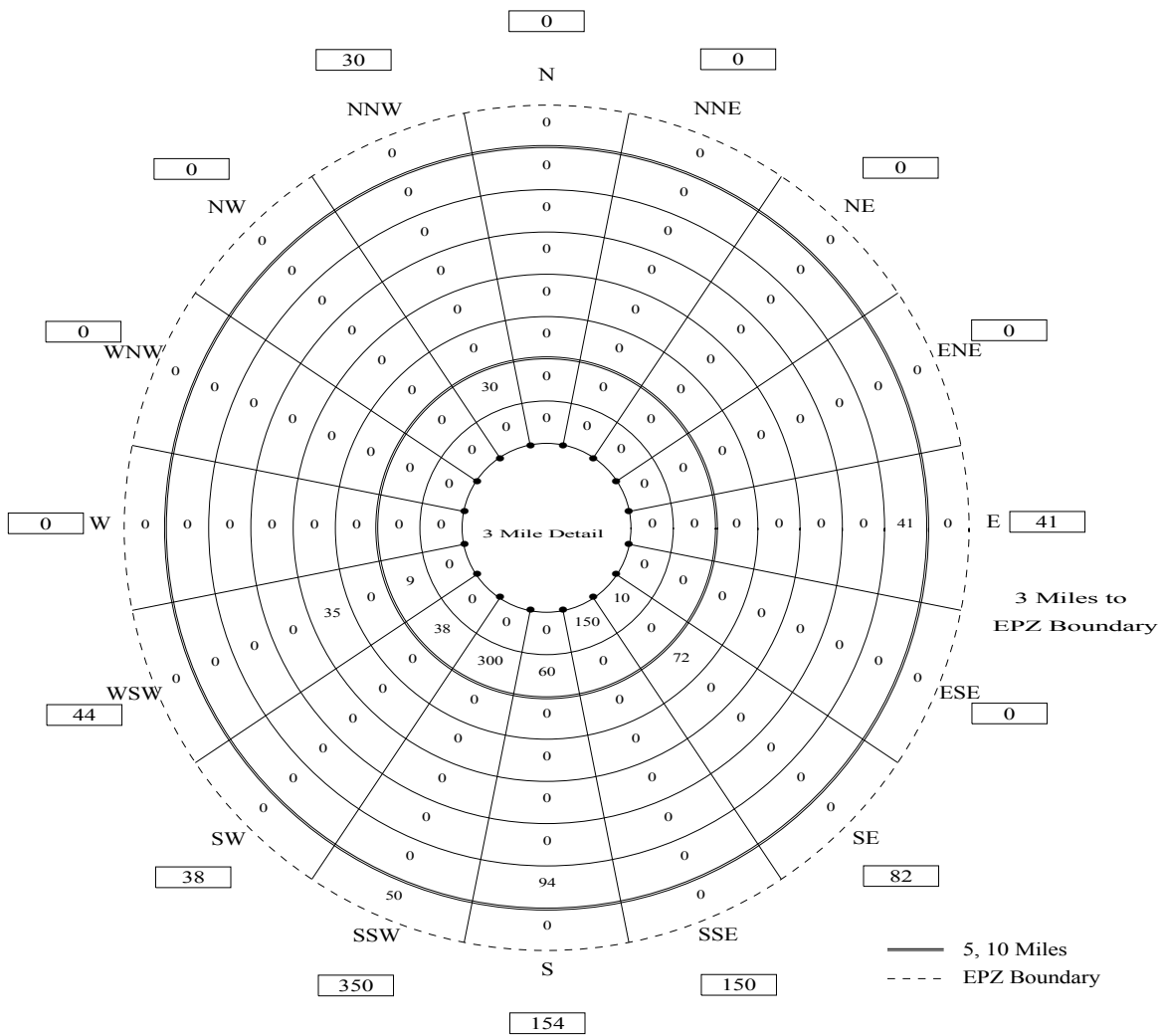


Figure 3-4. Transient Population by Sector



Transient Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	0	0-3	0
3-4	160	0-4	160
4-5	437	0-5	597
5-6	72	0-6	669
6-7	35	0-7	704
7-8	0	0-8	704
8-9	0	0-9	704
9-10	135	0-10	839
10-EPZ	50	0-EPZ	889

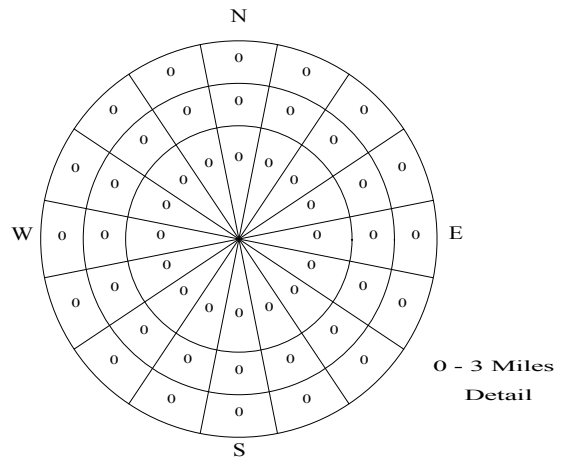


Figure 3-5. Transient Vehicles by Sector

Employees

Employees who work within the EPZ fall into two categories:

- Those who live and work in the EPZ
- Those who live outside of the EPZ and commute to jobs within the EPZ.

Those of the first category are already counted as part of the permanent resident population. To avoid double counting, we focus on those commuting employees who will evacuate along with the permanent resident population.

Data for major employers (more than 50 total employees) in the EPZ was provided by the county emergency management offices. The locations of these facilities were mapped using GIS software. The GIS map was overlaid with the evacuation analysis network and employees were loaded onto appropriate links.

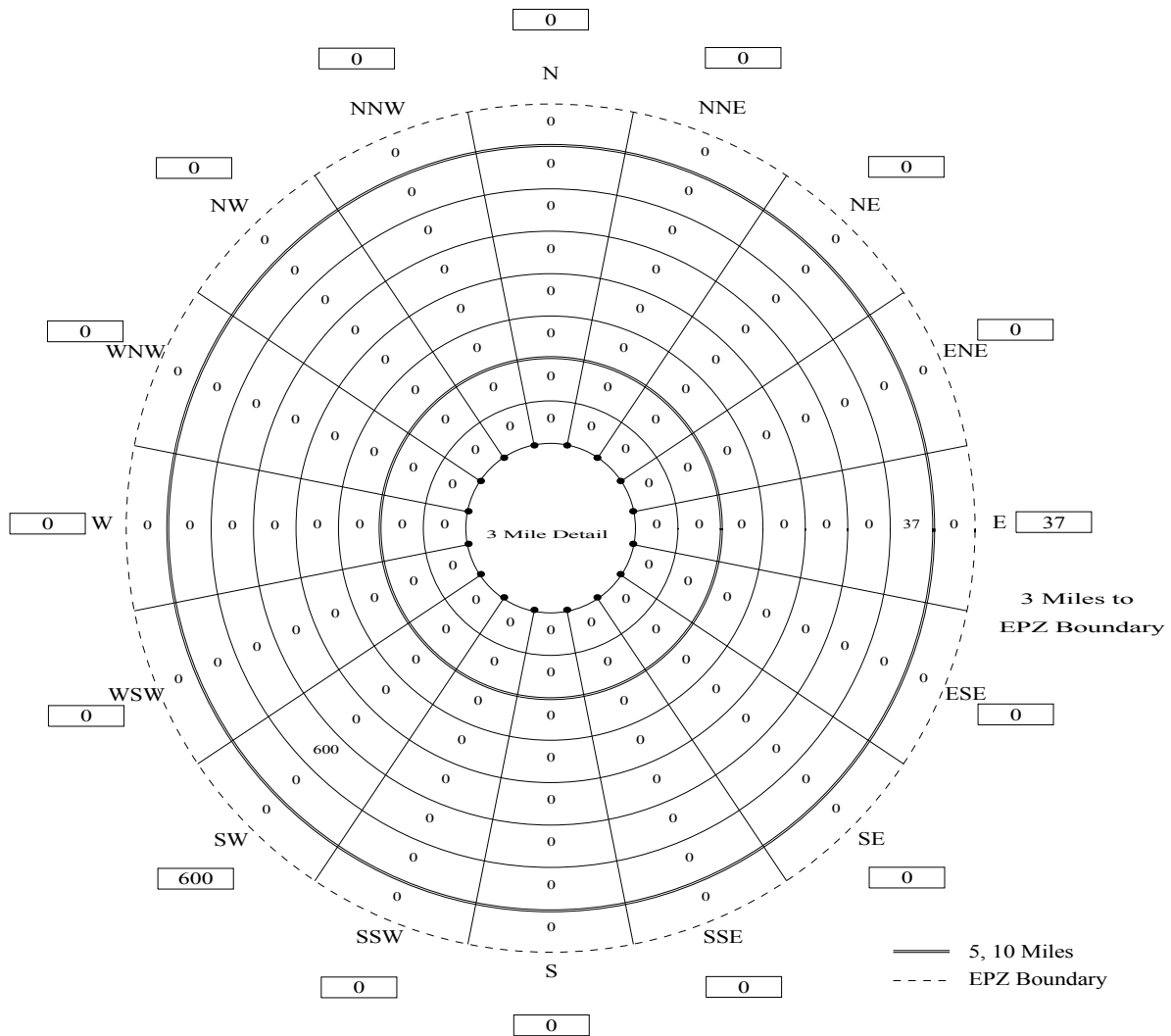
Three major employers were identified for the LNP EPZ:

1. The Crystal River Nuclear Plant
 - Total employment of 1,000 people.
 - Maximum shift employment of 800 people.
 - 75% of employees are non-EPZ residents; thus max shift is 600 non-EPZ employees.
 - Evening workforce is equal to 13% of daytime workforce.
2. Sweetbay Supermarket – Grocery Store
 - Total employment of 60 people.
 - Maximum shift employment of 25 people.
 - Assumed 50% of employees are non-EPZ residents.
3. Super Walmart – Grocery/Convenience Store
 - Assumed Total employment of 100 people.
 - Assumed Maximum shift employment of 50 people.
 - Assumed 50% of employees are non-EPZ residents.

There are likely several smaller employment centers within the EPZ, but employees at such facilities are most likely EPZ residents.

An occupancy of 1.03 persons per employee-vehicle obtained from the telephone survey, was used to determine the number of evacuating employee vehicles.

Figures 3-6 and 3-7 present non-EPZ Resident employee data by sector.



Employee Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	0	0-3	0
3-4	0	0-4	0
4-5	0	0-5	0
5-6	0	0-6	0
6-7	0	0-7	0
7-8	0	0-8	0
8-9	600	0-9	600
9-10	37	0-10	637
10-EPZ	0	0-EPZ	637

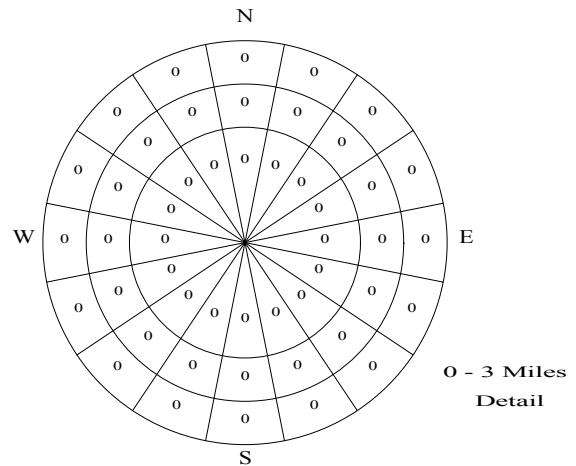
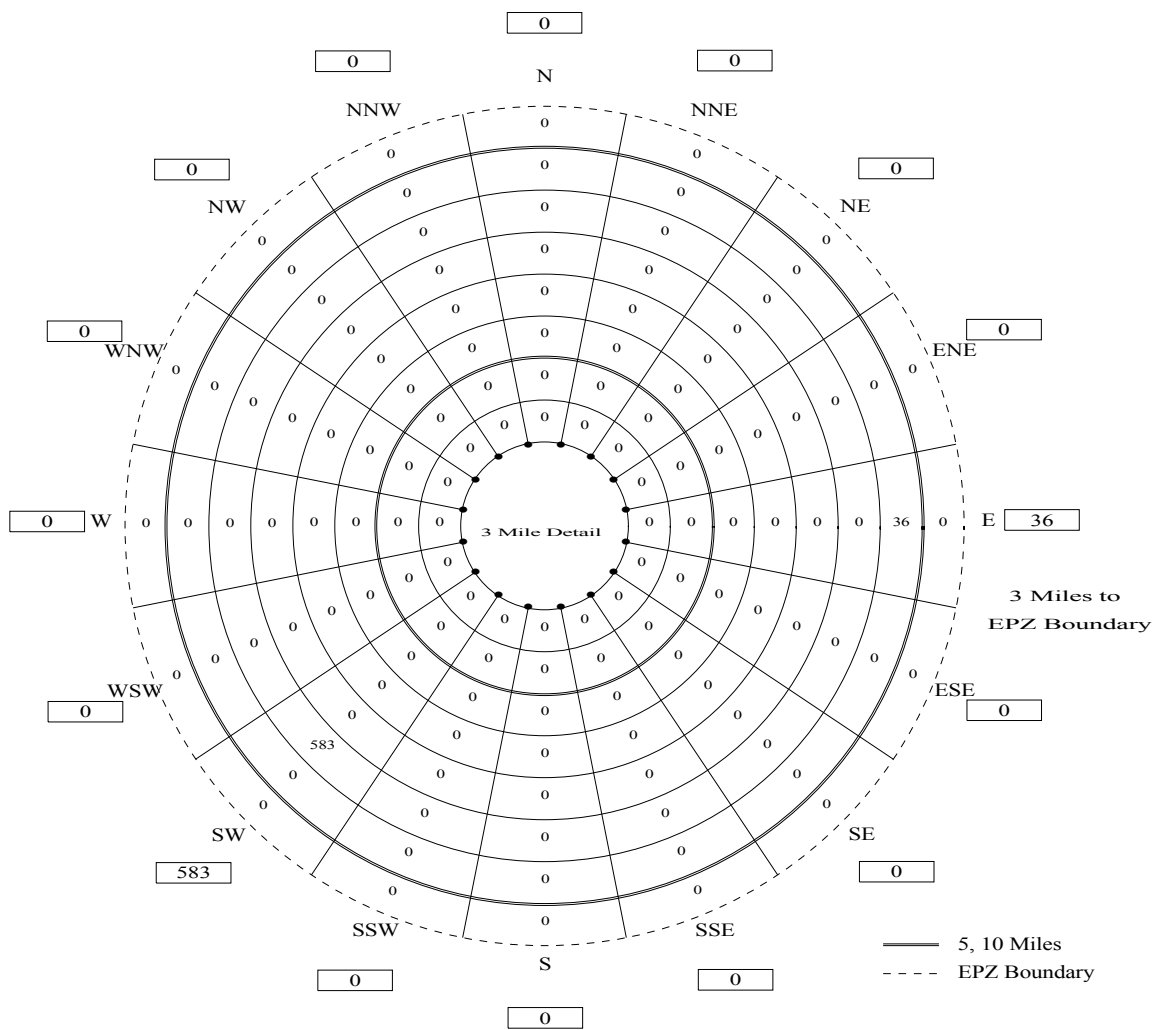


Figure 3-6. Employee Population by Sector



Employee Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	0	0-3	0
3-4	0	0-4	0
4-5	0	0-5	0
5-6	0	0-6	0
6-7	0	0-7	0
7-8	0	0-8	0
8-9	583	0-9	583
9-10	36	0-10	619
10-EPZ	0	0-EPZ	619

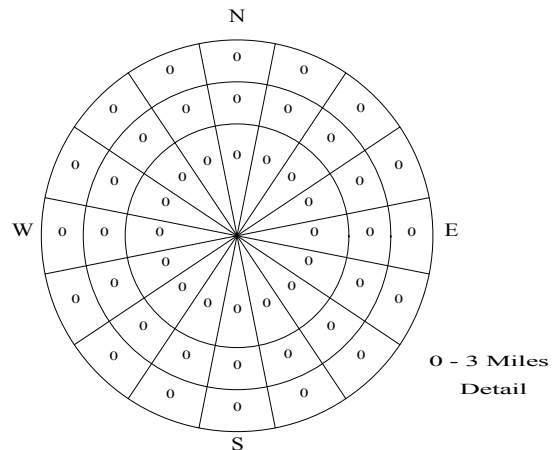


Figure 3-7. Employee Vehicles by Sector

Medical Facilities

There are three medical facilities in the LNP EPZ; a data request form was completed for each facility. Chapter 8 details the evacuation time estimate for the patients residing in these facilities. The number and type of evacuating vehicles that need to be provided depends on the state of health of the patients. Buses can transport up to 40 people; vans, up to 12 people; ambulances, up to 2 people (patients).

Pass-Through Demand

Vehicles will be traveling through the EPZ (external-external trips) at the time of an accident. After the Advisory to Evacuate is announced, these through travelers will also evacuate. These through vehicles are assumed to travel on the major routes through the EPZ (e.g. US Hwy 19, US Hwy 41). It is assumed that this traffic will continue to enter the EPZ during the first 90 minutes following the Advisory to Evacuate. We estimate approximately 2,400 vehicles enter the EPZ as external-external trips during this period.

4. ESTIMATION OF HIGHWAY CAPACITY

The ability of the road network to service vehicle demand is a major factor in determining how rapidly an evacuation can be completed. The capacity of a road is defined as the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane of roadway during a given time period under prevailing roadway, traffic and control conditions (From the 2000 Highway Capacity Manual).

In discussing capacity, different operating conditions have been assigned alphabetical designations, A through F, to reflect the range of 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 the prevailing conditions during inclement weather. Based on limited empirical data, weather conditions such as heavy rain reduce the values of free speed and of highway capacity by approximately 10 percent. Over the last decade new studies have been made on the effects of rain on traffic capacity. These studies indicate a range of effects between 5 and 20 percent depending on wind speed and precipitation rates.

Given the rural character of the EPZ within Levy and Marion Counties and the availability of well-maintained highways, congestion arising from evacuation is not likely to develop in those portions of the EPZ. The suburban character of the Citrus County portion of the EPZ will likely result in localized congestion. Estimates of roadway capacity must be determined with great care. Because of its importance, a brief discussion of the major factors that influence highway capacity is presented in this section.

Capacity Estimations on Approaches to Intersections

At-grade intersections are apt to become the first bottleneck locations under local heavy traffic volume conditions. This characteristic reflects the need to allocate access time to the respective competing traffic streams by exerting some form of control. During evacuation, control at critical intersections will often be provided by traffic control personnel assigned for that purpose, whose directions may supersede traffic control devices. The Traffic Management Plan identifies these locations (called Traffic Control Points, TCP – See Appendix G) and the management procedures applied.

The per-lane capacity of an approach to a signalized intersection can be expressed (simplistically) in the following form:

$$Q_{c\ ap, m} = \left(\frac{3600}{h_m} \right) \cdot \left[\frac{G-L}{C} \right]_m = \left(\frac{3600}{h_m} \right) \cdot P_m$$

where:

$Q_{cap,m}$	=	Capacity of a single lane of traffic on an approach, which executes movement, m , upon entering the intersection; vehicles per hour (vph)
h_m	=	Mean queue discharge headway of vehicles on this lane that are executing movement, m ; seconds per vehicle
G	=	The mean duration of GREEN time servicing vehicles that are executing movement, m , for each signal cycle; seconds
L	=	The mean "lost time" for each signal phase servicing movement, m ; seconds
C	=	The duration of each signal cycle; seconds
P_m	=	The proportion of GREEN time allocated for vehicles executing movement, m , from this lane. This value is specified as part of the control treatment.
m	=	The movement executed by vehicles after they enter the intersection: through, left-turn, right-turn, diagonal.

The turn-movement-specific mean discharge headway h_m , depends in a complex way upon many factors: roadway geometrics, turn percentages, the extent of conflicting traffic streams, the control treatment, and others. A primary factor is the value of "saturation queue discharge headway", h_{sat} , which applies to through vehicles that are not impeded by other conflicting traffic streams. This value, itself, depends upon many factors including motorist behavior. Formally, we can write,

$$h_m = f_m(h_{sat}, F_1, F_2, \dots)$$

where:

h_{sat}	=	Saturation discharge headway for through vehicles; seconds per vehicle
F_1, F_2	=	The various known factors influencing h_m
$f_m(\cdot)$	=	Complex function relating h_m to the known (or estimated) values of h_{sat}, F_1, F_2, \dots

The estimation of h_m for specified values of h_{sat}, F_1, F_2, \dots is undertaken within the PC-DYNEV simulation model and within the TRAD model by a mathematical model¹. The resulting values for h_m always satisfy the condition:

$$h_m \geq h_{sat}$$

¹ Lieberman, E., "Determining Lateral Deployment of Traffic on an Approach to an Intersection", McShane, W. & Lieberman, E., "Service Rates of Mixed Traffic on the far Left Lane of an Approach". Both papers appear in Transportation Research Record 772, 1980.

