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Definitions

Annual – Any 12 months, plus or minus 3 months.

Exceptions:

1. Exercises, drills, emergency information for residents, media training, and offsite emergency response training are defined as “once per calendar year.”

2. TVA annual training is for a 12-month period which includes a grace period extending to the end of the calendar quarter in which training is due.

Biennial – Any 24 months, plus or minus 6 months.

Central Emergency Control Center (CECC) - The off-site TVA emergency response facility located in Chattanooga with the overall TVA responsibility for response to an emergency. It consists of a director and staff to coordinate and direct TVA's efforts during the emergency.

Committed Dose Equivalent (CDE) - As defined by 10 CFR 20.1003.

Drill – A supervised instruction period aimed at testing, developing and maintaining skills in a particular operation. A drill is often a component of an exercise.

Emergency Action Level (EAL) – Specific events and criteria used to determine the appropriate emergency classification.

Emergency – Any situation that may result in undue risk to the health and safety of the public and/or site personnel, or significant damage to property or equipment.

Emergency Classification – A scheme derived to categorize a plant accident into one of four classes according to severity so that appropriate actions might be rapidly taken.

Emergency Notification System (ENS) – The phone line used to notify and inform the NRC of Event Status Data.

Emergency Planning Zone (EPZ): – A generic area defined about a nuclear facility to facilitate off-site emergency planning and develop a significant response base. It is defined for the plume and ingestion exposure pathways. During an emergency response, best efforts are made making use of plan action criteria without regard to whether particular areas are inside or outside EPZs. (NUREG-0654, Glossary)

Plume Exposure Pathway EPZ – An area delineated by an approximate ten-mile radius circle around the station. The principal exposure sources from this pathway are: (a) whole body external exposure to gamma radiation from the plume and from deposited materials and (b) inhalation exposure from the passing radioactive plume. The duration of principal potential exposures could range in length from hours to days. (NUREG-0654, Glossary)

Ingestion Exposure Pathway EPZ – An area delineated by an approximate fifty-mile radius circle around the station. The principal exposure for this pathway would be from ingestion of contaminated water or foods such as milk or fresh vegetables. The duration of exposure could range in length from hours to months. (NUREG-0654, Glossary)

Exclusion Area Boundary - The area for which TVA has absolute authority for exclusion of personnel and property within the site boundary. This boundary is used in FSAR dose assessments to define the distance to the first member of the public and is defined in the FSAR.

Exercise – An event that tests the integrated capability and a major portion of the basic elements existing within the emergency plan.

Final Safety Analysis Report (FSAR) - The final safety report that is submitted to the NRC in support of each plant's application for an operating license.

Hostile Action – An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, takes hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile Action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism based EALs should be used to address such activities (e.g., violent acts between individuals in the owner controlled area).

Hostile Force – One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

Health Physics Network (HPN) – The NRC’s health physics information line.

Interim – A temporary or provisional emergency response position or facility which is augmented or transferred as resources become available.

Joint Information Center (JIC) - A center established near the affected site to assist the news media in providing press coverage during an emergency.

Monthly – Any 30-day period, plus or minus 7 days.

Off-site –The area around a nuclear plant that is not on-site.

On-site – Onsite is defined according to the subject: (1) in relation to FSAR dose assessment, on-site is “within the exclusion area,” (2) in relation to accountability and site notifications, on-site is “within the site's outermost secured area,” (3) in relation to EP dose assessments on-site is defined as “1000 meter radius.”

Operations Duty Specialist (ODS) - The 24-hour per day emergency contact for the Tennessee Valley Authority.

Operations Support Center (OSC) – An area set aside within the plant for providing an assembly area for operational support personnel during an emergency situation.

Primary Sector – The 22 1/2° sector which bounds the existing wind direction.

Projected Dose – An estimated radioactive dose which affected population groups could potentially receive if no protective actions are taken.

Protected Area (PA) – An area encompassed by physical barriers and to which access is controlled. For the purposes of this plan, the Protected Area refers to the designated security area around the reactor and turbine buildings.

Protective Action Guides (PAGs) – The projected dose to individuals in the general population or the dose rate which warrants taking protective actions.

Protective Actions – Those emergency measures taken before or after an uncontrolled release of radioactive material has occurred for the purpose of preventing or minimizing radiological exposure.

Quarterly - Any three-month period, plus or minus one month.

Recovery – The post emergency activities in which the plant conditions are assessed and the plant is returned to an operational mode.

Rem (Roentgen Equivalent Man) – The special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor. A unit related to the rem is the millirem (mrem). 1 mrem = 1/1000 rem.

Restricted Area – Any area where access is controlled for the purpose of radiation protection.

Radiological Monitoring Control Center (RMCC) - An environmental monitoring coordination center.

Semi-annual – Any six-month period, plus or minus 45 days. (The exception to this is for drills for which it is defined as “twice each calendar year.”)

Site Boundary – The appropriate boundary between “onsite” and “offsite.”

Technical Support Center (TSC) – An onsite assembly/work area for designated support individuals knowledgeable of and responsible for engineering and management support of reactor operations in the event of an accident.

Thyroid Committed Dose Equivalent (Thyroid CDE) – The dose equivalent to the thyroid received from an intake of radioactive material by an individual during the 50-year period following the intake.

Total Effective Dose Equivalent (TEDE) – As defined by 10 CFR 20.1003.

Acronyms and Abbreviations

ac	Alternating Current
AL	Alabama
ALARA	As Low As Reasonably Achievable
BLN	Bellefonte Nuclear Plant
cc	Cubic Centimeter
CDE	Committed Dose Equivalent
CECC	Central Emergency Control Center
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
COL	Combined License
CR	Control Room
dc	Direct Current
DCD	Design Control Document
DHS	(U.S.) Department of Homeland Security
DOE	(U.S.) Department of Energy
EAL	Emergency Action Level
EDE	Effective Dose Equivalent
EDO	Emergency Duty Officer
ENS	(NRC) Emergency Notification System
EOC	Emergency Operations Center
EPA	(U.S.) Environmental Protection Agency
EPIP	Emergency Plan Implementing Procedure
EPZ	Emergency Planning Zone
ERDS	Emergency Response Data System
ERF	Emergency Response Facility
ERO	Emergency Response Organization
ETE	Evacuation Time Estimate
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FRMAC	Federal Radiological Monitoring and Assessment Center