That is, the turn-movement-specific discharge headways are always greater than, or equal to the saturation discharge headway for through vehicles. These headways (or its inverse equivalent, “saturation flow rate”), may be determined by observation or using the procedures of the Highway Capacity Manual.

Capacity Estimation Along Sections of Highway

The capacity of highway sections -- as distinct from approaches to intersections -- is a function of roadway geometrics, traffic composition (e.g. percent heavy trucks and buses in the traffic stream) and, of course, motorist behavior. There is a fundamental relationship which relates service volume (i.e. the number of vehicles serviced within a uniform highway section in a given time period) to traffic density. Figure 4-1 describes this relationship.

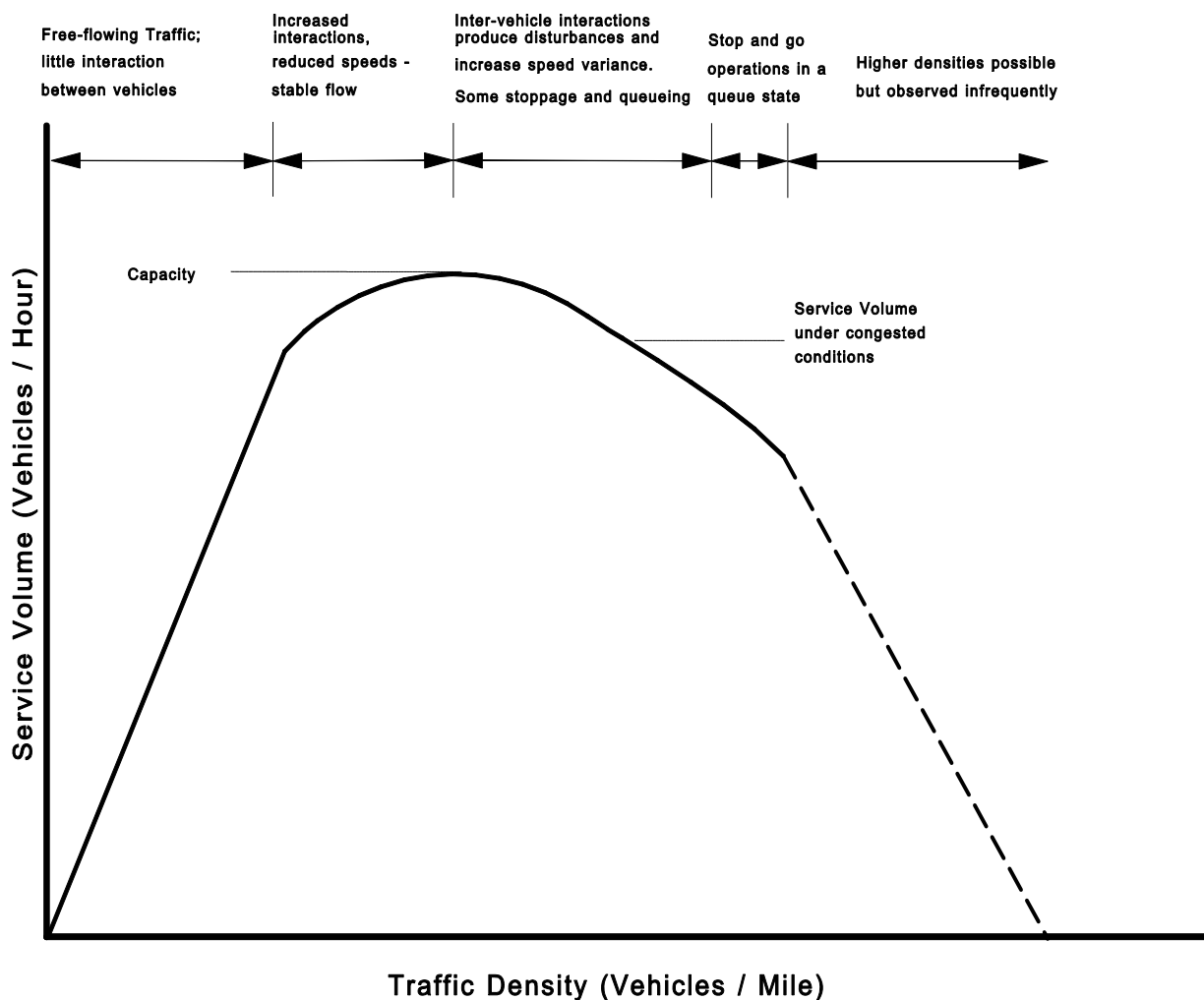


Figure 4-1. Fundamental Relationship Between Volume and Density

As indicated, there are two flow regimes: (1) Free Flow (left side of curve); and (2) Forced Flow (right side). In the Free Flow regime, the traffic demand is fully serviced; this service volume increases as demand volume and density increase, until the service volume attains its maximum value, which is the capacity of the highway section. As traffic demand and the resulting highway density increase beyond this "critical" value, the rate at which traffic can be serviced (i.e. the service volume) can actually decline below capacity. Therefore, in order to realistically represent traffic performance during congested conditions (i.e. when demand exceeds capacity), it is necessary to estimate the service volume, V_F , under congested conditions.

The value of V_F can be expressed as:

$$V_F = R \times \text{Capacity}$$

where R = Reduction factor which is less than unity.

Based on empirical data collected on freeways, we have employed a value of $R=0.85$. It is important to mention that some investigators, on analyzing data collected on freeways, conclude that little reduction in capacity occurs even when traffic is operating at Level of Service, F . While there is conflicting evidence on this subject, we adopt a conservative approach and use a value of capacity, V_F , that is applied during LOS F conditions; V_F is lower than the specified capacity.

The estimated value of capacity is based primarily upon the type of facility and on roadway geometrics. Sections of roadway with adverse geometrics are characterized by lower free-flow speeds and lane capacities.

The procedure used here was to estimate "section" capacity, V_E , based on observations made traveling over each section of the evacuation network, by the posted speed limits and travel behavior of other motorists and by reference to the 2000 Highway Capacity Manual. It was then determined for each highway section, represented as a network link, whether its capacity would be limited by the "section-specific" service volume, V_E , or by the intersection-specific capacity. For each link, the model selects the lower value of capacity.

Application to the Levy Nuclear Plant EPZ

As part of the development of the Levy Nuclear Plant (LNP) EPZ traffic network, an estimate of roadway capacity is required. The source material for the capacity estimates presented herein is contained in:

2000 Highway Capacity Manual (HCM)
Transportation Research Board
National Research Council
Washington, D.C.

The highway system in the LNP EPZ consists primarily of two categories of roads and, of course, intersections:

- Two-lane roads: Local, State
- Multi-lane Highways (at-grade)

Each of these classifications will be discussed.

Two-Lane Roads

Ref: HCM Chapter 20

Two lane roads comprise the majority of highways within the EPZ. The per-lane capacity of a two-lane highway is estimated at 1700 passenger cars per hour (pc/h). This estimate is essentially independent of the directional distribution of traffic volume except that, for extended distances, the two-way capacity will not exceed 3200 pc/h. The HCM procedures then estimate Level of Service (LOS) and Average Travel Speed. The evacuation simulation model accepts the specified value of capacity as input and computes average speed based on the time-varying demand: capacity relations.

Based on the field survey and on expected traffic operations associated with evacuation scenarios:

- Most sections of two-lane roads within the EPZ are classified as “Class I”, with “level terrain”; some are “rolling terrain”.

Multi-Lane Highway

Ref: HCM Chapter 21

Exhibit 21-23 (in the HCM) presents a set of curves that indicates a per-lane capacity of approximately 2100 pc/h, for free-speeds of 55-60 mph. Based on observation, the multi-lane highways running north-south along the eastern and western parts of the EPZ (US Highway 19 and US Highway 41) service traffic with free-speeds in this range. The actual time-varying speeds computed by the simulation model reflect the demand:capacity relationship and the impact of control at intersections.

Intersections

Ref: HCM Chapters 16, 17

Procedures for estimating capacity and LOS for approaches to intersections are presented in Chapters 16 (signalized intersections) and 17 (un-signalized intersections). These are the two longest chapters in the HCM 2000, reflecting the complexity of these procedures. The simulation logic is likewise complex, but different; as stated on page 31-21 of the HCM2000:

“Assumptions and complex theories are used in the simulation model to represent the real-world dynamic traffic environment.”

5. ESTIMATION OF TRIP GENERATION TIME

Federal Government guidelines (see NUREG 0654, Appendix 4) specify that the planner estimate the distributions of elapsed times associated with mobilization activities undertaken by the public to prepare for the evacuation trip. The elapsed time associated with each activity is represented as a statistical distribution reflecting differences between members of the public. The quantification of these activity-based distributions relies largely on the results of the telephone survey. We define the sum of these distributions of elapsed times as the Trip Generation Time Distribution.

Background

In general, an accident at a nuclear power plant is characterized by the following Emergency Action Classification Levels (see Appendix 1 of NUREG 0654 for details):

1. Unusual Event
2. Alert
3. Site Area Emergency
4. General Emergency

At each level, the Federal guidelines specify a set of Actions to be undertaken by the Licensee, and by State and Local offsite authorities. As a Planning Basis, we will adopt a conservative posture, in accord with Federal Regulations, that a rapidly escalating accident will be considered in calculating the Trip Generation Time. We will assume:

- a. The Advisory to Evacuate will be announced coincident with the emergency notification.
- b. Mobilization of the general population will commence up to 10 minutes after the alert notification.
- c. Evacuation Time Estimates (ETE) are measured relative to the Advisory to Evacuate.
- d. Schools will be evacuated prior to the Advisory to Evacuate, if circumstances permit.

We emphasize that the adoption of this planning basis is not a representation that these events will occur at the Levy Nuclear Plant (LNP) within the indicated time frame. Rather, these assumptions are necessary in order to:

- Establish a temporal framework for estimating the Trip Generation distribution as recommended in Appendix 4 of NUREG 0654.
- Identify temporal points of reference that uniquely define "Clear Time" and ETE.

It is likely that a longer time will elapse between the various classes of an emergency at LNP and that the Advisory to Evacuate is announced somewhat later than the siren alert.

For example, suppose one hour elapses from the siren alert to the Advisory to Evacuate. In this case, it is reasonable to expect some degree of spontaneous evacuation by the public during this one-hour period. As a result, the population within the Emergency Planning Zone (EPZ) will be lower when the Advisory to Evacuate is announced, than at the time of the General Emergency. Thus, the time needed to evacuate the EPZ, after the Advisory to Evacuate will be less than the estimates presented in this report.

The notification process consists of two events:

- Transmitting information (e.g. using sirens, tone alerts, EAS broadcasts, loud speakers).
- Receiving and correctly interpreting the information that is transmitted.

The peak permanent resident population within the EPZ approximates 22,758 persons who are deployed over an area of approximately 314 square miles and are engaged in a wide variety of activities. It must be anticipated that some time will elapse between the transmission and receipt of the information advising the public of an accident.

The amount of elapsed time will vary from one individual to the next depending where that person is, what that person is doing, and related factors. Furthermore, some persons who will be directly involved with the evacuation process may be outside the EPZ at the time that the emergency is declared. These people may be commuters, shoppers and other travelers who reside within the EPZ and who will return to join the other household members upon receiving notification of an emergency.

As indicated in NUREG 0654, the estimated elapsed times for the receipt of notification can be expressed as a distribution reflecting the different notification times for different people within, and outside, the EPZ. By using time distributions, it is also possible to distinguish between different population groups and different day-of-week and time-of-day scenarios, so that accurate ETE may be obtained.

For example, people at home or at work within the EPZ will be notified by siren, and/or tone alert and/or radio. Those well outside the EPZ will be notified by telephone, radio, TV and word-of-mouth, with potentially longer time lags. Furthermore, the spatial distribution of the EPZ population will differ with time of day - families will be united in the evenings, but dispersed during the day. In this respect, weekends will also differ from weekdays.

Generally, the information required can be obtained from a telephone survey of EPZ residents. Such a survey was conducted. Appendix F presents the raw survey results. It is important to note that the shape and duration of the evacuation trip mobilization distribution is important at sites where traffic congestion is not expected to cause the evacuation time estimate to extend in time well beyond the trip generation period.

Fundamental Considerations

The environment leading up to the time that people begin their evacuation trips consists of a sequence of events and activities. Each event (other than the first) occurs at an instant in time and is the outcome of an activity.

Activities are undertaken over a period of time. Activities may be in "series" (i.e. to undertake an activity implies the completion of all preceding activities) or may be in parallel (two or more activities may take place over the same period of time). Activities conducted in series are functionally dependent on the completion of prior activities; activities conducted in parallel are functionally independent of one-another. The relevant events associated with the public's preparation for evacuation are:

<u>Event Number</u>	<u>Event Description</u>
1	No-accident condition
2	Awareness of accident situation
3	Depart place of work or elsewhere, to return home
4	Arrive (or be at) home
5	Begin evacuation trip to leave the area

Associated with each sequence of events are one or more activities, as outlined below:

Event Sequence	Activity	Distribution
1 → 2	Public receives notification information	1
2 → 3	Prepare to leave work	2
2,3 → 4	Travel home*	3
2,4 → 5	Prepare to leave for evacuation trip	4

*If already at home, this is a null (no-time-consumed) activity.

These relationships are shown graphically in Figure 5-1.

An employee who lives outside the EPZ will follow sequence (d) of Figure 5-1; a resident of the EPZ who is at work, and will return home before beginning the evacuation trip will follow sequence (a) of Figure 5-1. Note that event 5, "Leave to evacuate the area," is conditional either on event 2 or on event 4. That is, activity 2 → 5 by a resident at home can be undertaken in parallel with activities 2 → 3, 3 → 4 and 4 → 5 by a commuter returning to that home, as shown in Figure 5-1 (a). Specifically, one adult member of a household can prepare to leave home (i.e. secure the home, pack clothing, etc.), while others are traveling home from work. In this instance, the household members would be able to evacuate sooner than if such trip preparation were deferred until all household members had returned home. For this study, we adopt the conservative posture that all activities will occur in sequence.

It is seen from Figure 5-1, that the Trip Generation time (i.e. the total elapsed time from Event 1 to Event 5) depends on the scenario and will vary from one household to the next. Furthermore, Event 5 depends, in a complicated way, on the time distributions of all activities preceding that event. That is, to estimate the time distribution of Event 5, we must obtain estimates of the time distributions of all preceding events.

Estimated Time Distributions of Activities Preceding Event 5

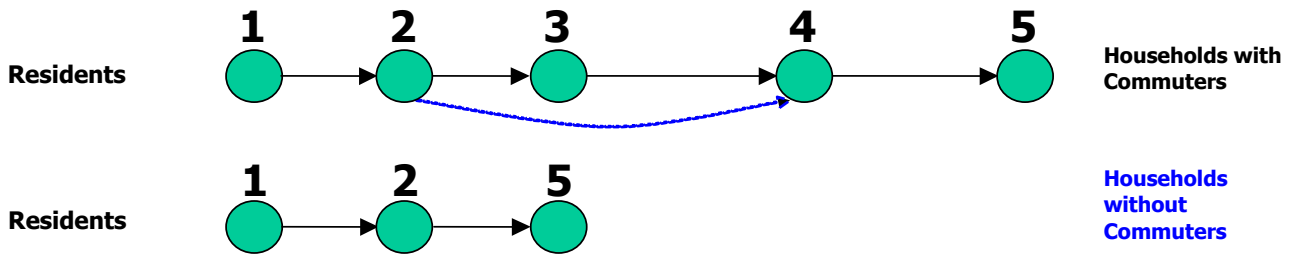
The time distribution of an event is obtained by "summing" the time distributions of all prior contributing activities (This "summing" process is quite different than an algebraic sum since we are operating on distributions – not scalar numbers).

Time Distribution No. 1, Notification Process: Activity 1 → 2

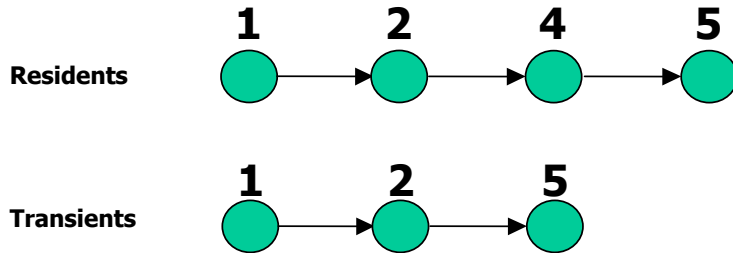
It is reasonable to expect that 85 percent of those within the EPZ will be aware of the accident within 30 minutes with the remainder notified within the following 20 minutes. The notification distribution is given below:

Distribution No. 1, Notification Time: Activity 1 → 2

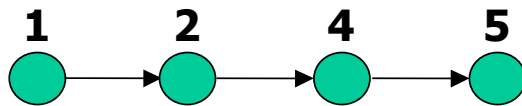
Elapsed Time (Minutes)	Percent of Population Notified
0	0
5	7
10	13
15	26
20	46
25	65
30	85
35	90
40	95
45	98
50	100



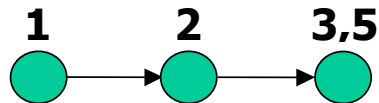
(a) Accident occurs during midweek, at midday; year round



(b) Accident occurs during weekend, at midday; summer season



(c) Accident occurs in the evening; non-summer season



(d) Employees who live outside the EPZ

- 1 Notification
- 2 Aware of Accident
- 3 Leave Work
- 4 Arrive Home
- 5 Begin Evacuation Trip

Increasing Time

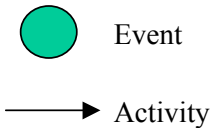


Figure 5-1. Events and Activities Preceding the Evacuation Trip

Distribution No. 2, Prepare to Leave Work: Activity 2 → 3

It is reasonable to expect that the vast majority of business enterprises within the EPZ will elect to shut down following notification and most employees would leave work quickly. Commuters, who work outside the EPZ could, in all probability, also leave quickly since facilities outside the EPZ would remain open and other personnel would remain. Personnel or farmers responsible for equipment or livestock would require additional time to secure their facility. The distribution of Activity 2 → 3 reflects data obtained by the telephone survey. This distribution is plotted in Figure 5-2 and listed below.

Elapsed Time (Minutes)	Cumulative Percent Employees Leaving Work
0	0
5	33
10	46
15	57
20	65
25	73
30	81
35	84
40	86
45	89
50	90
55	92
60	94
65	95
70	96
75	97
80	98
85	98
90	98
95	98
100	100

NOTE: The survey data was normalized to distribute the "Don't know" response.

Distribution No. 3, Travel Home: Activity 3 → 4

These data are provided directly by the telephone survey. This distribution is plotted in Figure 5-2 and listed below.

Elapsed Time (Minutes)	Cumulative Percent Returning Home
0	0
5	18
10	37
15	50
20	61
25	70
30	77
35	82
40	85
45	90
50	92
55	92
60	94
65	95
70	96
75	96
80	96
85	97
90	97
95	97
100	97
105	97
110	98
115	99
120	100

NOTE: The survey data was normalized to distribute the "Don't know" response

Distribution No. 4, Prepare to Leave Home: Activity 2, 4 → 5

These data are provided directly by the telephone survey. This distribution is plotted in Figure 5-2 and listed below.

Elapsed Time (Minutes)	Cumulative Pct. Ready to Evacuate	Elapsed Time (Minutes)	Cumulative Pct. Ready to Evacuate
0	0	110	88
5	9	115	89
10	18	120	90
15	27	125	91
20	37	130	93
25	48	135	94
30	54	140	94
35	60	145	94
40	63	150	95
45	65	155	95
50	70	160	95
55	74	165	95
60	79	170	95
65	81	175	95
70	83	180	95
75	85	185	96
80	85	190	96
85	85	195	97
90	86	200	98
95	86	205	99
100	86	210	100
105	86		

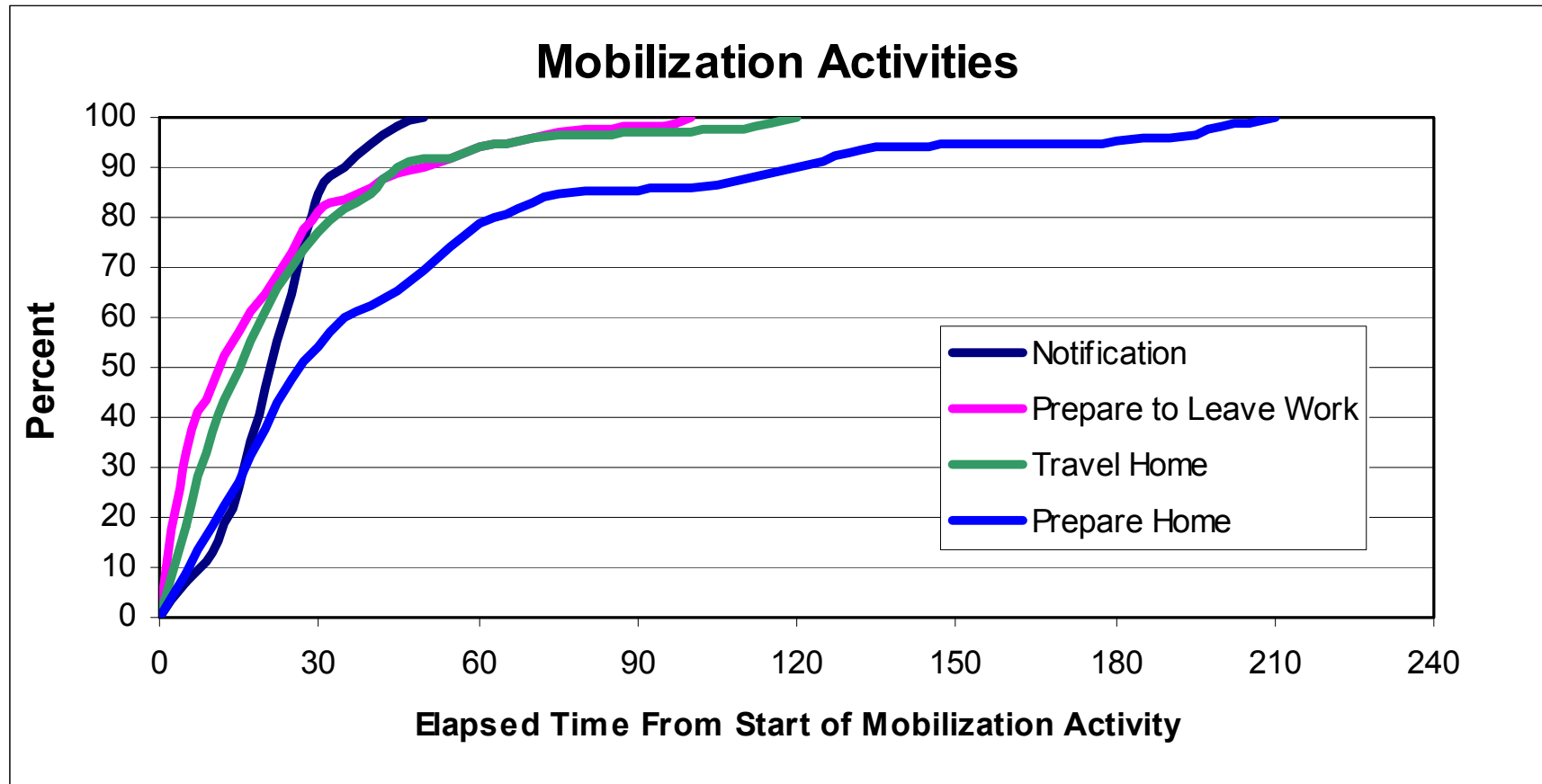


Figure 5-2. Evacuation Mobilization Activities

Calculation of Trip Generation Time Distribution

The time distributions for each of the mobilization activities presented herein must be combined to form the appropriate Trip Generation Distributions. We assume that the stated events take place in sequence such that all preceding events must be completed before the current event can occur. For example, if a household awaits the return of a commuter, the work-to-home trip (Activity 3 → 4) must precede Activity 4 → 5.

To calculate the time distribution of an event that is dependent on two sequential activities, it is necessary to “sum” the distributions associated with these prior activities. The distribution summing algorithm is applied repeatedly as shown to form the required distribution. As an outcome of this procedure, new time distributions are formed; we assign “letter” designations to these intermediate distributions to describe the procedure.

Apply “Summing” Algorithm To:	Distribution Obtained	Event Defined
Distributions 1 and 2	To Obtain Distribution A	That defines Event 3
Distributions A and 3	To Obtain Distribution B	That defines Event 4
Distributions B and 4	To Obtain Distribution C	That defines Event 5
Distributions 1 and 4	To Obtain Distribution D	That defines Event 5

Distributions A through D are described below; distributions A, C, and D are shown in Figure 5-3:

Distribution	Description
A	Time distribution of commuters departing place of work (Event 3). Also applies to employees who work within the EPZ but live outside the EPZ, and to Transients within the EPZ.
B	Time distribution of commuters arriving home.
C	Time distribution of residents with commuters leaving home to begin the evacuation trip.
D	Time distribution of residents without commuters returning home to begin the evacuation trip.

Figure 5-3 presents the combined trip generation distributions designated A, C, and D. These distributions are presented on the same time scale. The PC-DYNEV simulation model is designed to accept varying rates of vehicle trip generation for each origin centroid, expressed in the form of histograms. These histograms, which represent Distributions A, C, and D, properly displaced with respect to one another, are tabulated in Table 5-1 (Distribution B, Arrive Home, omitted for clarity).

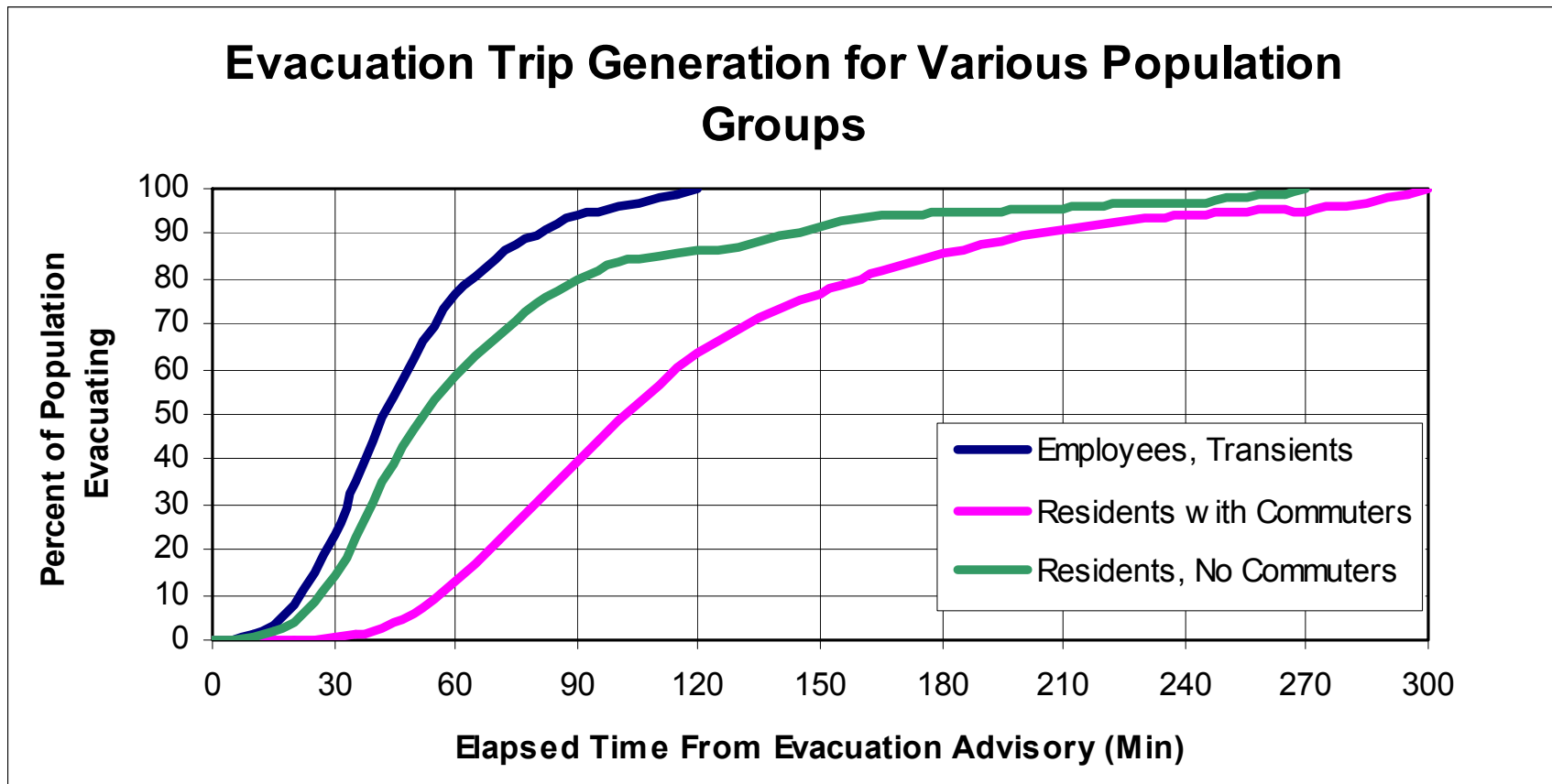


Figure 5-3. Comparison of Trip Generation Distributions

Table 5-1. Trip Generation Histograms for the EPZ Population					
Time Period	Duration (Min)	Percent of Total Trips Generated Within Indicated Time Period			
		Residents With Commuters (Distribution C)	Residents Without Commuters (Distribution D)	Employees (Distribution A)	Transients (Distribution A)
1	15	0	3	5	5
2	15	1	12	20	20
3	30	11	45	53	53
4	30	28	20	17	17
5	30	25	7	5	5
6	30	14	4	0	0
7	30	7	4	0	0
8	60	7	3	0	0
9	60	7	2	0	0
10	600	0	0	0	0

6. DEMAND ESTIMATION FOR EVACUATION SCENARIOS

An evacuation “case” defines a combination of Evacuation Region and Evacuation Scenario. The definitions of “Region” and “Scenario” are as follows:

Region	A grouping of contiguous Protective Action Zones (PAZ), that forms either a “keyhole” sector-based area, or a circular area within the EPZ, that must be evacuated in response to a radiological emergency.
Scenario	A combination of circumstances, including time of day, day of week, season, and weather conditions. Scenarios define the number of people in each of the affected population groups and their respective mobilization time distributions.

A total of 13 Regions were defined which encompass all the groupings of PAZ considered. These Regions are defined in Table 6-1. The PAZ configurations are identified in Figure 6-1. Each keyhole sector-based area consists of a circular area centered at the Levy Nuclear Plant (LNP), and three adjoining sectors, each with a central angle of 22.5 degrees. These sectors extend to a distance of 5 miles from LNP, or to the EPZ boundary. The azimuth of the center sector defines the orientation of these Regions.

A total of 11 Scenarios were evaluated for all Regions. Thus, there are a total of $11 \times 13 = 143$ evacuation cases. Table 6-2 is a description of all Scenarios.

Each combination of Region and Scenario implies a specific population to be evacuated. Table 6-3 presents the percentage of each population group assumed to evacuate for each scenario. Table 6-4 presents the vehicle counts for each scenario.

Table 6-1. Description of Evacuation Regions									
Region	Description	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
R01	2 mile ring								
R02	5-mile ring								
R03	Full EPZ								
Evacuate 2 mile ring and 5 miles downwind									
Region	Wind Direction Towards:	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
Refer to R02	WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE								
Refer to R01	SSE, S, SSW, SW, WSW, W								
Evacuate 5 mile ring and downwind to EPZ boundary									
Region	Wind Direction Towards:	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
R04	N								
R05	NNE, NE								
R06	ENE, E								
R07	ESE, SE								
R08	SSE								
R09	S, SSW								
R10	SW, WSW								
R11	W								
R12	WNW								
R13	NW, NNW								

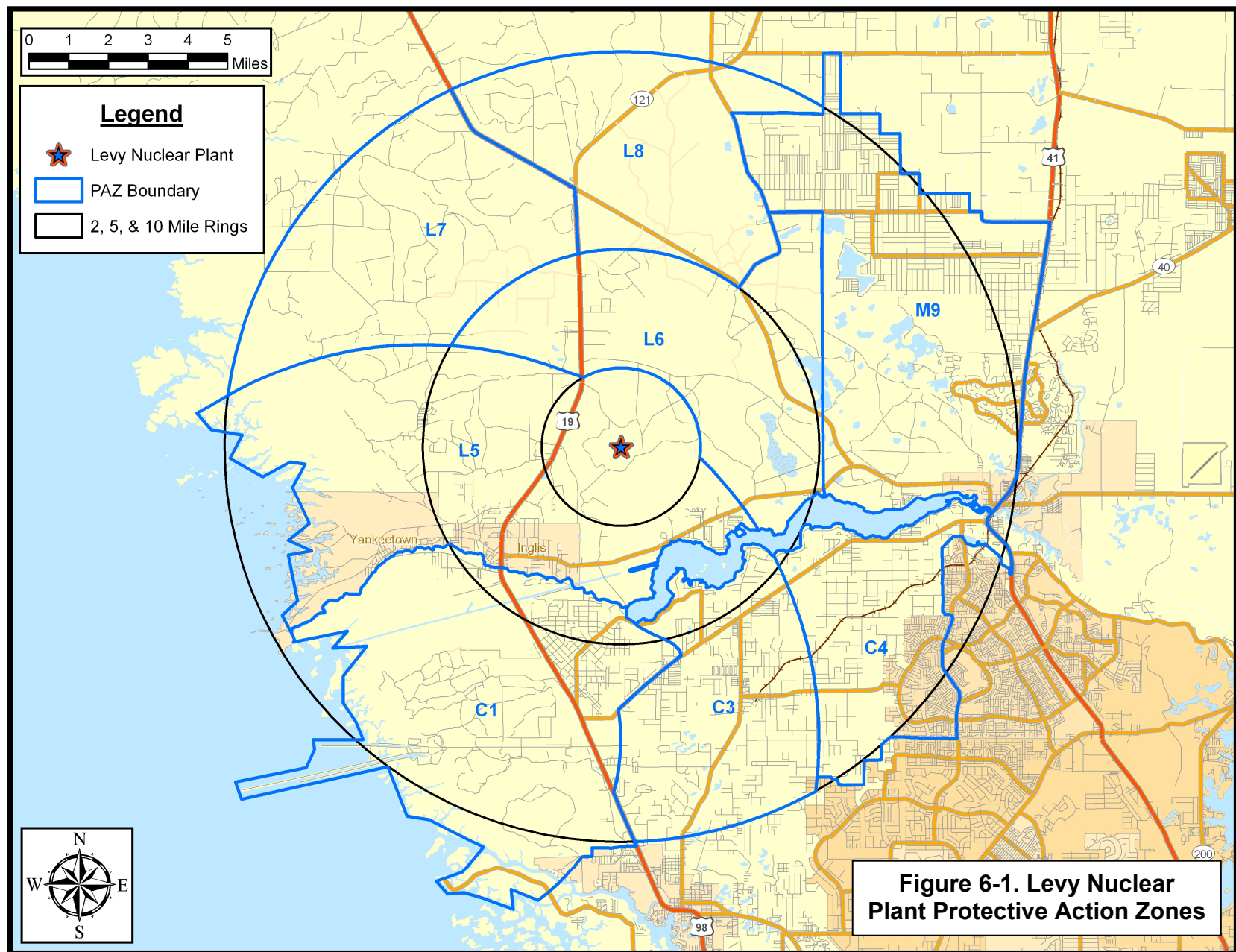


Table 6-2. Evacuation Scenario Definitions					
Scenarios	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Weekend	Midday	Good	New Plant Construction

Note: Schools are assumed to be in session for the Winter season (midweek, midday).

Table 6-3. Percent of Population Groups Evacuating for Various Scenarios

Scenarios	Residents With Commuters in Household	Residents With No Commuters in Household	Employees	Transients	Shadow	Special Event	School Buses	Transit Buses	External Through Traffic
1	45%	55%	96%	10%	31%	0%	10%	100%	100%
2	45%	55%	96%	10%	31%	0%	10%	100%	100%
3	10%	90%	75%	15%	31%	0%	0%	100%	100%
4	10%	90%	75%	15%	31%	0%	0%	100%	100%
5	10%	90%	10%	5%	30%	0%	0%	100%	60%
6	45%	55%	100%	50%	31%	0%	100%	100%	100%
7	45%	55%	100%	50%	31%	0%	100%	100%	100%
8	10%	90%	75%	100%	31%	0%	0%	100%	100%
9	10%	90%	75%	100%	31%	0%	0%	100%	100%
10	10%	90%	10%	50%	30%	0%	0%	100%	60%
11	10%	90%	75%	100%	31%	100%	0%	100%	100%

Resident Households With CommutersHouseholds of EPZ residents who await the return of commuters prior to beginning the evacuation trip.

Resident Households With No CommutersHouseholds of EPZ residents who do not have commuters or will not await the return of commuters prior to beginning the evacuation trip.

Employees EPZ employees who live outside of the EPZ.

Transients People who are in the EPZ at the time of an accident for recreational or other (non-employment) purposes.

Shadow Residents and employees in the Shadow Region (outside of the EPZ) who will spontaneously decide to relocate during the evacuation. The basis for the values shown is a 30% relocation of shadow residents along with a proportional percentage of shadow employees. The percentage of shadow employees is computed using the scenario-specific ratio of EPZ employees to residents.

Special Events Additional vehicles in the Levy Nuclear Plant area during the completion of construction on Unit 2 in the Year 2017. Unit 1 will be operational in the Year 2016.

School and Transit Buses Vehicle-equivalents present on the road during evacuation servicing schools and transit-dependent people (1 bus is equivalent to 2 passenger vehicles), respectively.

External Through Traffic Traffic on local highways and major arterial roads at the start of the evacuation. This traffic is stopped by access control approximately 90 minutes after the evacuation begins.

Table 6-4. Vehicle Estimates By Scenario										
Scenarios	Residents with Commuters	Residents without Commuters	Employees	Transients	Shadow	Special Events	School Buses *	Transit Buses *	External Traffic	Total Scenario Vehicles
1	6,020	7,330	594	89	9,250	-	12	40	2,400	25,735
2	6,020	7,330	594	89	9,250	-	12	40	2,400	25,735
3	602	12,748	464	133	9,164	-	-	40	2,400	25,551
4	602	12,748	464	133	9,164	-	-	40	2,400	25,551
5	602	12,748	62	44	8,898	-	-	40	1,440	23,834
6	6,020	7,330	619	445	9,267	-	112	40	2,400	26,233
7	6,020	7,330	619	445	9,267	-	112	40	2,400	26,233
8	602	12,748	464	889	9,164	-	-	40	2,400	26,307
9	602	12,748	464	889	9,164	-	-	40	2,400	26,307
10	602	12,748	62	445	8,898	-	-	40	1,440	24,235
11	1,022**	21,645**	464	889	14,743**	695	-	40	2,400	41,898

NOTE:

* School Buses and Transit Buses are expressed in vehicle equivalents (1 bus = 2 vehicles). Therefore actual number of buses are 1/2 the value shown.

**Permanent Resident population and Shadow population have been expanded (using County specific growth rates) to the Year 2017 when Unit 1 will be operational while Unit 2 construction is completed.

7. GENERAL POPULATION EVACUATION TIME ESTIMATES (ETE)

This section presents the current results of the computer analyses using the IDYNEV System described in Appendices B, C and D. These results cover 13 regions within the Levy Nuclear Plant EPZ and the 11 Evacuation Scenarios discussed in Section 6.

The ETE for all Evacuation Cases are presented in Tables 7-1A through 7-1D. **These tables present the estimated times to clear the indicated population percentages from the Evacuation Regions for all Evacuation Scenarios.** The tabulated values of ETE are obtained from the PC-DYNEV simulation model outputs of vehicles exiting the specified evacuation areas. These data are generated at 10-minute intervals, then interpolated to the nearest 5 minutes.

7.1 Voluntary Evacuation and Shadow Evacuation

We define “voluntary evacuees” as people who are within the EPZ in Protective Action Zones (PAZ) located outside the Evacuation Region, for which an Advisory to Evacuate *has not* been issued, yet who nevertheless elect to evacuate. We define “shadow evacuation” as the movement of people from areas *outside* the EPZ for whom no protective action recommendation has been issued. Both voluntary and shadow evacuation are assumed to take place over the same time frame as the evacuation from within the impacted Evacuation Region.

The ETE for LNP addresses the issue of voluntary evacuees as discussed in Section 2.2 and displayed in Figure 7-1 (same as Figure 2-1). Figure 7-2 presents the area identified as the Shadow Evacuation Region. This region extends radially from the boundary of the EPZ to a distance of 15 miles from LNP.

Traffic generated within this Shadow Evacuation Region, traveling away from the plant, has the potential for impeding evacuating vehicles from within the Evacuation Region. We assume that the traffic volumes emitted within the Shadow Evacuation Region correspond to 30 percent of the residents there plus a proportionate number of employees in that region. **All ETE calculations include this shadow traffic movement.**

7.2 Patterns of Traffic Congestion During Evacuation

Figures 7-3 through 7-6 illustrate the patterns of traffic congestion that arise for the case when the entire EPZ (Region R03) is advised to evacuate during the winter, weekend, midday period under good weather conditions (Scenario 8).