FSAR	Final Safety Analysis Report
ft	Feet
GE	General Emergency
gpm	Gallons per minute
HP	Health Physics
HPN	Health Physics Network (Communication System)
I	Iodine
IN	Information Notice (NRC)
INPO	Institute of Nuclear Power Operations
JIC	Joint Information Center
KI	Potassium Iodide
LAN	Local Area Network
LCO	Limiting Condition for Operation
LOCA	Loss of Coolant Accident
MCL	Management Counterpart Link
MERT	Medical Emergency Response Team
mph	Miles per hour
mR/hr	Milliroentgen per hour
MWe	Megawatt electric
MWt	Megawatt thermal
NEI	Nuclear Energy Institute
NOAA	(U.S.) National Oceanographic and Atmospheric Administration
NOUE	Notification of Unusual Event
NRC	(U.S.) Nuclear Regulatory Commission
NWS	(U.S.) National Weather Service
OBE	Operating Basis Earthquake
ODCM	Off-site Dose Calculation Manual
ODS	Operations Duty Specialist
OSC	Operations Support Center
PAG	Protective Action Guideline, Protective Action Guide
PAR	Protective Action Recommendation

PMCL	Protective Measures Counterpart Link
PNS	Prompt Notification System
psi, psia, psig	Pounds per square inch, psi absolute, psi gage
RAD, Rad, rad	Radiation or radiological, depending on context
RCS	Reactor Coolant System
REAC/TS	Radiation Emergency Assistance Center / Training Site
Rem	Roentgen Equivalent Man
R/hr	Roentgen per hour
RMCC	Radiological Monitoring Control Center
RO	Reactor Operator
RSCL	Reactor Safety Counterpart Link
Ru	Ruthenium
Rx	Reactor
SAE	Site Area Emergency
SED	Site Emergency Director
SI	Safety Injection
SPDS	Safety Parameter Display System
SRO	Senior Reactor Operator
STA	Shift Technical Advisor
SW	Service Water System
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent Dosimeter
TS, Tech Specs	Technical Specification(s)
TSC	Technical Support Center
TVA	Tennessee Valley Authority
μCi	Micro (μ) Curies
U.S.	United States
UPS	Uninterruptible Power Supply
V	Volts
Xe	Xenon

I. INTRODUCTION

This Emergency Plan describes the plans established by Tennessee Valley Authority (TVA) for responding to a radiological emergency at the Bellefonte Nuclear Station (BLN). The BLN Emergency Plan (the Plan) describes the organization, facilities, emergency response measures, and functional interfaces with off-site agencies which can be used to respond to a broad range of emergencies. The organization has defined responsibilities and specific authorities which provide for effective control and coordination of the emergency response, both on-site and off-site. The organization is augmented, as required, to address situations with serious potential consequences.

Types of emergencies are divided into four classifications which cover a broad spectrum of potential occurrences. The classifications range from a “Notification of Unusual Event,” in which off-site officials are notified of an unusual condition, through “General Emergency,” in which on-site and off-site evacuation may be required and a major state of emergency exists. This classification scheme is compatible with existing State plans.

An emergency response organization is established with specific duties and responsibilities defined, and points of contact between on-site and off-site supporting agencies are designated. Augmentation of the emergency response organization is required at “Alert” and higher levels and may occur at a Notification of Unusual Event (NOUE), and includes activation of both station and corporate emergency response personnel. Provisions for prompt notification of State, Local and Federal agencies are established and include information which may be required for off-site agency response.

Methods and procedures provide corrective and protective actions including evaluation of the operability of the unaffected unit. The use of protective equipment, protective action guides and exposure limits are also pre-specified. The facilities available for assessment and management of the emergency consist of on-site and off-site response facilities, communication systems, and portable or fixed equipment and systems for detection and measurement of those parameters causing or resulting from the emergency. Medical services are also available.

A recovery and re-entry plan describes the management, technical, and administrative organization necessary to execute timely and effective recovery of the facility based on assessments of plant conditions and desired end states. The recovery plan provides guidance for relaxing protective measures that have been instituted and requires the periodic estimation of total population exposure.

The Emergency Plan is reviewed on a periodic basis. Periodic drills and exercises involving communications, fire-fighting, first aid/medical response, radiological monitoring and Health Physics activities are routinely conducted. Joint exercises involving participation by State and local response agencies are held periodically, coordinated with other nuclear facilities within the affected states, to test major elements of the Plan within a six year period. Federal response agencies may also participate in these joint exercises. Critiques of each implementation of the Plan allow for critical reviews of technique, methods, and shortcomings. Improvements are factored into the Plan and/or Implementing Procedures through controlled revisions.

The format for this plan directly follows the format of NUREG-0654/FEMA-REP-1, Rev. 1. Appendix 8 of this plan provides a cross-reference between this plan, affected State and local plans, and to the evaluation criteria in Part II of NUREG-0654/FEMA-REP-1, Rev. 1.

A. PURPOSE

This Emergency Plan describes the facilities, equipment, response organizations, assessment and protective actions, and cooperative agreements established by TVA to provide for adequate protection of life and property in the event of a radiological emergency at BLN. In this context, protection of life and property includes:

- Notifying and mobilizing affected members of the licensee staff, Federal, State, local, and other response organizations, and the public.
- Limiting the radiological impact of the emergency on plant employees and affected members of the public.
- Limiting the potential adverse impact of protective actions, such as evacuations or sheltering.

The impact of plant emergencies is limited through the implementation of pre-planned and controlled preparatory, assessment, and protective actions consistent with this plan.

Emergency Plan Implementing Procedures (EPIPs) provide instructions for accomplishing the provisions established in the Plan. The procedures guide the classification of the emergency, provide for off-site notifications, and activation of the full response organization. They also provide techniques for estimating the consequences of off-site releases and making recommended Protective Action Recommendations.

B. SCOPE

This plan applies to planning for and response to any radiological emergency condition at BLN. Section II.D of this plan describes the emergency classification system. Appendix 1 identifies radiological emergency recognition categories, their initiating conditions, and Emergency Action Levels (EALs).

This emergency plan has been coordinated with the plans of affected government agencies and private sector support organizations as listed in Section II.A of this plan. Ongoing coordination with affected local, State, and Federal agencies and private sector support organizations is imperative to provide for an effective emergency response capability.

C. PLANNING BASIS AND EMERGENCY PLANNING ZONES

1. Planning Basis

BLN is licensed under the requirements of 10 CFR Part 52, “Early Site Permits; Standard Design Certifications; and Combined Licenses For Nuclear Power

Plants." The regulations in 10 CFR Part 52 invoke the emergency planning requirements in 10 CFR Part 50, "Domestic Licensing Of Production And Utilization Facilities." Consistent with the requirements of both 10 CFR Part 50 and 10 CFR Part 52, this plan is based on the requirements of 10 CFR Part 50, Section 50.47, "Emergency Plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities." This plan is also based on the guidance provided in 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" (Reference 1). NUREG-0654 has been endorsed as an acceptable means of meeting the emergency planning requirements of 10 CFR Part 50 through USNRC Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors" (Reference 2).

2. Emergency Planning Zones

NUREG-0654 establishes two Emergency Planning Zones (EPZs) for which planning for predetermined actions should be implemented - the Plume Exposure Pathway EPZ, which has a radius of approximately ten miles, and the Ingestion Exposure Pathway EPZ, which has a radius of approximately fifty miles.