Traffic congestion, as the term is used here, is defined as Level of Service (LOS) F. LOS F is defined as follows (2000 HCM):

Level of Service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level of Service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow, which causes the queue to form, and Level of Service F is an appropriate designation for such points.

This definition is general and conceptual in nature, and applies primarily to uninterrupted flow. Levels of Service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them.

All highway "links" which experience LOS F at the indicated times are delineated in these Figures by a red line; all others are lightly indicated. Congestion develops in areas with high population density and at traffic bottlenecks. The approaches to US Hwy 41 in Dunnellon, to US Hwy 19/98 in Crystal River and to US Hwy 19/98 in Inglis are congested at 1 hour after the Advisory to Evacuate (ATE) for Scenario 8, as indicated in Figure 7-3. Congestion is also exhibited northbound on US Hwy 41 and eastbound on State Highway 484 at this time. Congestion patterns are similar at 1 hour and 30 minutes after the ATE, as shown in Figure 7-4; however, congestion eastbound on Dunnellon Road is beginning to dissipate. Figure 7-5 indicates that most of the congestion in the EPZ has cleared by 2 hours after the ATE, while some congestion persists in the Rainbow Springs area along US Hwy 41. The roadway network is clear of congestion at 2 hours and 30 minutes after the ATE, as shown in Figure 7-6. The absence of congestion on network links implies that traffic demand there has decreased below the roadway capacity for a period of time sufficient to dissipate any traffic queues. It does not necessarily imply that traffic has completely cleared from these roadway sections.

7.3 Evacuation Rates

Another format for displaying the dynamics of evacuation is depicted in Figure 7-7. This plot indicates the rate at which traffic flows out of the indicated areas for the case of an evacuation of the entire EPZ (Region R03) under the indicated conditions. Appendix J presents these plots for all Evacuation Scenarios for Region R03.

As indicated in Figure 7-7, there is typically a long "tail" to these distributions. Vehicles evacuate an area slowly at the beginning, as people respond to the Advisory to Evacuate at different rates. Then traffic demand builds rapidly (slopes of curves increase). When the system becomes congested, traffic exits the EPZ at rates somewhat below capacity until some evacuation routes have cleared. As more routes clear, the aggregate rate of egress slows since many vehicles have already left the EPZ. Towards the end of the process, relatively few evacuation routes service the remaining demand. There is no significant congestion within the EPZ and the ETE is driven by the mobilization activities of the EPZ population.

This decline in aggregate flow rate, towards the end of the process, is characterized by these curves flattening and gradually becoming horizontal. Ideally, it would be desirable to fully saturate all evacuation routes equally so that all will service traffic near capacity levels and all will clear at the same time. For this ideal situation, all curves would retain the same slope until the end – thus minimizing evacuation time. In the real world, this ideal is generally unattainable reflecting the variation in population density and in highway capacity within the EPZ.

7.4 Guidance on Using ETE Tables

Tables 7-1A through 7-1D present the ETE values for all 13 Evacuation Regions and all 11 Evacuation Scenarios. They are organized as follows:

Table	Contents
7-1A	ETE represents the elapsed time required for 50 percent of the population within a Region, to evacuate from that Region.
7-1B	ETE represents the elapsed time required for 90 percent of the population within a Region, to evacuate from that Region.
7-1C	ETE represents the elapsed time required for 95 percent of the population within a Region, to evacuate from that Region.
7-1D	ETE represents the elapsed time required for 100 percent of the population within a Region, to evacuate from that Region.

The user first determines the percentile of population for which the ETE is sought. The applicable value of ETE within the chosen Table may then be identified using the following procedure:

1. Identify the applicable **Scenario**:
 - The Season
 - Summer (schools not in session)
 - Winter (also Autumn and Spring)
 - The Day of Week
 - Midweek (work-day)
 - Weekend, Holiday
 - The Time of Day
 - Midday (work and commuting hours)
 - Evening
 - Weather Condition
 - Good Weather
 - Rain
 - Special Event (if any)
 - New Plant Construction

While these Scenarios are designed, in aggregate, to represent conditions throughout the year, some further clarification is warranted:

- The conditions of a summer evening (either midweek or weekend) and rain are not explicitly identified in Tables 7-1A through 7-1D. For these conditions, Scenario (4) applies.

- The conditions of a winter evening (either midweek or weekend) and rain are not explicitly identified in Tables 7-1A through 7-1D. For these conditions, Scenario (9) applies.
 - The seasons are defined as follows:
 - Summer implies that public schools are *not* in session.
 - Winter, Spring and Autumn imply that public schools *are* in session.
 - Time of Day: Midday implies the time over which most commuters are at work.
2. With the Scenario (and column in the Table) identified, now identify the **Evacuation Region**:
- Determine the projected azimuth direction of the plume (coincident with the wind direction). This direction is expressed in terms of compass orientation: *towards* N, NNE, NE, ...
 - Determine the distance that the Evacuation Region will extend from the Levy Nuclear Plant. The applicable distances and their associated candidate Regions are given below:
 - 2 Miles (Region R01)
 - 5 Miles (Region R02)
 - to EPZ Boundary (Regions R03 through R13)
 - Enter Table 7-2 and identify the applicable group of candidate Regions based on the wind direction and on the distance that the selected Region extends from LNP. Select the Evacuation Region identifier in that row from the first column of the Table.
3. Determine the **ETE for the Scenario** identified in Step 1 and the Region identified in Step 2, as follows:
- The columns of Table 7-1 are labeled with the Scenario numbers. Identify the proper column in the selected Table using the Scenario number determined in Step 1.
 - Identify the row in this table that provides ETE values for the Region identified in Step 2.
 - The unique data cell defined by the column and row so determined contains the desired value of ETE expressed in Hours:Minutes.

Example

It is desired to identify the ETE for the following conditions:

- Sunday, August 10th at 4:00 AM.
- It is raining.
- Wind direction is *toward* the northeast (NE).
- Wind speed is such that the distance to be evacuated is judged to be 10 miles (to EPZ boundary).
- The desired ETE is that value needed to evacuate 95 percent of the population from within the impacted Region.

Table 7-1C is applicable because the 95th-percentile population is desired. Proceed as follows:

1. Identify the Scenario as summer, weekend, evening and raining. Entering Table 7-1C, it is seen that there is no match for these descriptors. However, the clarification given above assigns this combination of circumstances to Scenario 4.
2. Enter Table 7-2 and locate the group entitled "Evacuate 5-Mile Ring and Downwind to EPZ Boundary". Under "Wind Direction Towards:", identify the NE (northeast) azimuth and read REGION R05 in the first column of that row.
3. Enter Table 7-1C to locate the data cell containing the value of ETE for Scenario 4 and Region R05. This data cell is in column (4) and in the row for Region R05; it contains the ETE value of **3:10**.

Table 7-1A Time To Clear The Indicated Area of 50 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter		Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend		Weekend
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	Scenario:	(11)
Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather		New Plant Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ													
R01 2-mile ring	1:15	1:15	1:05	1:10	1:05	R01 2-mile ring	1:15	1:15	1:05	1:10	1:05	R01 2-mile ring	1:25
R02 5-mile ring	1:15	1:20	1:05	1:10	1:05	R02 5-mile ring	1:15	1:20	1:05	1:10	1:05	R02 5-mile ring	1:15
R03 Entire EPZ	1:20	1:25	1:10	1:15	1:10	R03 Entire EPZ	1:20	1:25	1:10	1:15	1:10	R03 Entire EPZ	1:35
2-Mile Ring and Downwind to 5 Miles													
Same As R01 SSE, S, SSW, SW, WSW, W	1:15	1:15	1:05	1:10	1:05	Same As R01 SSE, S, SSW, SW, WSW, W	1:15	1:15	1:05	1:10	1:05	Same As R01 SSE, S, SSW, SW, WSW, W	1:25
Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	1:15	1:20	1:05	1:10	1:05	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	1:15	1:20	1:05	1:10	1:05	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	1:15
5-Mile Ring and Downwind to EPZ Boundary													
R04 N	1:20	1:25	1:10	1:15	1:10	R04 N	1:20	1:25	1:10	1:15	1:10	R04 N	1:25
R05 NNE, NE	1:20	1:25	1:10	1:15	1:10	R05 NNE, NE	1:20	1:25	1:10	1:15	1:10	R05 NNE, NE	1:25
R06 ENE, E	1:20	1:25	1:10	1:15	1:10	R06 ENE, E	1:20	1:25	1:10	1:15	1:10	R06 ENE, E	1:25
R07 ESE, SE	1:20	1:25	1:10	1:15	1:10	R07 ESE, SE	1:20	1:25	1:10	1:15	1:10	R07 ESE, SE	1:15
R08 SSE	1:15	1:20	1:05	1:10	1:05	R08 SSE	1:15	1:20	1:05	1:10	1:05	R08 SSE	1:25
R09 S, SSW	1:15	1:20	1:05	1:10	1:05	R09 S, SSW	1:15	1:20	1:05	1:10	1:05	R09 S, SSW	1:15
R10 SW, WSW	1:15	1:20	1:05	1:10	1:05	R10 SW, WSW	1:15	1:20	1:05	1:10	1:05	R10 SW, WSW	1:15
R11 W	1:15	1:20	1:05	1:10	1:05	R11 W	1:15	1:20	1:05	1:10	1:05	R11 W	1:15
R12 WNW	1:20	1:20	1:10	1:10	1:10	R12 WNW	1:20	1:20	1:10	1:10	1:10	R12 WNW	1:20
R13 NW,NNW	1:20	1:25	1:10	1:10	1:10	R13 NW,NNW	1:20	1:25	1:10	1:10	1:10	R13 NW,NNW	1:20

Table 7-1B Time To Clear The Indicated Area of 90 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter		Winter	
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend		Weekend	
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	Scenario:	(11)	
Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday	
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather		New Plant Construction	
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01 2-mile ring	2:30	2:30	2:00	2:00	2:10	R01 2-mile ring	2:30	2:30	2:00	2:00	2:10	R01 2-mile ring	2:50	
R02 5-mile ring	2:40	2:40	2:10	2:10	2:20	R02 5-mile ring	2:40	2:40	2:10	2:10	2:20	R02 5-mile ring	2:50	
R03 Entire EPZ	2:50	2:50	2:30	2:30	2:30	R03 Entire EPZ	2:50	2:50	2:20	2:30	2:30	R03 Entire EPZ	3:00	
2-Mile Ring and Downwind to 5 Miles														
Same As R01 SSE, S, SSW, SW, WSW, W	2:30	2:30	2:00	2:00	2:10	Same As R01 SSE, S, SSW, SW, WSW, W	2:30	2:30	2:00	2:00	2:10	Same As R01 SSE, S, SSW, SW, WSW, W	2:50	
Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	2:40	2:40	2:10	2:10	2:20	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	2:40	2:40	2:10	2:10	2:20	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	2:50	
5-Mile Ring and Downwind to EPZ Boundary														
R04 N	2:50	2:50	2:20	2:20	2:30	R04 N	2:40	2:50	2:20	2:20	2:30	R04 N	2:50	
R05 NNE, NE	2:50	2:50	2:20	2:20	2:30	R05 NNE, NE	2:40	2:50	2:20	2:20	2:30	R05 NNE, NE	2:50	
R06 ENE, E	2:50	2:50	2:20	2:30	2:30	R06 ENE, E	2:50	2:50	2:20	2:20	2:30	R06 ENE, E	2:50	
R07 ESE, SE	2:50	2:50	2:30	2:30	2:30	R07 ESE, SE	2:50	2:50	2:20	2:20	2:30	R07 ESE, SE	2:50	
R08 SSE	2:40	2:40	2:10	2:10	2:20	R08 SSE	2:40	2:40	2:10	2:10	2:20	R08 SSE	2:50	
R09 S, SSW	2:40	2:40	2:10	2:10	2:20	R09 S, SSW	2:40	2:40	2:10	2:10	2:20	R09 S, SSW	2:50	
R10 SW, WSW	2:40	2:40	2:10	2:10	2:20	R10 SW, WSW	2:40	2:40	2:10	2:10	2:20	R10 SW, WSW	2:50	
R11 W	2:40	2:40	2:10	2:10	2:20	R11 W	2:40	2:40	2:10	2:10	2:20	R11 W	2:50	
R12 WNW	2:40	2:40	2:10	2:10	2:20	R12 WNW	2:40	2:40	2:10	2:10	2:20	R12 WNW	2:50	
R13 NW,NNW	2:40	2:40	2:10	2:10	2:20	R13 NW,NNW	2:40	2:40	2:10	2:10	2:20	R13 NW,NNW	2:50	

Table 7-1C Time To Clear The Indicated Area of 95 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter		Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend		Weekend
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	Scenario:	(11)
Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather		New Plant Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ													
R01 2-mile ring	3:20	3:20	2:50	2:50	3:00	R01 2-mile ring	3:20	3:20	2:50	2:50	3:00	R01 2-mile ring	3:20
R02 5-mile ring	3:30	3:30	2:50	2:50	3:00	R02 5-mile ring	3:30	3:30	2:50	2:50	3:00	R02 5-mile ring	3:20
R03 Entire EPZ	3:40	3:50	3:10	3:10	3:10	R03 Entire EPZ	3:40	3:40	3:10	3:10	3:10	R03 Entire EPZ	3:30
2-Mile Ring and Downwind to 5 Miles													
Same As R01 SSE, S, SSW, SW, WSW, W	3:20	3:20	2:50	2:50	3:00	Same As R01 SSE, S, SSW, SW, WSW, W	3:20	3:20	2:50	2:50	3:00	Same As R01 SSE, S, SSW, SW, WSW, W	3:20
Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	3:30	3:30	2:50	2:50	3:00	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	3:30	3:30	2:50	2:50	3:00	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	3:20
5-Mile Ring and Downwind to EPZ Boundary													
R04 N	3:40	3:40	3:10	3:10	3:10	R04 N	3:40	3:40	3:00	3:10	3:10	R04 N	3:30
R05 NNE, NE	3:40	3:40	3:10	3:10	3:10	R05 NNE, NE	3:40	3:40	3:00	3:10	3:10	R05 NNE, NE	3:30
R06 ENE, E	3:40	3:40	3:10	3:10	3:10	R06 ENE, E	3:40	3:40	3:10	3:10	3:10	R06 ENE, E	3:30
R07 ESE, SE	3:40	3:40	3:10	3:10	3:10	R07 ESE, SE	3:40	3:40	3:10	3:10	3:10	R07 ESE, SE	3:30
R08 SSE	3:30	3:30	3:00	3:00	3:00	R08 SSE	3:30	3:30	2:50	2:50	3:00	R08 SSE	3:20
R09 S, SSW	3:30	3:30	3:00	3:00	3:00	R09 S, SSW	3:30	3:30	2:50	2:50	3:00	R09 S, SSW	3:20
R10 SW, WSW	3:30	3:30	2:50	2:50	3:00	R10 SW, WSW	3:30	3:30	2:50	2:50	3:00	R10 SW, WSW	3:20
R11 W	3:30	3:30	3:00	3:00	3:00	R11 W	3:30	3:30	3:00	3:00	3:00	R11 W	3:20
R12 WNW	3:30	3:30	3:00	3:00	3:00	R12 WNW	3:30	3:30	3:00	3:00	3:00	R12 WNW	3:20
R13 NW,NNW	3:30	3:30	3:00	3:00	3:00	R13 NW,NNW	3:30	3:30	3:00	3:00	3:00	R13 NW,NNW	3:20

Table 7-1D Time To Clear The Indicated Area of 100 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter		Winter	
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend		Weekend	
Scenario:	(1)	(2)	(3)	(4)	(5)	Scenario:	(6)	(7)	(8)	(9)	(10)	Scenario:	(11)	
Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday		Midday		Evening	Region Wind Towards:	Midday	
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather		New Plant Construction	
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01 2-mile ring	5:00	5:00	5:00	5:00	5:00	R01 2-mile ring	5:00	5:00	5:00	5:00	5:00	R01 2-mile ring	5:00	
R02 5-mile ring	5:10	5:10	5:00	5:10	5:10	R02 5-mile ring	5:10	5:10	5:10	5:10	5:10	R02 5-mile ring	5:10	
R03 Entire EPZ	5:10	5:10	5:10	5:10	5:10	R03 Entire EPZ	5:10	5:10	5:10	5:10	5:10	R03 Entire EPZ	5:10	
2-Mile Ring and Downwind to 5 Miles														
Same As R01 SSE, S, SSW, SW, WSW, W	5:00	5:00	5:00	5:00	5:00	Same As R01 SSE, S, SSW, SW, WSW, W	5:00	5:00	5:00	5:00	5:00	Same As R01 SSE, S, SSW, SW, WSW, W	5:00	
Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	5:10	5:10	5:00	5:10	5:10	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	5:10	5:10	5:10	5:10	5:10	Same As R02 WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE	5:10	
5-Mile Ring and Downwind to EPZ Boundary														
R04 N	5:10	5:10	5:10	5:10	5:10	R04 N	5:10	5:10	5:10	5:10	5:10	R04 N	5:10	
R05 NNE, NE	5:10	5:10	5:10	5:10	5:10	R05 NNE, NE	5:10	5:10	5:10	5:10	5:10	R05 NNE, NE	5:10	
R06 ENE, E	5:10	5:10	5:10	5:10	5:10	R06 ENE, E	5:10	5:10	5:10	5:10	5:10	R06 ENE, E	5:10	
R07 ESE, SE	5:10	5:10	5:10	5:10	5:10	R07 ESE, SE	5:10	5:10	5:10	5:10	5:10	R07 ESE, SE	5:10	
R08 SSE	5:10	5:10	5:00	5:10	5:10	R08 SSE	5:10	5:10	5:10	5:10	5:10	R08 SSE	5:10	
R09 S, SSW	5:10	5:10	5:00	5:10	5:10	R09 S, SSW	5:10	5:10	5:10	5:10	5:10	R09 S, SSW	5:10	
R10 SW, WSW	5:10	5:10	5:00	5:10	5:10	R10 SW, WSW	5:10	5:10	5:10	5:10	5:10	R10 SW, WSW	5:10	
R11 W	5:10	5:10	5:10	5:10	5:10	R11 W	5:10	5:10	5:10	5:10	5:10	R11 W	5:10	
R12 WNW	5:10	5:10	5:10	5:10	5:10	R12 WNW	5:10	5:10	5:10	5:10	5:10	R12 WNW	5:10	
R13 NW,NNW	5:10	5:10	5:10	5:10	5:10	R13 NW,NNW	5:10	5:10	5:10	5:10	5:10	R13 NW,NNW	5:10	

Table 7-2. Description of Evacuation Regions									
Region	Description	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
R01	2 mile ring								
R02	5-mile ring								
R03	Full EPZ								
Evacuate 2 mile ring and 5 miles downwind									
Region	Wind Direction Towards:	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
Refer to R02	WNW, NW, NNW, N, NNE, NE, ENE, E, ESE, SE								
Refer to R01	SSE, S, SSW, SW, WSW, W								
Evacuate 5 mile ring and downwind to EPZ boundary									
Region	Wind Direction Towards:	PAZ							
		C1	C3	C4	L5	L6	L7	L8	M9
R04	N								
R05	NNE, NE								
R06	ENE, E								
R07	ESE, SE								
R08	SSE								
R09	S, SSW								
R10	SW, WSW								
R11	W								
R12	WNW								
R13	NW, NNW								

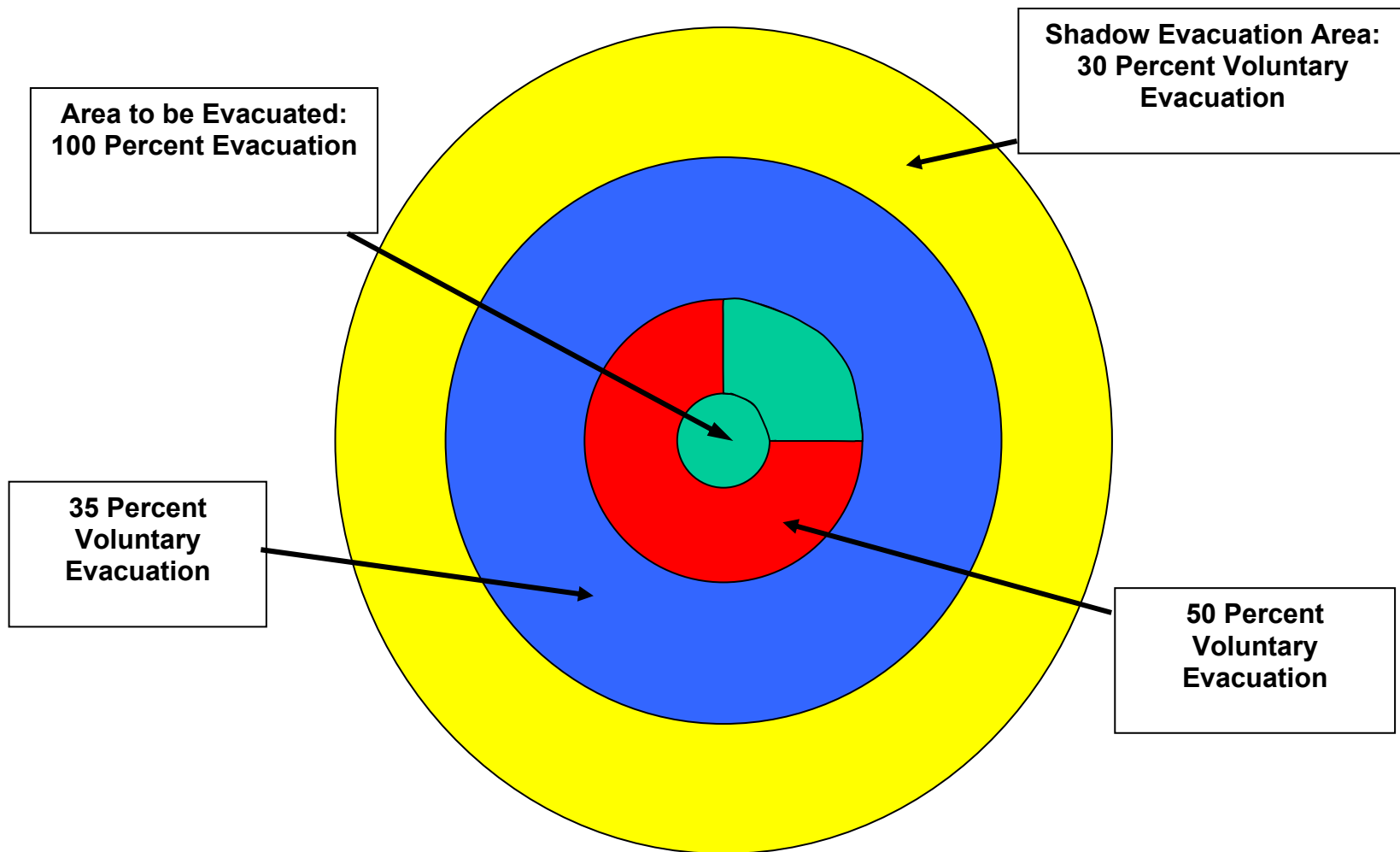
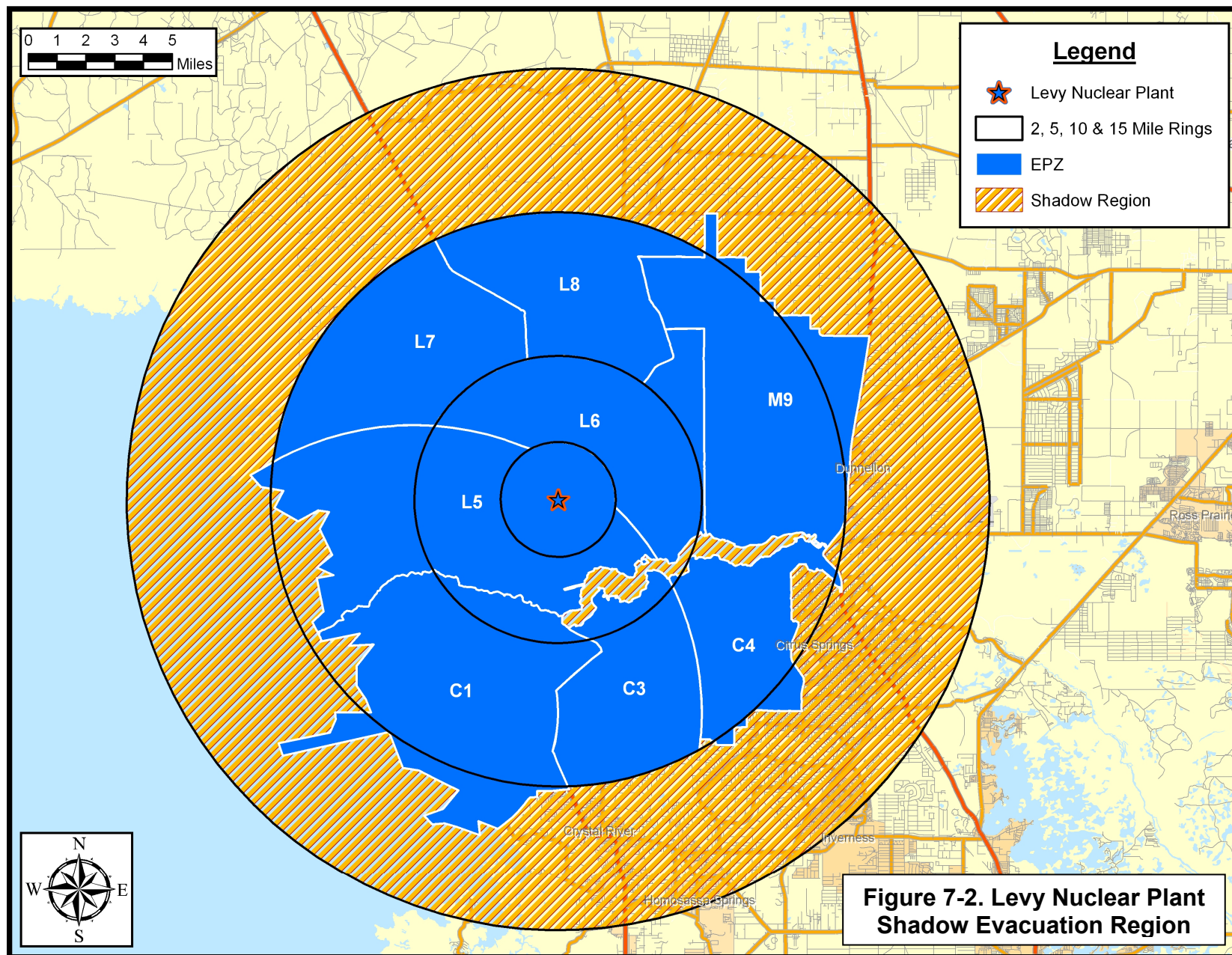


Figure 7-1. Assumed Evacuation Response



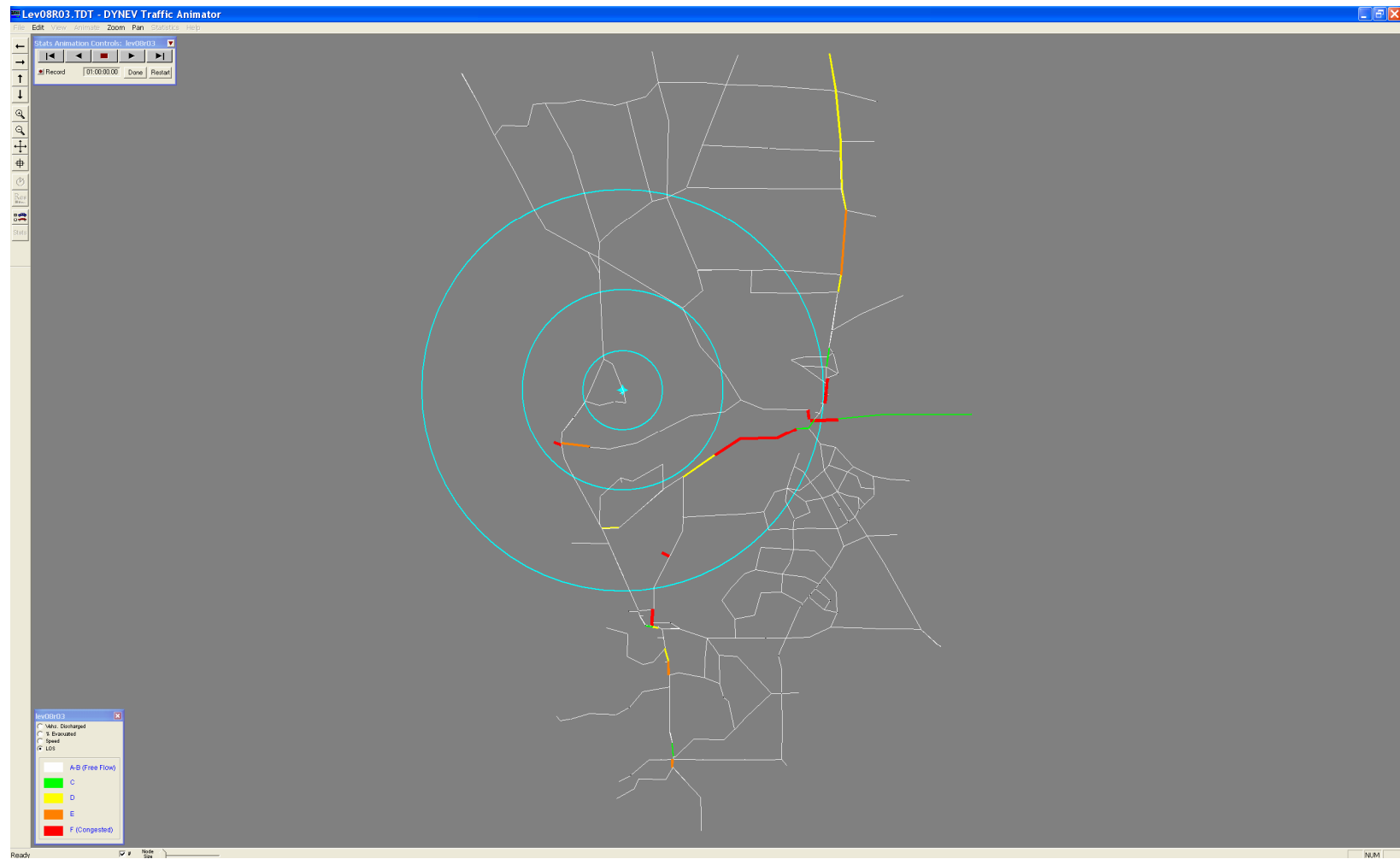


Figure 7-3. Congestion Patterns at 1 Hour After the Advisory to Evacuate (Scenario 8)

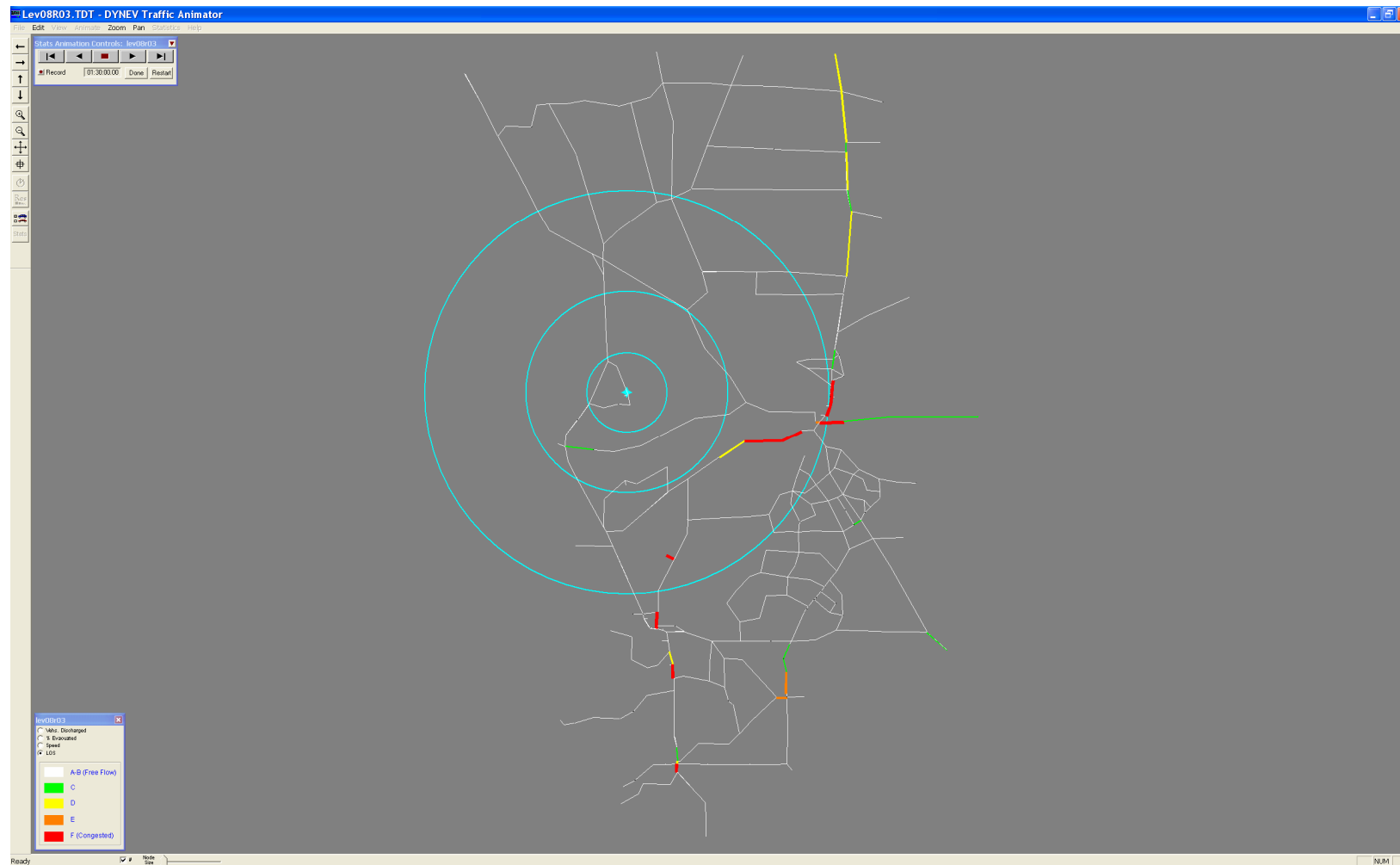


Figure 7-4. Congestion Patterns at 1 Hour, 30 Minutes After the Advisory to Evacuate (Scenario 8)

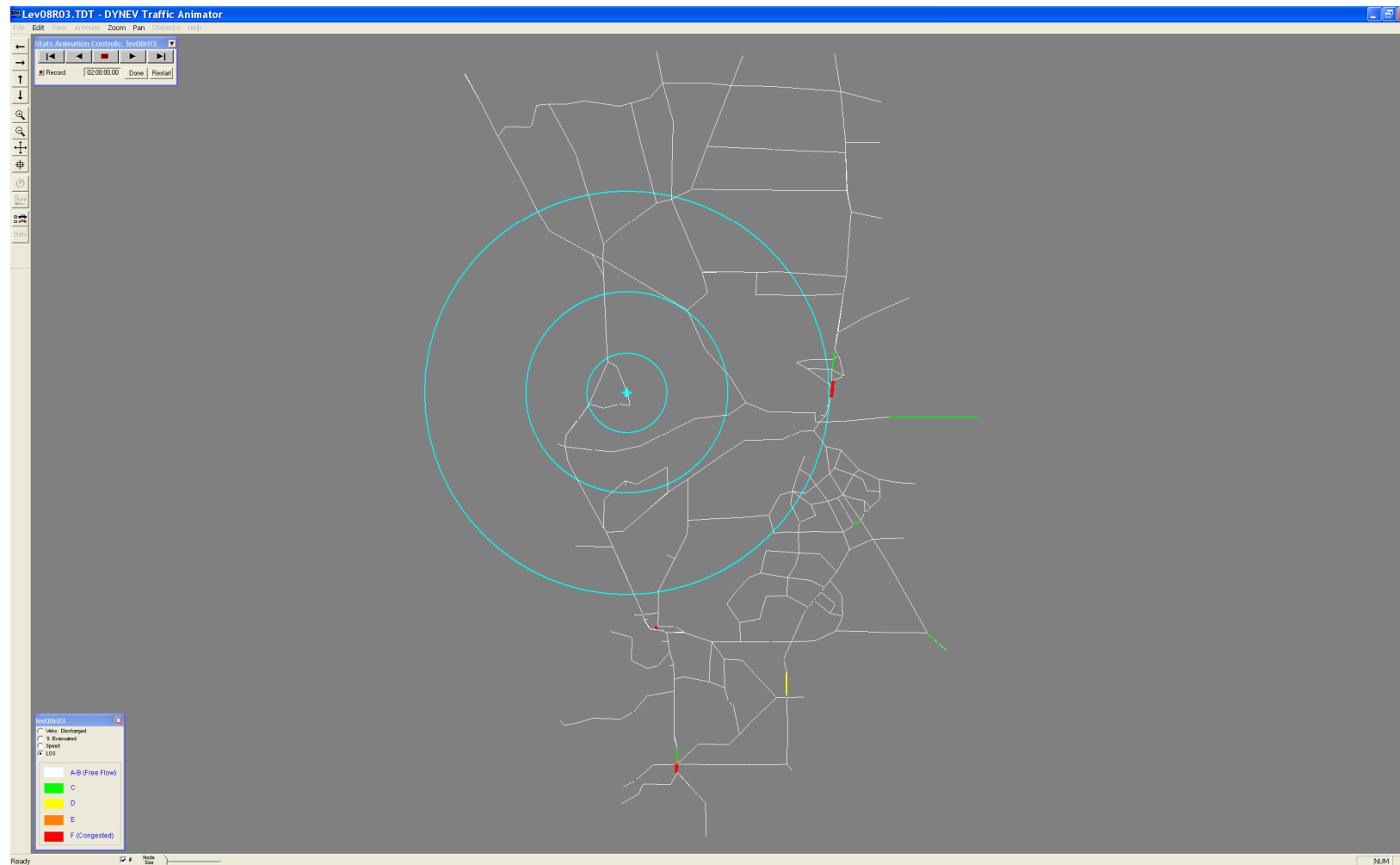


Figure 7-5. Congestion Patterns at 2 Hours After the Advisory to Evacuate (Scenario 8)