Plume Exposure Pathway EPZ

The Plume Exposure Pathway EPZ is that area where the principal sources of incident-related radiation exposures are likely to be whole body gamma radiation exposures and inhalation exposures from the passing radioactive plume. As a result of this exposure scenario, any exposures resulting from a radiological incident at the facility are likely to have a duration from less than one hour to a few days.

The Plume Exposure Pathway EPZ consists of an area about 10 miles in radius around the site. Figure I-1 provides an illustration of the Plume Exposure Pathway EPZ, including circles denoting the 2, 5, and 10 mile radii.

Ingestion Exposure Pathway EPZ

The Ingestion Exposure Pathway EPZ is that area where the principal sources of incident-related radiation exposures are likely to result from ingestion of contaminated water and food, including milk, fresh vegetables, and foodstuffs. As a result of this exposure scenario, any exposures resulting from a radiological incident at the facility are likely to have a duration from a few hours to months.

The Ingestion Exposure Pathway EPZ consists of an area about 50 miles in radius around the site. Figure I-2 provides an illustration of the Ingestion Exposure Pathway EPZ.

3. Site and Area Description

BLN Units 3 and 4 consist of two units, each of which includes a Westinghouse AP1000 reactor plant. Each reactor unit is designed for a core power output of approximately 3400 MWt which results in a gross electrical output of at least 1000 MWe.

The BLN site is approximately seven miles northeast of downtown Scottsboro. BLN is located about 38 miles east of downtown Huntsville, Alabama (AL); 44 miles southwest of downtown Chattanooga, Tennessee; and 48 miles north of downtown Gadsden, Alabama. The nearest population center to BLN is Huntsville, Alabama. The closest communities to BLN are the Town of Hollywood (three miles to the west) and the Town of Pisgah (five miles to the east).

Figure I-1 - Plume Exposure Pathway Emergency Planning Zone

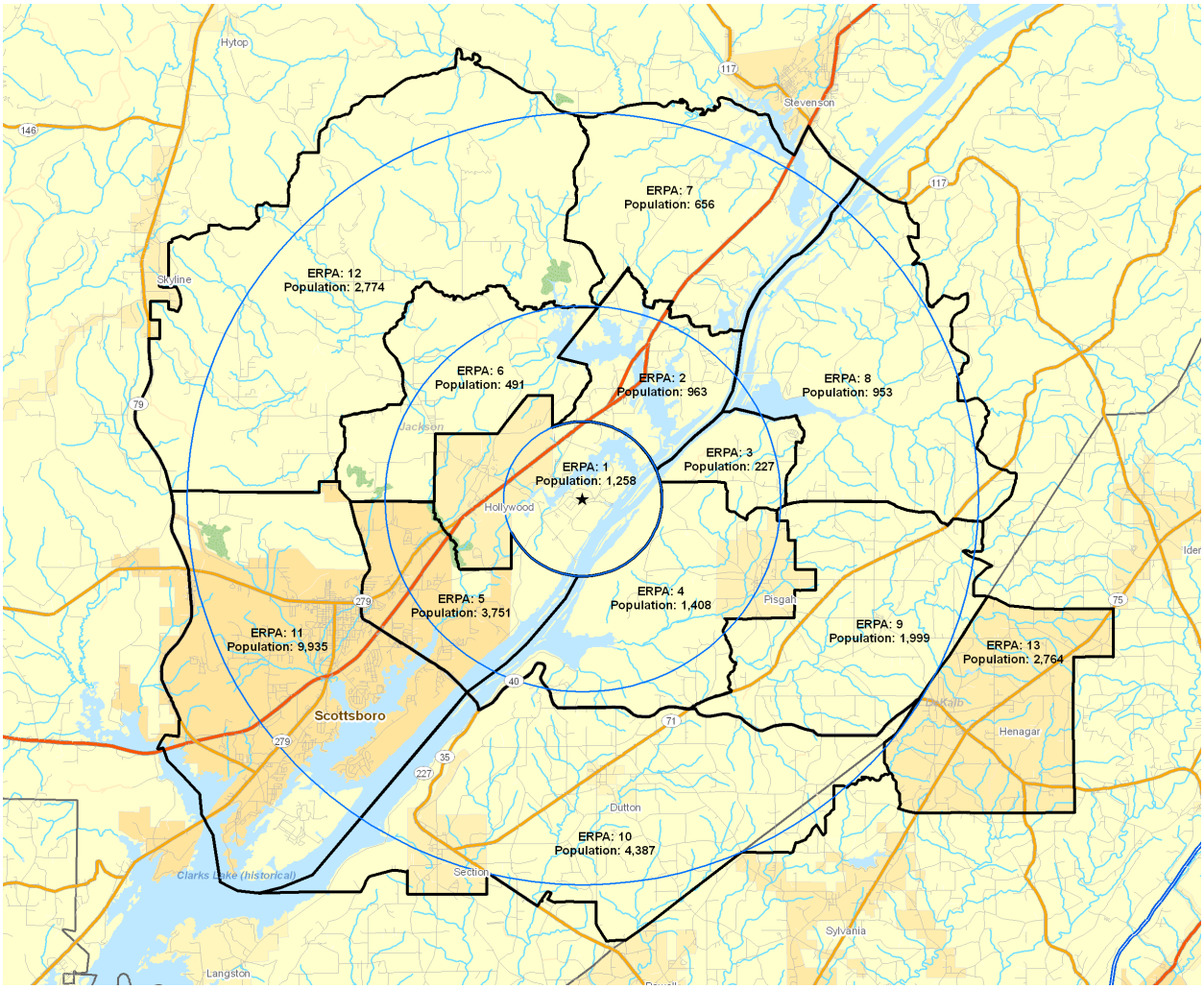
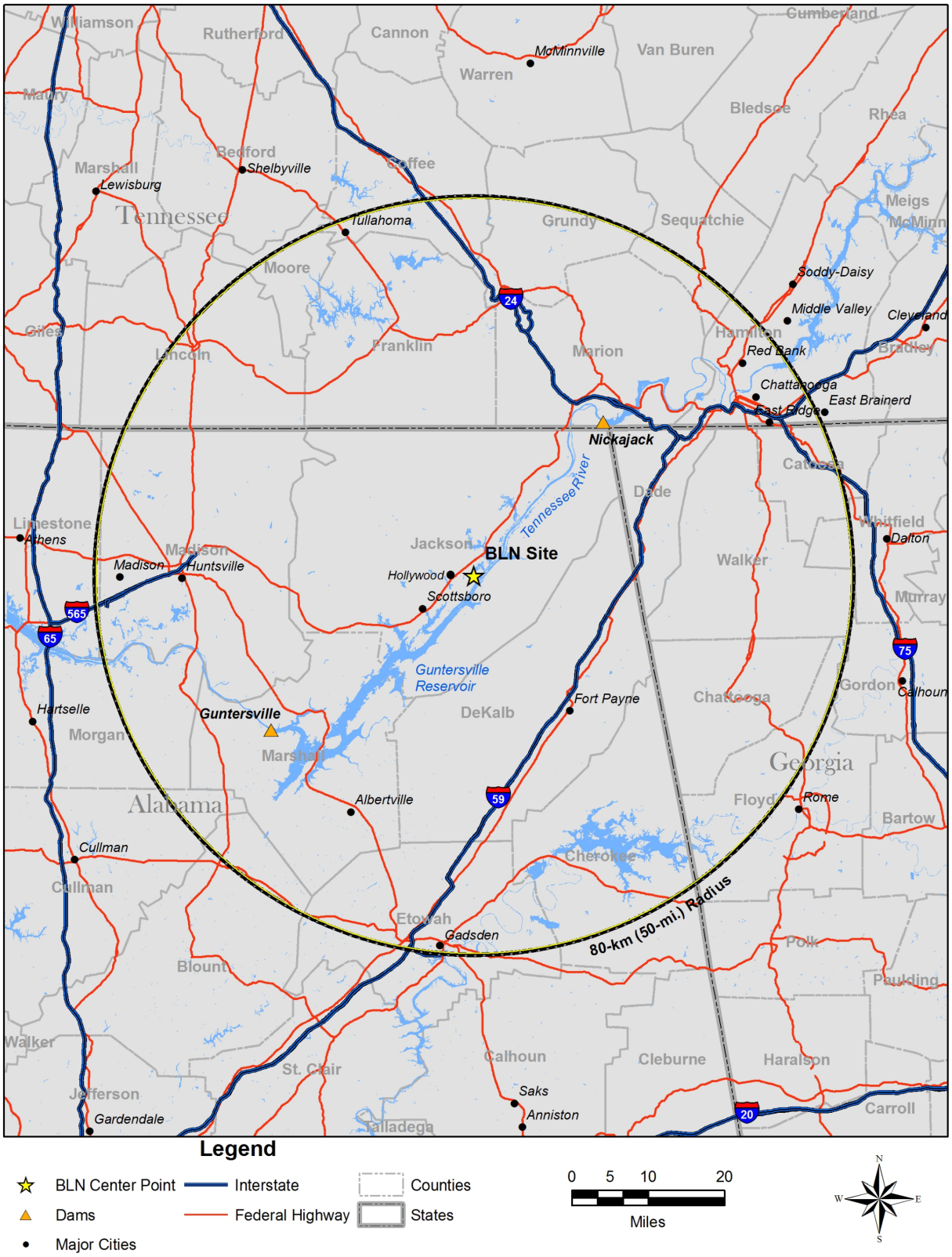