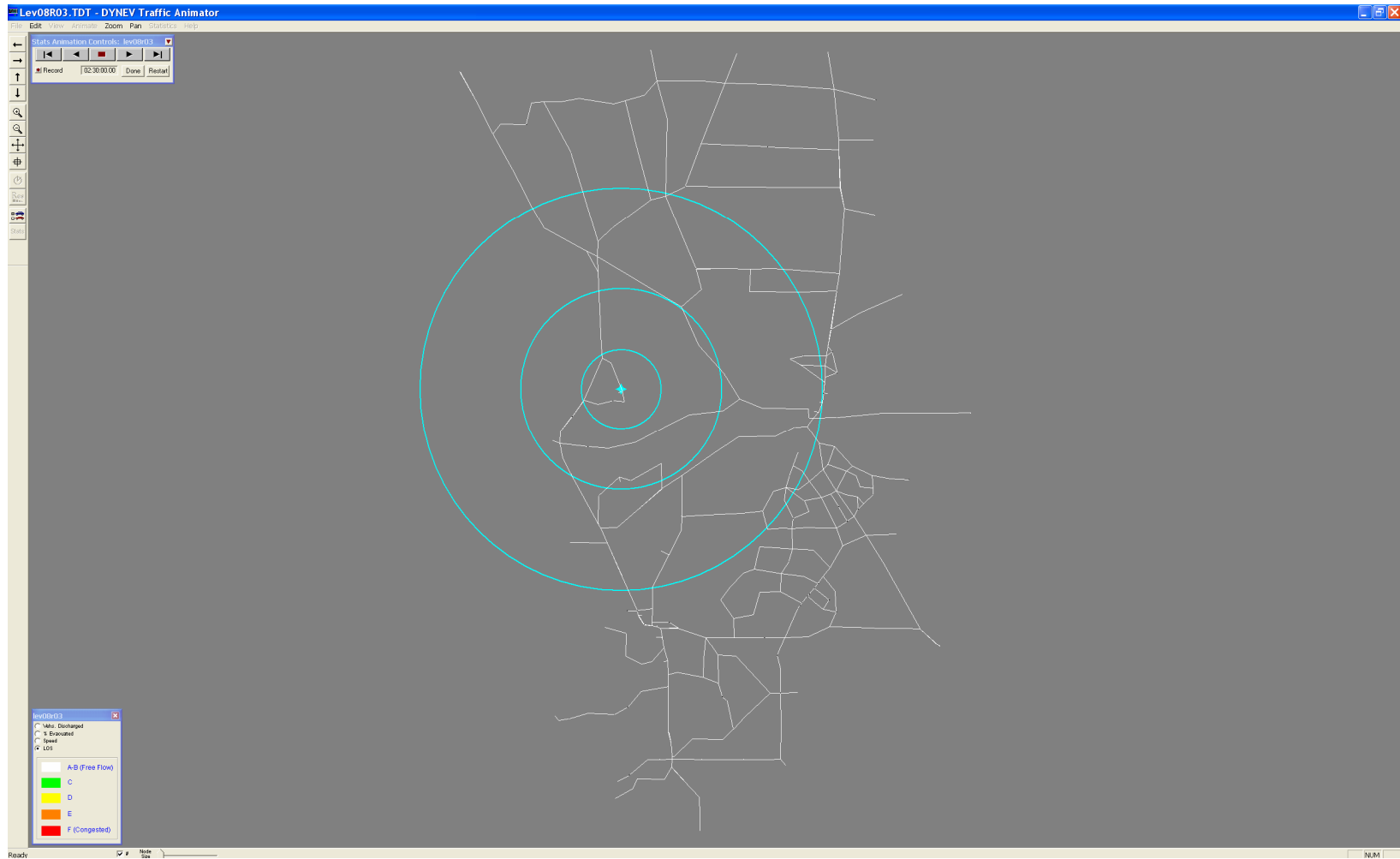
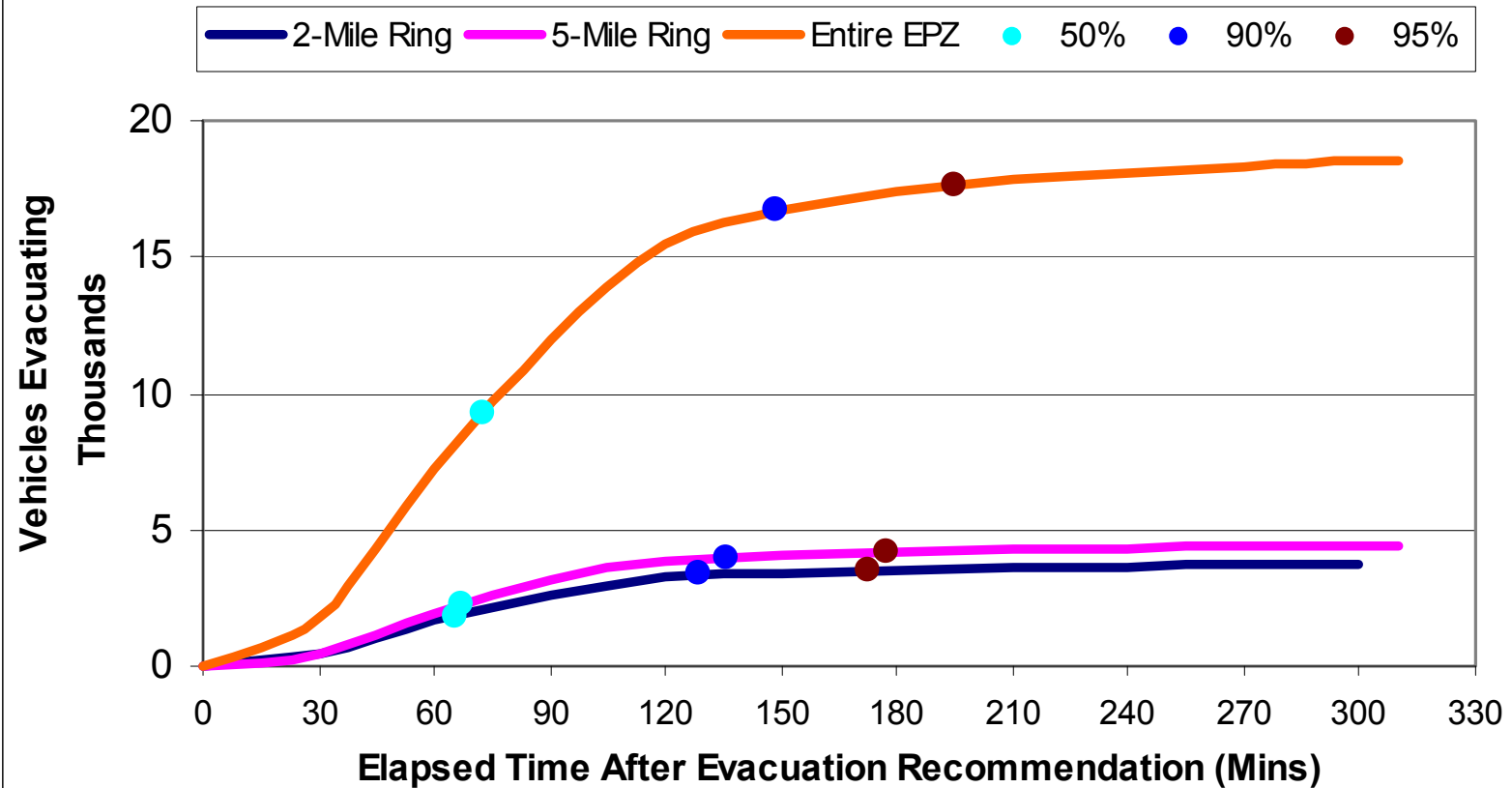


Figure 7-6. Congestion Patterns at 2 Hours, 30 Minutes After the Advisory to Evacuate (Scenario 8)

Evacuation Time Estimates Winter, Weekend, Midday, Good Weather (Scenario 8)



**Figure 7-7. Evacuation Time Estimates for LNP
Winter, Weekend, Midday, Good Weather
Evacuation of Region R03 (Entire EPZ)**

8. TRANSIT-DEPENDENT AND SPECIAL FACILITY EVACUATION TIME ESTIMATES

This section details the analyses applied and the results obtained in the form of evacuation time estimates for transit vehicles (buses). The demand for transit service reflects the needs of two population groups: (1) residents, employees and transients with no vehicles available; and (2) residents of special facilities such as schools, health-support facilities, institutions and child-care facilities.

These transit vehicles merge into and become a part of the general evacuation traffic environment that is comprised mostly of “passenger cars” (pc’s). The presence of each transit vehicle in the evacuating traffic stream is represented within the modeling paradigm described in Appendix D as equivalent to two pc’s. This equivalence factor represents the larger size and more sluggish operating characteristics of a transit vehicle relative to those of a pc.

Transit vehicles must be mobilized in preparation for their respective evacuation missions. Specifically:

- Bus drivers must be alerted
- They must travel to the bus depot
- They must be briefed there and assigned to a route or facility

These activities consume time. Based on experience at other suburban plants, it is estimated that bus mobilization time will average approximately 90 minutes extending from the Advisory to Evacuate to the time when buses arrive at their respective assignments.

During this mobilization period, other mobilization activities are taking place. One of these is the action taken by parents, neighbors, relatives and friends to pick up children from school prior to the arrival of buses, so that they may join their families. Virtually all studies of evacuations have concluded that this “bonding” process of uniting family members is universally prevalent during emergencies and should be anticipated in the planning process. Many emergency plans, however, call for parents to pick up children at host schools or reception centers to speed the evacuation of the school children in the event that buses need to return to the EPZ and evacuate transit dependents. We provide estimates of buses under the assumption that no children will be picked up at school by their parents as an upper bound estimate of the transit vehicles needed.

The procedure is:

- Estimate demand for transit service
- Estimate time to perform all transit functions
- Estimate route travel times to the EPZ boundary and to the school reception centers

8.1 Transit-Dependent People - Demand Estimate

The telephone survey (see Appendix F) results were used to estimate the portion of the population requiring transit service:

- Those persons in households that do not have a vehicle available.
- Those persons in households that do have vehicle(s) that would not be available at the time the evacuation is ordered.

In the latter group, the vehicle(s) may be used by a commuter(s) who does not return (or is not expected to return) home to evacuate the household.

Table 8-1 presents estimates of transit-dependent people. Note:

- Estimates of persons requiring transit vehicles include school children. For those evacuation scenarios where children are at school when an evacuation is ordered, separate transportation is provided for the school children. The actual need for transit vehicles by residents is thereby less than the given estimates. However, we will not reduce our estimates of transit vehicles since it would add to the complexity of the implementation procedures.
- It is reasonable and appropriate to consider that many transit-dependent persons will evacuate by ride-sharing with neighbors, friends or family. For example, nearly 80 percent of those who evacuated from Mississauga, Ontario, who did not use their own cars, shared a ride with neighbors or friends. Other documents report that approximately 70 percent of transit-dependent persons were evacuated via ride-sharing. **We will adopt a conservative estimate that 50 percent of transit-dependent persons will ride-share.**

The estimated number of bus trips needed to service transit-dependent persons is based on an estimate of average bus occupancy of 30 persons at the conclusion of the bus run. Transit vehicle seating capacities typically equal or exceed 60 children (equivalent to 40 adults). If transit vehicle evacuees are two-thirds adults and one-third children, then the number of "adult seats" taken by 30 persons is $20 + (2/3 \times 10) = 27$. On this basis, the average load factor anticipated is $(27/40) \times 100 = 68$ percent. Thus, if the actual demand for service exceeds the estimates of Table 8-1 by 50 percent, the demand for service can still be accommodated by the available bus seating capacity.

Table 8-1 indicates that transportation must be provided for 582 people. Therefore, a total of 20 bus runs are required to transport this population to reception centers.

To illustrate this estimation procedure, we calculate the number of persons, P, requiring public transit or ride-share, and the number of buses, B, required for the Levy EPZ:

$$P = 10,150 \times (0.045 \times 1.40 + 0.349 \times (1.70 - 1) \times 0.45 \times 0.41 + 0.421 \times (2.45 - 2) \times (0.45 \times 0.41)^2)$$

$$P = 10,150 \times (0.1147) = 1164$$

$$B = (0.5 \times P) \div 30 = 20$$

These calculations are explained as follows:

- All members (1.4 avg.) of households (HH) with no vehicles (4.5%) will evacuate by public transit or ride-share. The term 10,150 (total households) x 0.045 x 1.40, accounts for these people.
- The members of HH with 1 vehicle away (34.9%), who are at home, equal (1.70-1). The number of HH where the commuter will not return home is equal to (10,150 x 0.349 x 0.45 x 0.41), given that 45% of the households in the EPZ have at least one commuter, 41% of which will not wait for the commuter to return before evacuating. The number of persons who will evacuate by public transit or ride-share is equal to the product of these two terms.
- The members of HH with 2 vehicles that are away (42.1%), who are at home, equal (2.45 – 2). The number of HH where neither commuter will return home is equal to 10,150 x 0.421 x (0.45 x 0.41)². The number of persons who will evacuate by public transit or ride-share is equal to the product of these two terms.
- Households with 3 or more vehicles are assumed to have no need for transit vehicles.
- The total number of persons requiring public transit is the sum of such people in HH with no vehicles, or with 1 or 2 vehicles that are away from home.

8.2 School Population – Transit Demand

Table 8-2 presents the school population and transportation requirements for the direct evacuation of all schools within the EPZ. The column in Table 8-2 entitled “Bus Runs Required” specifies the number of buses required for each school under the following set of assumptions and estimates:

- No students will be picked up by their parents prior to the arrival of the buses.
- Bus capacity, expressed in students per bus, is set to 70 for primary schools and 50 for middle and high schools.
- Those staff members who do not accompany the students will evacuate in their private vehicles.
- No allowance is made for student absenteeism that is in the neighborhood of 3 percent, daily.

We recommend that the Counties introduce procedures whereby the schools are contacted prior to the dispatch of buses from the depot (approximately one hour after the Advisory to Evacuate), to ascertain the current estimate of students to be evacuated. In this way, the number of buses dispatched to the schools will reflect the actual number needed. Some parents will likely pick up their children at school, although they are asked to pick children up at the reception centers. Those buses originally allocated to evacuate school children that are not needed due to children being picked up by their parents, can be gainfully assigned to service other facilities or those persons who do not have access to private vehicles or to ride-sharing.

Table 8-3 presents a list of the reception centers for each school in the EPZ. Those students not picked up by their parents prior to the arrival of the buses, will be transported to these centers where they will be subsequently retrieved by their respective families.

8.3 Special Facility Demand

Table 8-4 presents the census of special facilities in the EPZ as of July, 2007. Approximately 127 people have been identified as living in, or being treated in, these facilities. This census also indicates the number of wheelchair-bound people and the number of bed-ridden people. The transportation requirements for this group are also presented. The number of ambulance runs is determined by assuming that 2 patients can be accommodated per ambulance trip; the number of wheelchair van runs assumes 4 wheelchairs per trip; wheelchair buses can transport 15 patients, and the number of bus runs estimated assumes 30 ambulatory patients per trip.

8.4 Evacuation Time Estimates for Transit-Dependent People

The available resources expressed in terms of bus-seats, are sufficient in each county to service the evacuation demand in a “single-wave”, assuming drivers are available for all vehicles. In general, the buses will transport the evacuees to the appropriate reception centers and return to the EPZ for a second trip if needed.

In the event that the allocation of buses dispatched from the depots to the various facilities and to the bus routes is somewhat “inefficient”, or if there is a shortfall of available drivers, then there may be a need for some buses to return to the EPZ from the reception center after completing its first evacuation trip, to complete a “second wave” of providing transport service to evacuees. For this reason, the ETE will be calculated for both a one wave transit evacuation and for two waves (Table 8-7). Of course, if the impacted Evacuation Region is other than R03 (the entire EPZ), then there will likely be ample transit resources relative to demand in the impacted Region and this discussion of a second wave would likely not apply.

For each county, transit resources will be assigned to schools as a first priority. When these needs are satisfied, subsequent assignments of buses to service the transit-

dependent should be sensitive to their mobilization time. Clearly, the buses should be dispatched after people have completed their mobilization activities and are in a position to board the buses when they arrive at the pick-up points.

ETE for Transit Trips were developed using both good weather and adverse weather conditions. Figure 8-1 presents the chronology of events relevant to transit operations. The elapsed time for each activity will now be discussed with reference to Figure 8-1.

Activity: Mobilize Drivers (A→B→C)

Mobilization is the elapsed time from the Advisory to Evacuate until the time the buses have arrived at the facility to be evacuated. It is assumed that for a rapidly escalating radiological emergency with no observable indication before the fact, drivers would likely require 90 minutes to be contacted, to travel to the depot, be briefed, and to travel to the transit-dependent facilities. Mobilization time is slightly longer – 100 minutes – when raining.

Activity: Board Passengers (C→D)

Studies have shown that passengers can board a bus at headways of 2-4 seconds (Ref. HCM2000 Page 27-27). Therefore, the total dwell time to service passengers boarding a bus to capacity at a single stop (e.g., at a school) is about 5 minutes. A loading time of 10 minutes will be used for rain scenarios. For multiple stops along a pick-up route we must allow for the additional delay associated with stopping and starting at each pick-up point. This additional delay to service passengers expands this estimate of boarding time to 15 minutes in good weather, and 20 minutes in rain.

Activity: Travel to EPZ Boundary (D→E)

School Evacuation

The distance from a school to the EPZ boundary is measured using Geographical Information Systems (GIS) software along the most likely route out of the EPZ. The travel times to the EPZ boundary are based on evacuation speeds computed by the model (PC-DYNEV). The average speed for an evacuation of the full EPZ (Region 3) under Scenario 6 (winter, midweek, midday, good weather) conditions at 90 minutes (mobilization time) is 49.4 mph, while the average speed for an evacuation of the full EPZ under Scenario 7 conditions (Rain) is 38.7 mph. The travel time from the EPZ boundary to the Reception Center was computed assuming an average speed of 50 mph and 40 mph for good weather and rain, respectively. Based on discussions with the EPZ counties, there are adequate buses to evacuate the school children in a single wave.

Tables 8-5A (good weather) and 8-5B (rain) present the following evacuation time estimates (rounded up to the nearest 5 minutes) for schools in the EPZ: (1) The elapsed time from the Advisory to Evacuate until the bus exits the EPZ; and (2) The elapsed

time until the bus reaches the School Reception Center. The evacuation time out of the EPZ can be computed as the sum of travel times associated with Activities A→B→C, C→D, and D→E (For example: 90 min. + 5 + 10 = 1:45 for Dunnellon Middle School, with good weather). The evacuation time to the School Reception Center is determined by adding the time associated with Activity E→F (discussed below), to this EPZ evacuation time.

Evacuation of Transit-Dependent Population

The buses dispatched from the depots to service the transit-dependent evacuees will be scheduled so that they arrive at their respective routes after their passengers have completed their mobilization. As indicated in Section 5, about 90 percent of the evacuees will complete their mobilization when the first buses will begin their routes, 120 minutes after the Advisory to Evacuate.

Those buses servicing the transit-dependent evacuees will first travel along their pick-up routes, then proceed out of the EPZ. Table 8-6 details the proposed bus routes to service the transit dependent people in the Levy EPZ, while Figure 8-2 maps the proposed bus pick-up routes. The travel distance along the respective pick-up routes within the EPZ is measured using GIS software. The average speed output by the PC-DYNEV model at the mobilization time is used to estimate the route travel time. Routes 2 through 5 which circulate through the major population centers within the EPZ have multiple buses spaced at 30 minute headways; each subsequent bus arrives at the route 30 minutes after the previous bus. The use of bus headways is designed to service those transit-dependent persons that may need more time to mobilize.

Table 8-7 presents the transit-dependent population evacuation time estimates for each route obtained using the above procedures. For example, the ETE for Route 6 is computed as 120 + 13 + 15 = 2:30 for good weather. Here, 13 minutes is the time to travel 11.3 miles at 53.9 mph (average speed output by PC-DYNEV). The ETE for a second wave (discussed below) is presented in the event there is a shortfall of available buses or bus drivers.

Activity: Travel to School Reception Centers (E→F)

The distances from the EPZ boundary to the reception centers are also measured using Geographical Information Systems (GIS) software along the most likely route from the EPZ to the relocation school. For a one-wave evacuation, this travel time outside the EPZ does not contribute to the ETE. For a two-wave evacuation, the ETE for buses must be considered separately, since it could exceed the ETE for the general public.

Activity: Passengers Leave Bus (F→G)

Passengers can disembark within 5 minutes. The bus driver takes a 10 minute break.

Activity: Bus Returns to Route for Second Wave Evacuation (G→C)

The buses assigned to return to the EPZ to perform a “second wave” evacuation of transit-dependent evacuees will be those buses that evacuated the schools. Thus, the mobilization time for the second wave is the average time that buses arrive at the reception center (See Table 8-5). The travel time back to the EPZ is estimated as 20 minutes for good weather and 25 minutes for rain. The bus then travels its route and picks up transit-dependent evacuees along the route. The average speed output by PC-DYNEV at the time the buses begin the second wave is used to compute the route travel time. Multiple buses will likely not be needed for the second wave evacuation. Thus, only a single bus will be sent for a second wave evacuation, as Table 8-7 indicates. The additional buses at the reception center may be needed for a second wave evacuation of special facilities as detailed in the following section.

The travel times for Bus Route Number 6 are computed as follows for good weather:

- Bus arrives at reception center at 2:05 in good weather (average of “ETE to RC (min)” column in Table 8-5A).
- Bus discharges passengers (5 minutes) and driver takes a 10-minute rest: 15 minutes.
- Bus returns to EPZ: 20 minutes (assumed).
- Bus completes pick-ups along route and departs EPZ: 15 minutes + (11.3 miles @ 53.8 mph) = 35 minutes.
- Bus exits EPZ at time $2:05 + 0:15 + 0:20 + 0:35 = 3:15$ after the Advisory to Evacuate.

The ETE estimates for the second wave are given in Table 8-7. The ETE for the transit-dependent population does not extend beyond the ETE for the general population.

Evacuation of Ambulatory Persons from Special Facilities

The bus operations for this group are similar to those for school evacuation except:

- Buses are assigned on the basis of 25-30 patients to allow for staff to accompany the patients.
- The passenger loading time will be longer at approximately one minute per patient to account for the time to move patients from inside the facility to the vehicles.

As is done for the schools, it is estimated that mobilization time averages 90 minutes. In the event there is a shortfall of transit vehicles for a “first-wave” evacuation, then

buses used to evacuate schools will have to return to evacuate the special facilities. The school ETE to the Reception Centers is approximately 2:05 on average, and about 20 minutes of additional inbound travel time to the special facility from the reception area would be required. It follows, therefore, that about one hour would have to be added to the calculated ETE for special facilities, in the event they are evacuated as a “second wave.”

Table 8-4 indicates that the medical facilities are 7.5 miles from the plant, on average. Thus, buses evacuating these facilities will have to travel approximately 2.5 miles. We will conservatively estimate the travel distance out of the EPZ as 5 miles. The average travel speed at 90 minutes after the Advisory to Evacuate is 49.4 mph, thus the travel time out of the EPZ for buses evacuating special facilities is 6 minutes. The ETE for Crystal Gem Manor Assisted Living, with 43 patients, is provided as an example:

ETE: $90 + 43 \times 1 + 6 = 139$ min. or 2:20 rounded up. 3:20 for “second wave”.