Figure I-2 - Ingestion Exposure Pathway Emergency Planning Zone



II. EMERGENCY PLAN

A. ASSIGNMENT OF RESPONSIBILITY (ORGANIZATION CONTROL)

1. Emergency Organization

a. Participating Organizations

The principal organizations participating in emergency response activities at BLN include:

- TVA
- Alabama Emergency Management Agency
- Alabama Department of Public Health
- Jackson County (AL) Government Agencies
- DeKalb County (AL) Government Agencies
- U.S. NRC
- U.S. Department of Energy (DOE)
- U.S. Department of Homeland Security (DHS/Federal Emergency Management Agency (FEMA))

Appendix 7 of this plan provides copies of certification letters with State and local agencies responsible for the emergency planning effort.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

b. Concept of Operations

TVA's responsibilities during an emergency condition focus on taking actions to:

- Assess plant conditions
- Classify emergency conditions
- Notify TVA Emergency Response Organization (ERO) and off-site agencies of emergency conditions
- Provide technical expertise to selected State agencies
- Provide support for off-site assessment

- Make protective action recommendations
- Mitigate the consequences of adverse plant conditions by monitoring and controlling plant parameters
- Request assistance from off-site agencies, as needed
- Provide support to affected agencies for communications with the affected public
- Terminate emergency conditions

Normal operations at BLN are conducted under the authority of the Shift Manager and directed from the appropriate Control Room. In the event of an abnormal condition, the Shift Manager directs the activities of the plant staff in performing initial assessment, corrective, and protective functions. Using approved emergency response procedures, including the Emergency Action Levels (EALs) provided in Appendix 1 of this plan, the Shift Manager determines if an emergency condition exists and, if so, the proper emergency classification. Based on this classification and plant conditions, the Shift Manager assumes the role of the Site Emergency Director (SED) and determines if activation of the emergency response facilities (ERFs) is desirable or required[1, 2, 3]. The SED also makes or directs initial notifications to the NRC and the Operations Duty Specialist (ODS), who notifies designated authorities in Alabama, who subsequently notify designated authorities in Jackson and DeKalb Counties[4]. The ODS also notifies the Emergency Duty Officer (EDO) and Central Emergency Control Center (CECC) Director. The EDO is responsible for establishing initial operation of the CECC in the event of an Alert or higher classification. He is responsible for completing initial notifications of emergency events to TVA and offsite emergency response organizations.

The Control Room is the initial center for coordination of emergency response for emergency conditions. For emergencies classified as Alert, Site Area Emergency and General Emergency, the Site Emergency Director directs the activation of the ERO. The Site Emergency Director may direct the activation of all or part of the

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[1] If an event is transient in nature such that staffing of the ERO is not practical prior to termination of the event, then the ERO may not be staffed; however, notifications to affected authorities will be completed consistent with the requirements of this plan.

[2] Under some circumstances, such as unanticipated natural events or hostile action against the facility, the SED may judge that movement of personnel as needed to staff the emergency response facilities may create undue personnel hazards. Under such circumstances, the Site Emergency Director may elect to postpone staffing of the emergency response facilities and implement compensatory measures as needed to provide for ongoing personnel and facility safety.

[3] The ERO may be staffed prior to the declaration of an emergency situation, such as in anticipation of severe weather that is likely to result in the declaration of an emergency condition.

[4] If the initial emergency classification is General Emergency, then the ODS also immediately notifies the designated local authorities.

ERO for a Notification of Unusual Event, based on an assessment of plant conditions and support needs.

The Technical Support Center (TSC) acts in support of the command and control function of the Control Room and provides an area for station personnel who have expertise in those areas of plant operation required to support the emergency response. This facility is equipped with communication equipment, computers, printers, off-site and on-site computer access, plant drawings, procedures and other materials and equipment to support its function. Personnel in the TSC assess the emergency condition and make responsible recommendations to the Control Room and the CECC as necessary to provide for the safety of plant personnel and members of the general public. After the CECC is operational and activated, the CECC (which assumes the responsibilities commonly assigned to Emergency Operations Facilities at other nuclear facilities) assumes many of the functions of the TSC and relies on the TSC as a vital link to the station.

Following activation of the ERFs and receipt of an adequate turnover, the plant manager or other designated member of the station management staff assumes the SED position, relieves the Shift Manager of SED responsibilities and directs the activities of the on-site emergency response organization from the TSC.

The CECC is located in Chattanooga, TN and is staffed by TVA corporate personnel, including the CECC Director, who directs the activities of this facility. The CECC Director is responsible for ensuring the CECC communicates emergency status to the State and counties, directing the efforts of the off-site monitoring teams, making radiological assessments, recommending off-site protective measures to the State and counties, and arranging for dispatch of any special assistance or services requested by the station. Specific information relating to the staffing and reporting structure of the CECC organization is provided in EPIPs.

The Operations Support Center (OSC) provides an operational center to provide support to the TSC and Control Room. The OSC dispatches Assessment and Repair Teams as directed by the Site Emergency Director, providing operational information, radiological assessment, and manpower for in-plant functions.

Table II-1 summarizes the responsibilities and activities of the ERFs under the various emergency classifications.

As noted previously in this section the SED is responsible for directing notifications to affected plant staff, which may include the unaffected unit's Control Room. This notification and subsequent communications will apprise the unaffected unit staff of plant conditions and allow them to determine any required actions.

Additionally, in the unlikely event that emergencies are declared simultaneously at both units during operations, the SED function is designated from on-site shift

management. The SED discharges those duties described in this Emergency Plan and provides for coordination of activities between the on-site ERFs.

There is a potential for an emergency at an operational unit to affect personnel and activities at the second unit while the second unit remains under construction. Emergency actions, including requirements for notification of construction site personnel, are stipulated in EPIPs. Requirements for subsequent response actions by construction site personnel are stipulated in the construction site Health and Safety Plan or its supporting documents.

The State of Alabama

The response provided by the State of Alabama is described in the Alabama Radiological Emergency Operations Plan. The principal state agency for mobilization of state resources to cope with an emergency is the Alabama Department of Public Health. This agency is supported by the Alabama Emergency Management Agency Operations Division, which provides radiological assessment and protection functions, and by other State agencies.

For a BLN emergency, the State of Alabama operates out of the Emergency Operations Center (EOC) in Clanton, AL.

County Governments

In an emergency situation at a nuclear station, county governments are immediately notified of the event. They have the primary responsibility for the protection of the citizens within the county boundaries consistent with the requirements of their respective Radiological Emergency Plans. The principal TVA contact with county government is through the ODS. This contact is maintained until relieved by CECC Off-Site Agency Communicators.

It is recognized that the county council, the chief executive of the county, and mayors of local communities have responsibilities in an emergency situation as well. TVA provides information to local government agencies through its support to the Alabama state government.

Local Agency Support Services

State, local and county agencies responsible for public health and safety work through the Emergency Management Agency's Emergency Operations Center in the affected county. The CECC coordinates with the agencies necessary to support the emergency condition.

Federal Government Emergency Response

The Station also maintains close contact with the NRC Operations Center and/or the NRC Region II offices in Atlanta, Georgia. This is an important function to provide accurate information and assessment of the emergency to the Federal

Government. As a result of these communications, the NRC can best appraise their response to the emergency. In a like manner, the U.S. Department of Energy, Oak Ridge Operations, is available to provide radiological assistance to the Station.

The Federal Radiological Monitoring and Assessment Center (FRMAC) Operations Plan (Reference 3) provides for the coordinated management of Federal technical response activities related to a radiological emergency.

Department of Energy

The Department of Energy (DOE) is assigned responsibility to prepare for, establish, and manage the FRMAC. The FRMAC may be activated when a major radiological emergency exists, and the Federal government responds when a State, other governmental entity with jurisdiction, or a regulated entity requests federal support.

Further information concerning objectives and organization is provided in the FRMAC Operations Plan.

Nuclear Regulatory Commission

The response provided by the NRC is described in NUREG-0728, “NRC Incident Response Plan” (Reference 4). The representative of the NRC who would provide input to the CECC Director is the Region II Regional Administrator/ designee. A workspace and a telephone have been provided in the CECC for this NRC representative.

Environmental Protection Agency

The EPA in Montgomery, Alabama may provide assistance in supporting environmental monitoring teams and mobile radioanalytical laboratories.

DHS/FEMA

DHS/FEMA bears responsibility for coordinating Federal agency response for non-technical aspects of the emergency, such as providing support for displaced members of the public. Such support would typically be requested by affected State and local agencies.

Appendix 7 of this plan provides copies of the certification letters established between TVA and organizations supporting this plan. The responsibilities of many Federal agencies are established in the National Response Framework (Reference 5) and therefore no certification letters are required for these agencies.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

c. Organizational Interrelationships

Figure II-1 illustrates the interrelationships between the affected organizations.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

d. Individual in Charge of Emergency Response

In the event of an abnormal condition, the Shift Manager determines if an emergency condition exists and, if so, the proper emergency classification. Upon declaration of an emergency, the Shift Manager or Unit Supervisor assumes the role of the Site Emergency Director and is in charge of the emergency response for the facility.

If required by the emergency classification, or if deemed appropriate by the Site Emergency Director, emergency response personnel are notified and instructed to report to their emergency response locations[5]. The Shift Manager is relieved as Site Emergency Director when the plant manager or his designated alternate reports to the station and is updated as to the status of the unit, the emergency actions taken, and the current status of the emergency.

The CECC is activated upon declaration of an Alert, Site Area Emergency or General Emergency. The CECC is staffed by corporate personnel, including the CECC Director, who directs the activities of this facility. The senior TVA representative is responsible for ensuring the CECC communicates emergency status to the State government, directs the efforts of the off-site monitoring teams, makes radiological assessments, recommends off-site protective measures to the State, and arranges through the company for dispatch of any special assistance or services requested by the station.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

e. 24 Hour Emergency Response Capability

TVA maintains capability for 24 hour response, including staffing of communications links, through training of multiple responders for key emergency response positions, consistent with the training requirements established in Section II.O of this plan.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

[5] See Section II.A.1.b of this plan regarding situations under which staffing of the emergency response facilities may be deferred.

2. Functions, Responsibilities, and Legal Basis

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

3. Written Agreements

Appendix 7 of this plan provides copies of the certification letters established between TVA and the State and local government agencies and private sector organizations committed to supporting further development and implementation of this plan. The roles and responsibilities of State and local government agencies and other supporting organizations are outlined in this plan.

The responsibilities of the primary Federal agencies having responsibilities under this plan are established in the National Response Framework; therefore, no certification letters are required for these agencies.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Continuous Operations

TVA maintains capability for continuous operations through training of multiple responders for key emergency response positions, consistent with the training requirements established in Section II.O of this plan. The Site Emergency Director or CECC Director, as appropriate, bears responsibility for ensuring continuity of technical, administrative, and material resources during emergency operations.