Table 8-4 indicates that 2 wheelchair bus runs and 2 wheelchair van runs are needed for the entire EPZ. Wheelchair buses and vans are often scarce; however, regular buses can be used to transport wheelchair bound patients. Patients would occupy the front portion of the bus and their wheelchairs would be folded and stacked in the back of the bus. Loading times are estimated at 5 minutes per wheelchair bound person as staff will have to assist them in boarding the bus. For example, the ETE for the wheelchair bound at Seven Rivers Regional Medical Center is:

ETE: $90 + 33 \times 5 + 6 = 4:25$ (rounded up to the nearest 5 minutes).

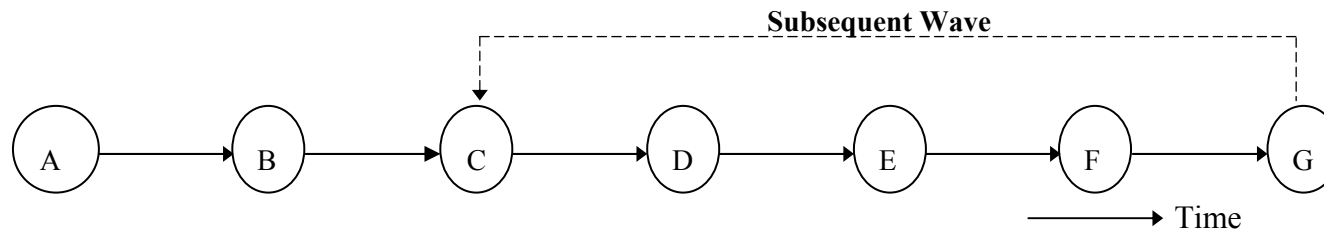
Thus, the ETE for special facilities do not exceed the general population ETE.

Emergency Medical Services (EMS) Vehicles

The previous discussion focused on transit operations for ambulatory persons residing at medical facilities within the Evacuation Region. It is also necessary to provide transit services to non-ambulatory persons who do not – or cannot – have access to private vehicles. Based on the data provided in Table 8-4, a total of 10 ambulance runs are needed to evacuate all of the bed ridden patients in the EPZ, assuming 2 people per ambulance. These ambulances will be provided by EMS providers within the EPZ. Additional ambulances will be provided by Crystal River and other neighboring cities if needed.

It is estimated that 30 minutes will be needed to mobilize ambulances and travel to the medical facilities. Loading times are conservatively estimated as 30 minutes. As with the buses transporting ambulatory patients, ambulances will have to travel 5 miles, on average, to leave the EPZ. The average speed output by the model at 1 hour for Region 3, Scenario 6 is 51.3 mph as much of the EPZ has not yet mobilized; thus, travel time out of the EPZ is 6 minutes.

The ETE for ambulances is: $30 + 30 + 6 = 1:10$ (rounded to the nearest 5 minutes)



Event

A	Advisory to Evacuate
B	Bus Dispatched from Depot
C	Bus Arrives at Facility/Pick-up Route
D	Bus Departs for Reception Center
E	Bus Exits Region
F	Bus Arrives at School Reception Center
G	Bus Available for “Second Wave” Evacuation Service

Activity

A→B	Driver Mobilization
B→C	Travel to Facility or to Pick-up Route
C→D	Passengers Board the Bus
D→E	Bus Travels Towards Region Boundary
E→F	Bus Travels Towards School Reception Center Outside the EPZ.
F→G	Passengers Leave Bus; Driver Takes a Break

Figure 8-1. Chronology of Transit Evacuation Operations

Table 8-1. Transit Dependent Population Estimates

Facility Name	2007 EPZ Population	Survey Average Household Size With Indicated No. of Vehicles			Estimated Number of Households	Survey Percent Households With			Survey Percent Households With Commuters	Survey Percent Households With Non-Returning Commuters	Total People Requiring Transport	Estimated Ridesharing Percentage	People Requiring Public Transit	Percent of Population Requiring Public Transit
		0	1	2		0 Veh-icle	1 Veh-icle	2 Veh-icle						
Levy Nuclear Plant	22,758	1.40	1.70	2.45	10,150	4.5%	34.9%	42.1%	45%	41%	1164	50%	582	2.6%

Table 8-2. School Population Demand Estimates							
PAZ	Distance (miles)	Direction	School Name	Municipality	Enrollment	Staff	Bus Runs Required
Levy County							
L5	5	WSW	Yankeetown School	Yankeetown	329	51	5
Citrus County							
C4	9.9	SW	Citrus Springs Elementary	Citrus Springs	875	55	13
Marion County							
M9	9.4	E	Dunnellon Middle School	Dunnellon	1,100	110	22
M9	9.4	E	Dunnellon Christian Academy	Dunnellon	263	33	4
M9	11.9	ENE	Romeo Elementary School	Dunnellon	810	105	12
<i>Marion County Total:</i>					2,173	248	38
EPZ Total:					3,377	354	56

Table 8-3. School Relocation Schools		
Facility	PAZ	Relocation School
Middle Schools		
Dunnellon Middle School	M9	Bronson High School
Elementary Schools		
Citrus Springs Elementary	C4	Citrus Springs Middle School
Dunnellon Christian Academy	M9	Bronson High School
Romeo Elementary	M9	Bronson High School
Yankeetown School	L5	First United Methodist Church

Table 8-4. Special Facility Transit Demand

PAZ	Distance (miles)	Direction	Facility Name	Municipality	Capacity	Current Census	Ambulatory Patients	Wheelchair Bound	Bed- ridden	Ambulance Runs	Wheelchair Bus Runs	Wheelchair Van Runs	Bus Runs
Citrus County													
C1	8.2	S	Seven Rivers Regional Medical Center	Crystal River	128	80	27	33	20	10	2	1	1
C1	8.0	S	Crystal Gem Manor Assisted	Crystal River	70	43	43	0	0	0	0	0	2
C3	6.8	SSE	Richard Hoffman Adult Family Care Home	Dunnellon	5	4	2	2	0	0	0	1	1
EPZ Total:					203	127	72	35	20	10	2	2	4

Table 8-5A. School Evacuation Time Estimates - Good Weather								
School	Driver Mobilization Time(min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)	Travel Time to EPZ Bndry (min)	ETE (hr:min)	Dist. EPZ Bndry to R.C. (mi.)	Travel Time EPZ Bndry to RC (min)	ETE to R.C. (hr:min)
Levy County Schools								
Yankeetown School	90	5	9.7	12	1:50	20.7	25	2:15
Citrus County Schools								
Citrus Springs Elementary School	90	5	2.0	3	1:40	2.9	4	1:45
Marion County Schools								
Dunnellon Middle School	90	5	7.8	10	1:45	27.7	34	2:20
Dunnellon Christian Academy	90	5	7.6	10	1:45	27.7	34	2:20
Romeo Elementary School	90	5	0.3	1	1:40	27.7	34	2:10
Average for EPZ:					1:45	Average:		2:05

Table 8-5B. School Evacuation Time Estimates - Rain								
School	Driver Mobilization Time(min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)	Travel Time to EPZ Bndry (min)	ETE (hr:min)	Dist. EPZ Bndry to R.C. (mi.)	Travel Time EPZ Bndry to RC (min)	ETE to R.C. (hr:min)
Levy County Schools								
Yankeetown School	100	10	9.7	16	2:10	20.7	32	2:40
Citrus County Schools								
Citrus Springs Elementary School	100	10	2.0	4	1:55	2.9	5	2:00
Marion County Schools								
Dunnellon Middle School	100	10	7.8	13	2:05	27.7	42	2:45
Dunnellon Christian Academy	100	10	7.6	12	2:05	27.7	42	2:45
Romeo Elementary School	100	10	0.3	1	1:55	27.7	42	2:35
Average for EPZ:					2:05	Average:		2:30

Table 8-6. Summary of Transit Dependent Bus Routes			
Route Number	Number of Buses	Route Description	Length (mi.)
1	6	West on CR 488 (6 buses), buses split with 3 buses continuing west on CR 488 and then SB on US Hwy 19/98 out of the EPZ and 3 buses going south on CR 495 out of the EPZ.	13.1, 15.6
2	4	Buses will circulate in Citrus Springs picking up passengers along local roads, then proceed out of the EPZ.	10.0
3	4	Buses will circulate in Dunnellon picking up passengers along local roads, then proceed out of the EPZ northbound on US Hwy 41.	14.2
4	2	Buses will circulate in Yankeetown picking up passengers along local roads, then proceed out of the EPZ southbound on US Hwy 19/98.	18.2*
5	2	Buses will circulate in Inglis picking up passengers along local roads, then proceed out of the EPZ southbound on US Hwy 19/98.	18.2*
6	1	West on Rainbow Lakes Blvd, north on Soundview Dr, west on Sea Cliff Ave, north on NW Ridgewood Rd, and then east on 27 th St out of the EPZ.	11.3
7	1	West on CR 40, northwest on CR 336, and then north on US Hwy 19/98 out of the EPZ.	19.2

*Circulating portion of route is assumed to be 10 miles long.

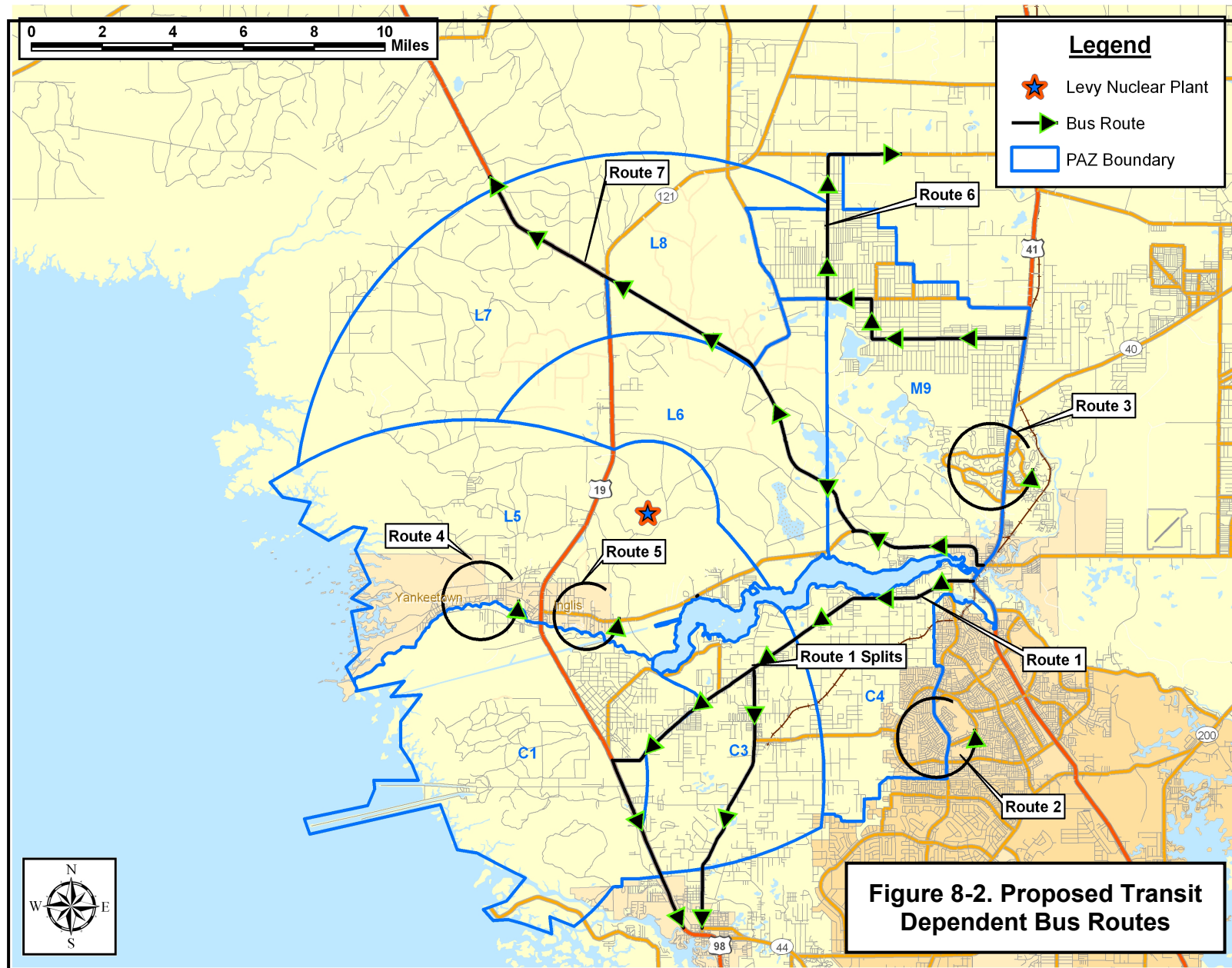


Table 8-7A. Transit Dependent Evacuation Time Estimates - Good Weather

Route Number	Bus Number	Single Wave					Second Wave						
		Mobilization (min.)	Route Length (mi.)	Route Travel Time ¹ (min)	Pickup Time (min)	ETE (hr:min)	Mobilization (min.)	Unload (min.)	Driver Rest (min.)	Return time to EPZ (min.)	Route Travel Time ² (min.)	Pickup Time (min.)	ETE (hr:min)
1	1,2	120	13.1	15	15	2:30	125	5	10	20	15	15	3:10
	3,4	120	15.6	17	15	2:35							
2	1	120	10	11	15	2:30	125	5	10	20	11	15	3:10
	2	150	10	11	15	3:00							
	3	180	10	11	15	3:30							
3	1	120	14.2	16	15	2:35	125	5	10	20	16	15	3:15
	2	150	14.2	16	15	3:05							
	3	180	14.2	16	15	3:35							
4	1	120	18.2	20	15	2:35	125	5	10	20	20	15	3:15
	2	150	18.2	20	15	3:05							
5	1	120	18.2	20	15	2:35	125	5	10	20	20	15	3:15
	2	150	18.2	20	15	3:05							
6	1	120	11.3	13	15	2:30	125	5	10	20	13	15	3:10
7	1	120	19.2	21	15	2:40	125	5	10	20	21	15	3:20
Average for EPZ:						2:50	Average for EPZ:						3:15

¹ Average speed output by PC-DYNEV at 125 minutes for good weather is 53.9 mph.

² Average speed output by PC-DYNEV at 160 minutes (mobilization time + unload + driver rest + return time to EPZ) for good weather is 53.8 mph.

Table 8-7B. Transit Dependent Evacuation Time Estimates - Rain

Route Number	Bus Number	Single Wave					Second Wave						
		Mobilization (min.)	Route Length (mi.)	Route Travel Time ³ (min.)	Pickup Time (min.)	ETE (hr:min)	Mobilization (min.)	Unload (min.)	Driver Rest (min.)	Return time to EPZ (min.)	Route Travel Time ⁴ (min.)	Pickup Time (min.)	ETE (hr:min)
1	1,2	120	13.1	20	20	2:40	150	5	10	25	16	20	3:50
	3,4	120	15.6	23	20	2:45							
2	1	120	10	15	20	2:35	150	5	10	25	12	20	3:45
	2	150	10	15	20	3:05							
	3	180	10	15	20	3:35							
3	1	120	14.2	21	20	2:45	150	5	10	25	18	20	3:50
	2	150	14.2	21	20	3:15							
	3	180	14.2	21	20	3:45							
4	1	120	18.2	27	20	2:50	150	5	10	25	22	20	3:55
	2	150	18.2	27	20	3:20							
5	1	120	18.2	27	20	2:50	150	5	10	25	22	20	3:55
	2	150	18.2	27	20	3:20							
6	1	120	11.3	17	20	2:40	150	5	10	25	14	20	3:45
7	1	120	19.2	29	20	2:50	150	5	10	25	24	20	3:55
Average for EPZ:						3:00	Average for EPZ:						3:50

³ Average speed output by PC-DYNEV at 120 minutes for a rain scenario is 40.3 mph.

⁴ Average speed output by PC-DYNEV at 180 minutes (mobilization time + unload + driver rest + return time to EPZ) for a rain scenario is 48.6 mph.

9. TRAFFIC MANAGEMENT STRATEGY

This section presents the current traffic control and management strategy that is designed to expedite the movement of evacuating traffic. The resources required to implement this strategy include:

- Personnel with the capabilities of performing the planned control functions of traffic guides (preferably, not necessarily, law enforcement officers).
- Traffic Control Devices to assist these personnel in the performance of their tasks. These devices should comply with the guidance of the Manual of Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration (FHWA) of the U.S.D.O.T. All state and most county transportation agencies have access to the MUTCD (also available online). Applicable devices include, with reference to the MUTCD:
 - Traffic Barriers: Chapter 6F, section 6F.61, 62 and Figure 6F-4.
 - Traffic Cones: Chapter 3F and section 6F.56.
 - Signs: Chapter 2I
- A plan that defines all necessary details and is documented in a format that is readily understood by those assigned to perform traffic control.

The functions to be performed in the field are:

1. Facilitate evacuating traffic movements that serve to expedite travel out of the EPZ along routes that the analysis has found to be most effective.
2. Discourage traffic movements that permit evacuating vehicles to travel in a direction which takes them significantly closer to the power plant, or which interferes with the efficient flow of other evacuees.

We employ the terms "facilitate" and "discourage" rather than "enforce" and "prohibit" to indicate the need for flexibility in performing the traffic control function. There are always legitimate reasons for a driver to prefer a direction other than that indicated. For example:

- A driver may be traveling home from work or from another location, to join other family members preliminary to evacuating.
- An evacuating driver may be taking a detour from the evacuation route in order to pick up a relative, or other evacuees.
- The driver may be an emergency worker en route to perform an important activity.

The implementation of a plan must also be flexible enough for the application of sound judgment by the traffic guide.

The traffic management strategy is the outcome of the following process:

1. A field survey of these critical locations.
The schematics describing traffic control, which are presented in Appendix G, are based on data collected during field surveys, upon large-scale maps, and on overhead photos.
2. Computer analysis of the evacuation traffic flow environment.
This analysis identifies the best routing and those locations that experience pronounced congestion.
3. Consultation with emergency management and enforcement personnel.
Trained personnel who are experienced in controlling traffic and are aware of the likely evacuation traffic patterns have extensively reviewed these control tactics.
4. Prioritization of TCPs.
Application of traffic control at some TCPs will have a more pronounced influence on expediting traffic movements than at other TCPs. For example, TCPs controlling traffic originating from areas in close proximity to the power plant could have a more beneficial effect on minimizing potential exposure to radioactivity than those TCPs located far from the power plant. Thus, during the mobilization of personnel to respond to the emergency situation, those TCPs which are assigned a higher priority, should be manned earlier. These priorities have been developed in conjunction with county emergency management representatives and law enforcement personnel.

The control tactic at each TCP is presented in each schematic that appears in Appendix G.

The use of Intelligent Transportation Systems (ITS) technologies can reduce manpower and equipment needs, while still facilitating the evacuation process. Dynamic Message Signs (DMS) can be placed within the EPZ to provide information to travelers regarding traffic conditions, route selection, and reception center information. DMS can also be placed outside of the EPZ to warn motorists to avoid using routes that may conflict with the flow of evacuees away from the nuclear power plant. Highway Advisory Radio (HAR) can be used to broadcast information to evacuees en route through their vehicle stereo systems. Automated Traveler Information Systems (ATIS) can also be used to provide evacuees with information. Internet websites can provide traffic and evacuation route information before the evacuee begins his trip, while on board navigation systems (GPS units), cell phones, and pagers can be used to provide information en route. These are only several examples of how ITS technologies can benefit the evacuation process.

Chapter 2I of the MUTCD presents guidance on Emergency Management signing. Specifically, the Evacuation Route sign, EM-1 on page 2I-3, with the word “Hurricane” removed, could be installed selectively within the EPZ, if considered advisable by local and state authorities. Similar comments apply to sign EM-3 which identifies TCP locations.

10. EVACUATION ROUTES

Evacuation routes are composed of two distinct components:

- Routing from a Protective Action Zone (PAZ) being evacuated to the boundary of the Evacuation Region and thence out of the Emergency Planning Zone (EPZ).
- Routing of evacuees from the EPZ boundary to the reception centers.