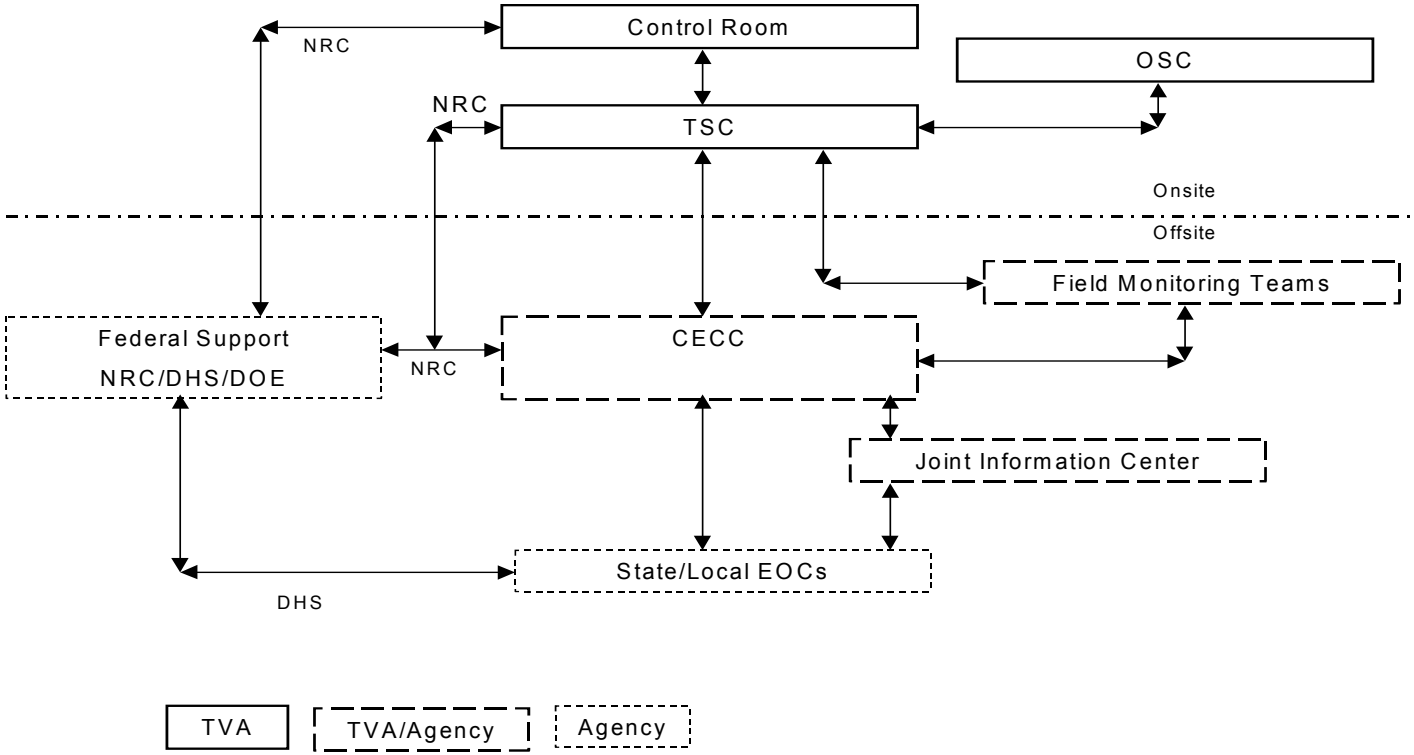
Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

Table II-1 - Responsibility for Emergency Response Functions

	Emergency Classification			
Function	**NOUE**	**Alert**	**Site Area Emergency**	**General Emergency**
Supervision of reactor operations and manipulation of controls	CR	CR	CR	CR
Management of plant operations	CR (TSC)	TSC	TSC	TSC
Technical support for reactor operations	CR (TSC)	TSC	TSC	TSC
Management of corporate emergency response resources	CR (TSC) (CECC)	CECC	CECC	CECC
Monitoring of radioactive effluents and the environs; dose assessment and projection	CR (TSC) (CECC)	CECC	CECC	CECC
Provision of information to State and local emergency response organizations, including Protective Action Recommendations	CR (TSC) (CECC)	CECC	CECC	CECC
Management of recovery operations	CR (TSC) (CECC)	TSC/ CECC	TSC/CECC	TSC/CECC
Technical support for recovery operations	CR (TSC) (CECC)	TSC/ CECC	TSC/CECC	TSC/CECC

Note: Listing of facilities in parentheses indicates that activation of these facilities or performance of these functions is optional, based on management assessment of plant conditions and emergency response needs.

Figure II-1 - Emergency Response Organization Interrelationships



B. ON-SITE EMERGENCY ORGANIZATION

1. On-site Emergency Organization

Figure II-2 illustrates the on-site emergency response organization (ERO). EPIPs provide details regarding ERO position functions.

The minimum staff required to conduct routine and immediate emergency operations is maintained at the station consistent with 10 CFR 50.54(m) and the facility Technical Specifications. Staffing is described in Subsection 13.1 of the FSAR. Station administrative procedures provide the details of the normal station organization, including reporting relationships.

Upon declaration of an emergency, designated members of the normal staff complement fulfill corresponding roles within the emergency response organization. For example, Health Physics personnel undertake radiation protection activities, Security personnel undertake Security activities, Engineering personnel focus on plant assessment and technical support for operations, and Operations personnel focus on plant operations.

2. Site Emergency Director

The Shift Manager position is staffed at all times. Upon recognition of an emergency condition, the individual filling this position assumes the duties of the Site Emergency Director until relieved by a qualified member of the management staff consistent with Section II.B.3 of this plan or until termination of the emergency condition, whichever comes first.

The individual filling the Site Emergency Director role has the responsibility and authority to initiate any required emergency response actions, including notification of the ODS, who undertakes subsequent notification of affected State and local authorities and provision of Protective Action Recommendations to off-site authorities.

3. Site Emergency Director Line of Succession

If the Shift Manager is rendered unable to fulfill the duties and responsibilities of the Site Emergency Director position (such as due to personal illness or injury) the Unit Supervisor present on shift (a position that also is staffed at all times) assumes the Site Emergency Director position until relieved by a qualified member of the management staff as outlined below.

A trained, higher level member of TVA's management staff may assume Site Emergency Director responsibilities from the Shift Manager after becoming fully familiar with the pertinent plant and radiological conditions and status of emergency response/accident mitigation efforts.

4. Site Emergency Director Responsibilities

The Site Emergency Director has the responsibility and authority to initiate emergency actions necessary to protect the life, health, and safety of the plant staff. Any required evacuations of individuals (including members of the public) from the plant's Exclusion Area are conducted cooperatively with state and local agencies, if necessary. The responsibilities of the Site Emergency Director include:

- Classifying the emergency
- Authorizing notification to the ODS and therefore subsequent notification of State and local agencies of the emergency status
- Initiating notification of the NRC regarding the emergency status
- Issuing protective action recommendations
- Authorizing emergency exposure limits
- Activating emergency response personnel and facilities
- Reducing power or shutting down the reactor
- Committing company funds (within allowed limits) as necessary or obtaining corporate approval for expending funds above allowed limits
- Acquiring emergency equipment or supplies
- Ordering site evacuation
- Restricting access to the site
- Notifying company management
- Implementing work schedules
- Directing on-site emergency activities

The first five items above may not be delegated. Upon activation of the CECC, the CECC Director assumes responsibility for informing off-site agencies and recommending protective measures.

The SED has the authority to request assistance from any organization which he deems necessary to mitigate the conditions causing the emergency. In addition, the SED may request off-site assistance in fire-fighting, rescue services, law enforcement, and medical support prior to augmentation of the on-site emergency organization (see Figure II-1). The participating agencies and support services

with which emergency support services have been negotiated are listed, by certification letters, in Appendix 7 of this plan.

5. Plant Emergency Response Staff

TVA establishes minimum emergency response staffing consistent with Table II-2 of this plan, which has been based on the guidance provided in Table B-1 of NUREG-0654 and the provisions of the Emergency Plans of currently-licensed TVA nuclear facilities. Figure II-2 illustrates the plant staff emergency organization.

The positions, title and major tasks to be performed by the persons assigned to the functional areas of emergency activity at the station are described in EPIPs. These assignments shall cover the emergency functions in Table II-2. The minimum on-shift staffing and goals for augmenting on-shift resources after declaration of an emergency are also indicated in Table II-2. The 60 and 90 minute goals for emergency response staff augmentation are consistent with those implemented for existing TVA nuclear facilities. The functional tasks to be performed by persons assigned to the areas of emergency activity are as designated in EPIPs.

Should the Site Emergency Director deem that additional emergency response personnel are needed or the emergency classification is upgraded to Alert or higher, he shall initiate the augmentation of the on-shift Emergency Organization by directing notification of supplemental emergency response personnel.

The responsibilities of the emergency response personnel assigned on shift and those who make up the augmentation crews meet the staffing functions identified in Table B-1 of NUREG-0654. The numbers of emergency response personnel designated for both the on-shift and augmentation contingents meet or exceed the guidance.

The ERO, when fully activated, includes the positions described in Table II-2. Additional personnel may be designated by station management as emergency responders providing special expertise deemed beneficial, but not mandatory, to the planned response. The individuals assigned as emergency response personnel are designated by station management based on the technical requirements of the position.

The responsibilities of key members of the TSC and OSC staff are outlined below:

Site Vice President

The Site Vice President serves as a corporate interface for the SED, relieving him from duties which could distract from the SED's primary purpose of plant operations and accident mitigation activities. The Site Vice President shall provide assistance in the following areas as needed:

- Provides TVA policy direction to the Site Emergency Director
- Directs the site resources to support the Site Emergency Director in the accident mitigation activities
- Provides direct interface on overall site response activities with:
  - NRC, FEMA, or other Federal organizations responding to the site
  - CECC Director
  - Onsite media
- At his discretion, may provide interface at the appropriate offsite location on the overall site response activities with:
  - State and local agencies
  - NRC region/corporate
  - Joint Information Center
- Provides support to other emergency operation centers as necessary

Site Emergency Director

- Discharges duties as established in Section II.B.4 of this plan

Operations Manager

- Directs operational activities
- Informs Site Emergency Director of plant status and operational problems
- Performs damage assessment as necessary
- Recommends solutions and mitigating action for operational problems

Technical Assessment Manager

- Directs onsite effluent assessment
- Directs activities of technical assessment team
- Projects future plant status based on present plant conditions
- Keeps assessment team informed of plant status

- Provides information, evaluations, and projects to Site Emergency Director
- Coordinates assessment activities with the CECC plant assessment team
- Provides for Plant Status Board information maintenance

Maintenance Manager

- Directs repairs and corrective actions
- Performs damage assessment
- Directs activities of Operations Support Center

Admin Assistants (TSC and OSC)

- Maintains log of events
- Answers telephones
- Operates facsimile machine
- Fulfills other duties as assigned by Site Emergency Director

TSC Communicator

- Provides information from control room to Technical Assessment team as needed
- Completes plant data sheets as needed

Security Manager

- Directs activities of Nuclear Security Services personnel
- Controls access to site and control rooms
- Reports on site accountability/evacuation as defined in BFN-EPIPs

Radiation Protection (RP) Manager

- Directs and/or performs assessment of inplant and onsite radiological conditions
- Directs onsite RP activities
- Coordinates additional RP support with CECC Radiological Communicator

- Makes recommendations for protective actions for onsite personnel
- Maintains status map of offsite radiological conditions
- Coordinates assessment of radiological conditions offsite with CECC Radiological Communicator
- Maintains in-plant radiation status board
- Coordinates briefing of maintenance teams with maintenance manager and assigns a RP Technician to accompany them if necessary
- Makes final recommendations to the Site Emergency Director for personnel entry to radiological hazardous environment

OSC Director

- Directs repairs and corrective actions
- Performs damage assessment
- Coordinates OSC Teams to provide proper briefings and accompaniment by RP as applicable

Chemistry Manager

- Coordinates assessment of radioactive effluents with CECC Plant Assessment Team
- Directs post-accident sampling activities
- Directs activities of the radiochemical laboratory
- Determines impact of incident on environment, radwaste, various effluent treatment systems

OSC Mechanical Supervisor

- Directs OSC (Mechanical)
- Performs damage and repair assessment

Technical Assessment Team Leader

- Performs systems assessment as directed by Technical Assessment Manager
- Determines condition of reactor and nuclear fuel

- Acts as plant assessment team leader

OSC I/C Supervisor

- Directs OSC (Instrumentation)
- Performs damage and repair assessment

OSC Electrical Supervisor

- Directs OSC (Electrical)
- Performs damage and repair assessment

NRC Coordinator

- Acts as primary liaison with onsite NRC personnel
- Updates NRC personnel on plant status
- Provides information requests from NRC to TSC personnel

Operations Specialist

- Provides operational knowledge for status evaluation of plant systems
- Provides advice regarding technical specifications, system response, safety limits, etc.
- Assists in development of recommended solutions to developing problems

Emergency Preparedness Manager

- Advises Site Emergency Director regarding overall radiological emergency plan, use of implementing procedures, emergency equipment availability, and coordination with CECC
- Confirms site emergency centers are operating properly

Site Engineering Manager

- Serves as the primary interface with Engineering
- Provides for additional engineering support during and/or following a radiological emergency
- Coordinates the design and construction of emergency equipment and structures as necessary

Technical Assessment Team

- Prepares and provides periodic current assessments on plant conditions and provides this information to the CECC plant assessment team
- Projects future plant status based on present plant conditions
- Provides technical support to plant operations on mitigating

Technicians, Craftsmen, and Security Force personnel

- Discharge their duties in accordance with EPIPs and directions provided by assigned managers and supervisors

6. Interfaces Between Functional Areas

Figure II-1 illustrates the interfaces between and among the site functional areas of emergency response activity, TVA CECC support, and the affected State and local government response organizations.