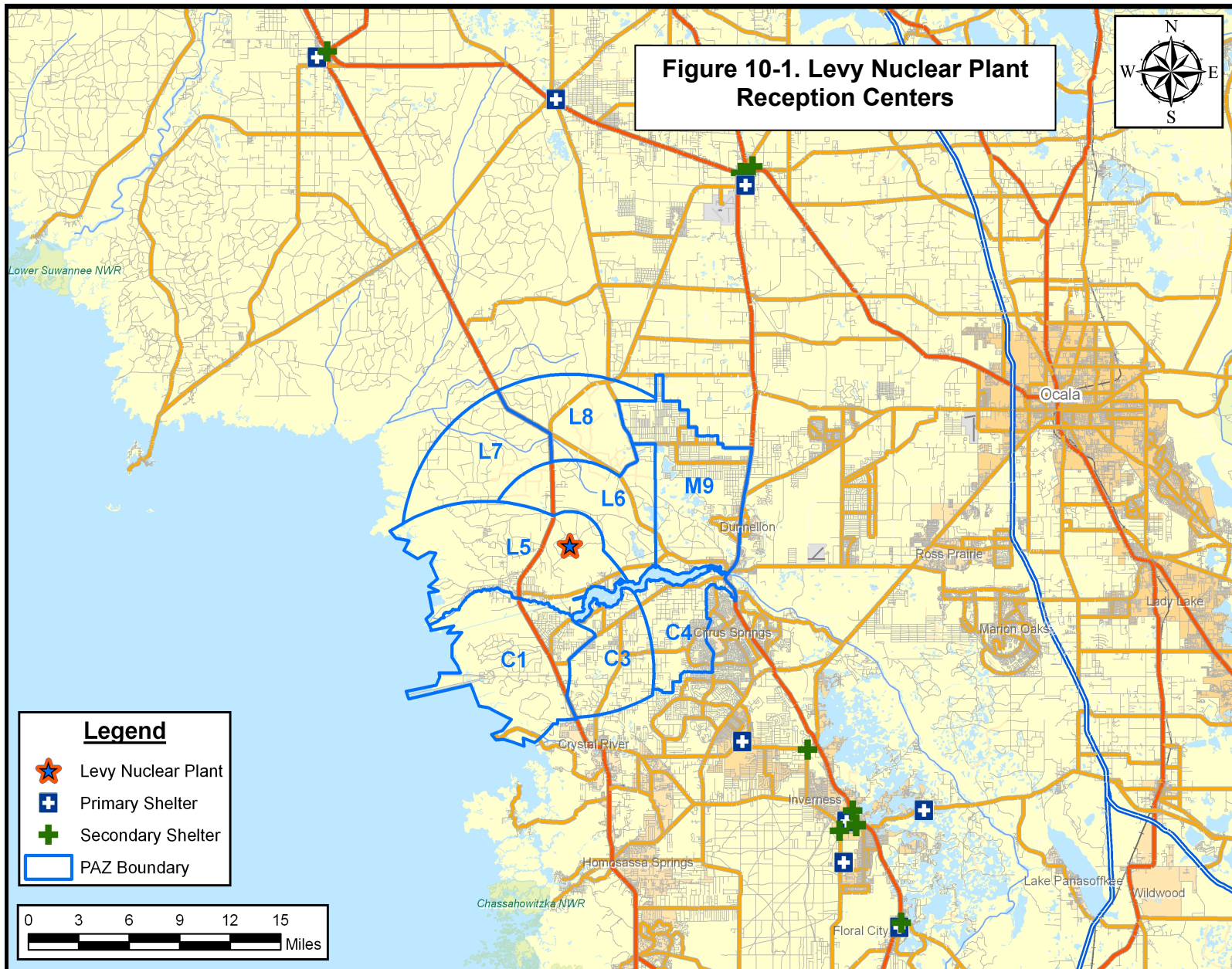
Evacuees should be routed within the EPZ in such a way as to *minimize their exposure to risk*. This primary requirement is met by routing traffic to move away from the location of the Levy Nuclear Plant, to the extent practicable, and by delineating evacuation routes that expedite the movement of evacuating vehicles. This latter objective is addressed by developing evacuation routes to achieve a balancing of traffic demand relative to the available highway capacity to the extent possible, subject to satisfying the primary requirement noted above. This is achieved by carefully specifying candidate destinations for all origin centroids where evacuation trips are generated, and applying the TRAD model effectively. See Appendices A-D for further discussion.

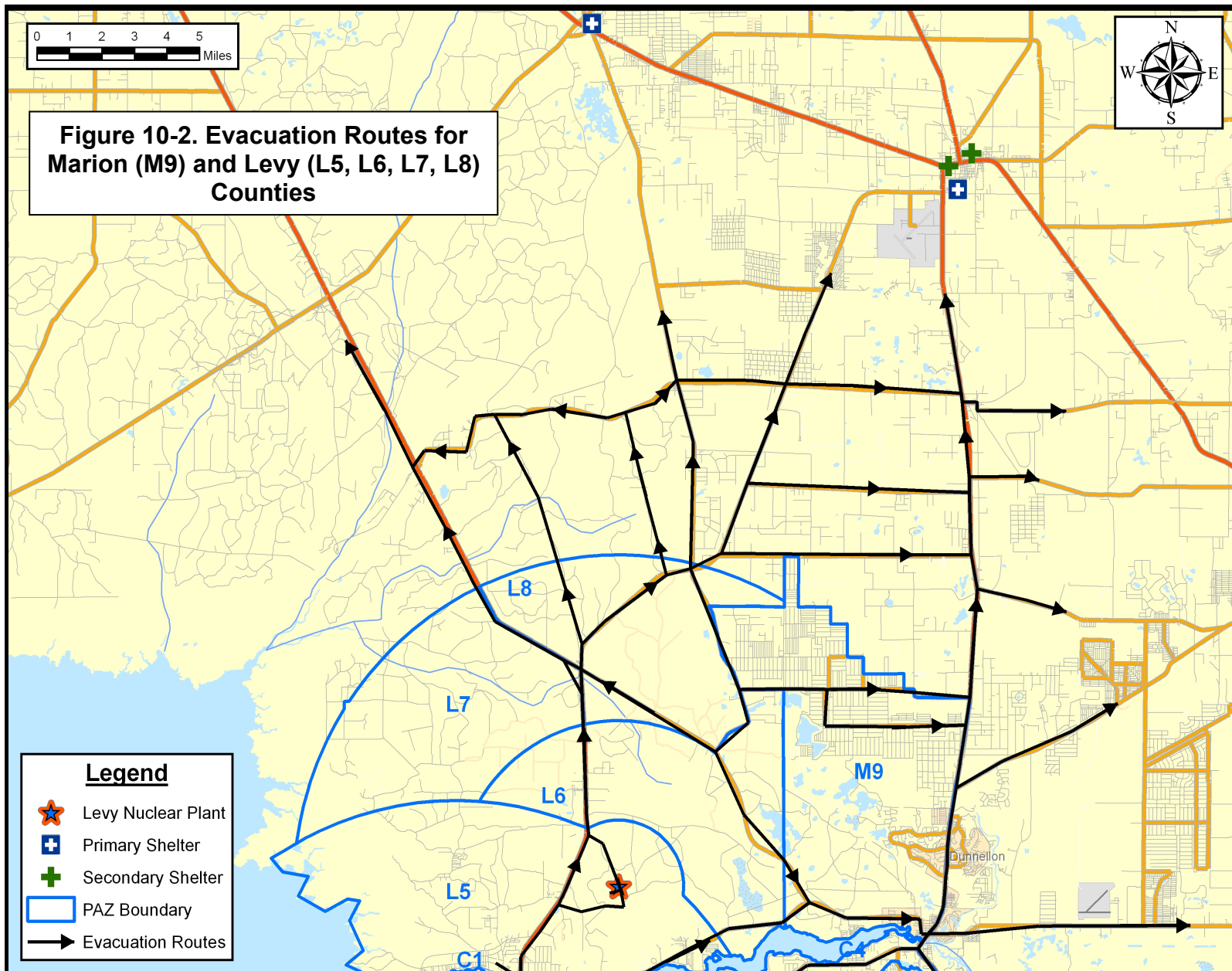
The routing of evacuees from the EPZ boundary to the reception centers should be responsive to several considerations:

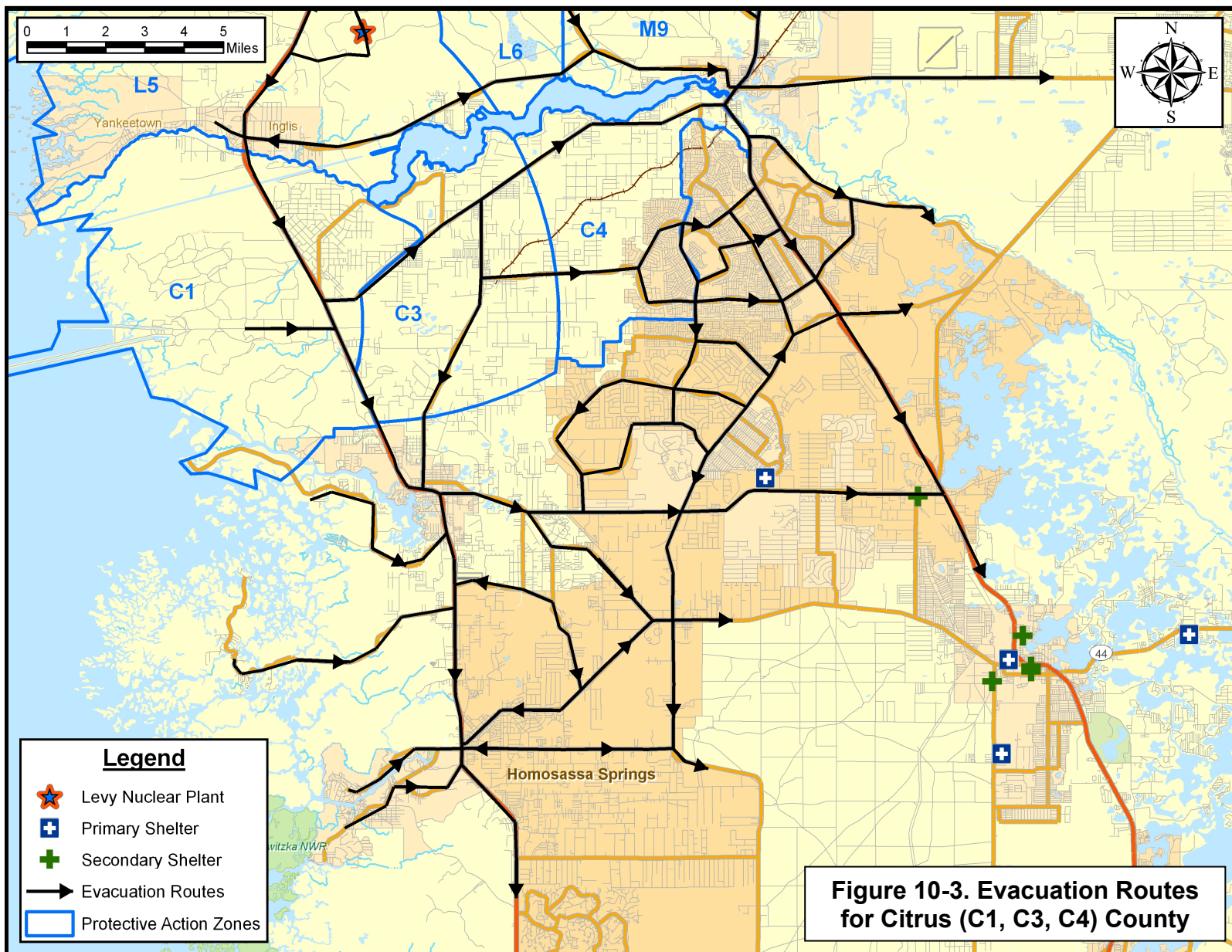
- Minimize the amount of travel outside the EPZ, from the points where these routes cross the EPZ boundary, to the reception centers.
- Relate the anticipated volume of traffic destined to the reception center, to the capacity of the reception center facility.

Table 10-1 lists the details – Name, Facility type and Location for all the designated reception centers. The facilities of the type – reception center and primary shelter – are shown as primary shelters, while all other facility types are shown as secondary shelters in Figure 10-1. The major evacuation routes for the three counties within the EPZ are presented in Figures 10-2 and 10-3.

Table 10-1 Reception Center Details – Name, Type and Location						
Reception Center	Facility Type	Street Address	City	State	ZIP	County
Withlacoochee Technical Institute	Reception Center	1201 W Main Street	Inverness	Florida	34450	Citrus
Lecanto Middle School	Special Needs Shelter	3800 W Educational Path	Lecanto	Florida	34461	Citrus
First Assembly of God of Inverness	Primary Shelter	4201 S Pleasant Grove Rd	Inverness	Florida	34452	Citrus
East Citrus Community Center	Primary Shelter	9907 E. Gulf-to-Lake Hwy.	Inverness	Florida	34450	Citrus
Floral City Community Building	Primary Shelter	8370 E Orange Ave	Floral City	Florida	34436	Citrus
Forest Ridge Elementary School	Primary Shelter	2927 N Forest Ridge Blvd	Hernando	Florida	34442	Citrus
Citrus High School	Secondary Shelter	600 W Highland Blvd	Inverness	Florida	34452	Citrus
Floral City Elementary	Secondary Shelter	8457 E. Marvin St.	Floral City	Florida	34436	Citrus
Hernando Elementary School	Secondary Shelter	2353 N Croft Ave	Hernando	Florida	34442	Citrus
Inverness Middle School	Secondary Shelter	1000 Middle School Dr	Inverness	Florida	34450	Citrus
Inverness Primary School	Secondary Shelter	206 S Line Avenue	Inverness	Florida	34452	Citrus
Pleasant Grove Elementary	Secondary Shelter	630 Pleasant Grove Rd.	Inverness	Florida	34452	Citrus
First United Methodist Church	Daycare Shelter	3896 S. Pleasant Grove Rd	Inverness	Florida	34452	Citrus
Bronson High School	Primary Shelter	350 School Street	Bronson	Florida	32621	Levy
Chiefland Elementary	Primary Shelter	1205 NW 4th Ave.	Chiefland	Florida	32626	Levy
Bronson High School	Daycare Shelter	350 School St.	Bronson	Florida	32621	Levy
Chiefland High (Gym)	Secondary Shelter	816 N. Main St.	Chiefland	Florida	32626	Levy
Williston Middle School	Secondary Shelter	1345 NE 3rd Ave.	Williston	Florida	32696	Levy
Williston High School	Secondary Shelter	427 W. Noble Ave.	Williston	Florida	32696	Levy
Williston Elementary	Primary Shelter	801 S. Main St.	Williston	Florida	32696	Levy







11. SURVEILLANCE OF EVACUATION OPERATIONS

There is a need for surveillance of traffic operations during the evacuation. There is also a need to clear any blockage of roadways arising from accidents or vehicle disablement. Surveillance can take several forms.

1. Traffic control personnel, located at Traffic Control and Access Control points, provide fixed-point surveillance.
2. Ground patrols may be undertaken along well-defined paths to ensure coverage of those highways that serve as major evacuation routes.
3. Aerial surveillance of evacuation operations may also be conducted using helicopter or fixed-wing aircraft.
4. Cellular phone calls (if cellular coverage exists) from motorists may also provide direct field reports of road blockages.

These concurrent surveillance procedures are designed to provide coverage of the entire EPZ as well as the area around its periphery. It is the responsibility of the Counties to support an emergency response system that can receive messages from the field and be in a position to respond to any reported problems in a timely manner. This coverage should quickly identify, and expedite the response to any blockage caused by a disabled vehicle.

Tow Vehicles

In a low-speed traffic environment, any vehicle disablement is likely to arise due to a low-speed collision, mechanical failure or exhausting its fuel supply. In any case, the disabled vehicle can be pushed onto the shoulder, thereby restoring traffic flow. Past experience in other emergencies indicates that evacuees who are leaving an area often perform activities such as pushing a disabled vehicle to the side of the road without prompting.

While the need for tow vehicles is expected to be low under the circumstances described above, it is still prudent to be prepared for such a need. Tow trucks with a supply of gasoline may be deployed at strategic locations within, or just outside, the EPZ. These locations should be selected so that:

- They permit access to key, heavily loaded, evacuation routes.
- Responding tow trucks would most likely travel counter-flow relative to evacuating traffic.

12. CONFIRMATION TIME

It is necessary to confirm that the evacuation process is effective in the sense that the public is complying with the Advisory to Evacuate. Although the counties in the EPZ may use their own procedures for confirmation, we suggest an alternative or complementary approach.

The procedure we suggest employs a stratified random sample and a telephone survey. The size of the sample is dependent on the expected number of households that do not comply with the Advisory to Evacuate. We believe it is reasonable to assume, for the purpose of estimating sample size that at least 80 percent of the population within the EPZ will comply with the Advisory to Evacuate. On this basis, an analysis could be undertaken (see Table 12-1) to yield an estimated sample size of approximately 300.

The confirmation process should start at about 3-1/2 hours after the Advisory to Evacuate, which is when 90 percent of evacuees have completed their mobilization activities. At this time, virtually all evacuees will have departed on their respective trips and the local telephone system will be largely free of traffic.

As indicated in Table 12-1, approximately 7-1/2 person hours are needed to complete the telephone survey. If six people are assigned to this task, each dialing a different set of telephone exchanges (e.g., each person can be assigned a different set of Protective Action Zones), then the confirmation process will extend over a time frame of about 75 minutes. Thus, the confirmation should be completed before the evacuated area is cleared. Of course, fewer people would be needed for this survey if the Evacuation Region were only a portion of the EPZ. Use of modern automated computer controlled dialing equipment can significantly reduce the manpower requirements and the time required to undertake this type of confirmation survey.

Should the number of telephone responses (i.e., people still at home) exceed 20 percent, then the telephone survey should be repeated after an hour's interval until the confirmation process is completed.

TABLE 12-1
ESTIMATED NUMBER OF TELEPHONE CALLS REQUIRED
FOR CONFIRMATION OF EVACUATION

Problem Definition

Estimate number of phone calls, n, needed to ascertain the proportion, F of households that have not evacuated.

Reference: Burstein, H., Attribute Sampling, McGraw Hill, 1971

Given:

No. of households plus other facilities, N, within the EPZ (est.) = 10,150

Est. proportion, F, of households that have not evacuated = 0.20

Allowable error margin, e: 0.05

Confidence level, α : 0.95 (implies A = 1.96)

Applying Table 10 of cited reference,

$$p = F + e = 0.25; \quad q = 1 - p = 0.75$$

$$n = \frac{A^2 pq + e}{e^2} = 308$$

Finite population correction:

$$n_F = \frac{nN}{n + N - 1} = 299$$

Thus, some 300 telephone calls will confirm that approximately 20 percent of the population has not evacuated. If only 10 percent of the population does not comply with the Advisory to Evacuate, then the required sample size, $n_F = 212$.

Est. Person Hours to complete 300 telephone calls

Assume: Time to dial using touch-tone (random selection of listed numbers): 30 seconds

Time for 6 rings (no answer): 36 seconds

Time for 4 rings plus short conversation: 60 sec.

Interval between calls: 20 sec.

Person Hours: $300[30+20+0.8(36)+0.2(60)]/3600 = 7.6$

13. RECOMMENDATIONS

The following recommendations are offered:

1. The traffic management plan has been reviewed by state and county emergency planners with local and state police (See Section 9 and Appendix G). Specifically...
 - The number and locations of Traffic Control Points (TCP) and Access Control Points (ACP) have been reviewed in detail.
 - The indicated resource requirements (personnel, cones, barriers, etc.) have been reconciled with current assets.Efforts should be made to keep the traffic management plan up to date and to have all deputies working within the EPZ briefed on the plan.
2. Intelligent Transportation Systems (ITS) such as Dynamic Message Signs (DMS), Highway Advisory Radio (HAR), Automated Traveler Information Systems (ATIS), etc. should be used to facilitate the evacuation process (See Section 9). The placement of additional signage should consider evacuation needs.
3. Counties should implement procedures whereby schools are contacted prior to dispatch of buses from the depots to get an accurate count of students needing transportation and the number of buses required (See Section 8).
4. Counties should establish strategic locations to position tow trucks provided with gasoline containers in the event of a disabled vehicle during the evacuation process (See Section 11) and should encourage gas stations to remain open during the evacuation.
5. Counties should establish a system to confirm that the Advisory to Evacuate is being adhered to (see the approach suggested by KLD in Section 12). Given the propensity for diving and boating within the EPZ along Lake Rousseau and the Gulf of Mexico, one or more helicopters equipped with loudspeakers could fly over these areas to alert all transients of the need to immediately evacuate. Vehicles equipped with loudspeakers are also recommended. Police boats using colored smoke and flares could also be used to alert transients.
6. Examination of the ETE in Section 7 and Appendix J shows that the ETE for 100 percent of the population is generally 1½ to 2 hours longer than for 95 percent of the population. This non-linearity reflects the fact that relatively few stragglers require significantly more time to mobilize (i.e. prepare for the evacuation trip) than their neighbors. This leads to two recommendations:
 - The public outreach (information) program should emphasize the need for evacuees to minimize the time needed to prepare to evacuate (secure the home, assemble needed clothes, medicines, etc.).
 - **The decision makers should reference Table J-1C which lists the time needed to evacuate 95 percent of the population, when preparing recommended protective actions.**