7. Corporate Support for the Plant Staff

Upon declaration of an Alert, Site Area Emergency, or General Emergency, the Site Emergency Director directs the activation and notification of the on-site and off-site ERFs. TVA management, technical, and administrative personnel staff the CECC and other facilities and provide augmented support for the plant staff consistent with the functions described in Table B-1 of NUREG-0654/FEMA-REP-1, Rev.1.

Figure II-3 of this plan provides a diagram of the CECC organization, including the Public Affairs function. Section II.G of this plan addresses the Public Affairs function.

In addition to the minimum required staff, other personnel are expected to report to the CECC to augment the minimum staff. This augmentation would occur gradually depending on the proximity of the personnel to the CECC.

The organization identified in this section is capable of continuous (24 hours) operations for a protracted period. The CECC Director is responsible for determining the minimum required staff and assuring continuity of resources.

The augmented staff focuses on discharging management, technical and administrative activities as needed to support the plant staff and to relieve the plant staff of external coordination responsibilities, including notification of and coordination with off-site authorities and release of information to the media. In addition to the activities discussed in Table II-2, activities of the CECC staff include:

a. Logistical support for plant personnel as discussed in Sections II.A and II.B of this plan.

b. Technical support for planning and recovery/re-entry operations as discussed in Section II.M of this plan.

c. Management-level interface with governmental authorities as discussed in Sections II.E and II.F of this plan.

d. Coordination with, and release of information to, the news media as discussed in Section II.G of this plan.

The CECC Director has the ultimate responsibility for directing the corporate emergency response. Corporate support would be coordinated between the Site Emergency Director and the CECC Director at the CECC. The CECC Director and his staff serve as the point of contact between station personnel, the corporate emergency response staff, and governmental authorities.

The responsibilities of key members of the CECC staff are outlined below:

CECC Director

- Has overall responsibility and authority for adequate TVA response to affected State/Local governments in protecting the health and safety of the public
- Directs and coordinates TVA emergency response
- Makes protective action recommendations to the State
- Reviews and approves TVA press releases (excluding initial report of event)
- Reviews adequacy of information to news media/public; and act as the primary point of contact for official TVA positions or recommendations
- Notification of key individuals of the condition and severity of the events; information relative to the plant status, and radiological impacts
- Notification of protective measures available to emergency responders; NRC, DOE, INPO, insurance underwriters, and the appropriate Federal, State, and local agencies
- Provides points of contact for key types of information from the CECC
- Establishes 24- hour/day operations, if required

Assistant CECC Director

- An optional position that may be filled at the CECC Director's discretion to assist him in carrying out his duties. This position will be filled by a person qualified as CECC Director

Emergency Planning Staff Representative

- Advises the CECC Director regarding all aspects of the Emergency Plan
- Confirms the CECC is set up and operating properly
- Assists the CECC Director in operating the CECC by evaluating, compiling, documenting, and posting data concerning the emergency situation

State Communicator

- Acts as TVA's primary communicator to the State
- Clarifies information discrepancies and provides pertinent information related to plant status, onsite response, and TVA dose assessment to the State
- Assists in providing TVA resource assistance
- Provides the State with technical advice as necessary
- Assists the State Liaison (a State government representative) in briefings and coordinating responses to State inquiries

TVA State Liaison

- Acts as the CECC representative to the SEOC to interpret technical aspects of the emergency condition
- Informs the CECC on State problems, requests, and actions

CECC Plant Assessment Manager

- Maintains contact with the SED or Technical Assessment Manager and coordinates any necessary support
- Requests assistance from other TVA organizations or NSSS vendors as needed
- Provides technical support for planning and reentry/recovery operations

- Briefs the CECC Director on information pertaining to plant status and any protective actions indicated for the public, based upon an assessment of plant status by the CECC and TSC assessment teams

- Receives periodic status reports from the site and provides them to the CECC Director and other TVA support organizations

- Makes recommendations to the SED on actions to be considered by the site to mitigate the problem based upon the assessment of plant status by the CECC Assessment Team

Plant Assessment Coordinator

- Coordinates the plant status assessment activities in the Plant Assessment Area

- Directs overall plant assessment function and reports results to the Plant Assessment Manager

The plant information needed by the coordinator and his plant assessment team is provided by a continuous telephone communications hookup with plant emergency staff.

CECC Plant Assessment Team

- Provides a periodic evaluation of plant status information for input back to the TSC and the CECC Plant Assessment Manager

- Draw upon their knowledge of plant information, procedures, core damage assessment, and industry analysis to evaluate the assessments provided by the site in terms of current and long-range plant conditions

- Apply their evaluation and independent assessment to provide needed data for developing any necessary protective action recommendations for the public

- Serve as an engineering/operations/core damage assessment consultant for the plant and reply to plant inquiries based on the available information

- Selects appropriate safety parameters for trending and maintains the CECC trend boards

- Maintain a detailed log of the sequence of events during the emergency

- Assists the CECC with other site-related communication needs, as necessary

Resource Support Coordinator

- Maintains communications with other technical personnel to coordinate support as necessary
- Coordinates support from other TVA organizations such as legal, medical, finance, and procurement
- Coordinates requests for support from other organizations outside TVA such as equipment vendors and INPO
- Coordinates arrangements for special equipment and supplies

Engineering Representative

- Provides a point of contact in the CECC for onsite and offsite Engineering
- Provides necessary engineering support as needed from the Engineering organization

Public Information Manager

- Coordinates the decision to activate the JIC with the CECC Director, the General Manager, Client Communications, and SEOC
- Provides the TVA Chief Spokesperson and the JIC Information Staff with information to inform the public and news media about an emergency
- Informs the CECC Director of TVA's Public Information activities in response to an emergency
- Coordinates all news release drafts with the State and Federal agencies participating at the JIC and secures approval of the CECC Director prior to making a release to the media
- Coordinates the decision to establish the JIC with the SEOC

JIC Liaison

- Responsible for contacting responding agencies and transmitting information for coordination
- Establishes and maintains an information flow from the JIC or Site Communications to the CECC

Information Writers

- Gather information from the CECC officers and technical advisor and prepare written statements based on that information
- Develop information releases for the approval of the CECC Director for release to the TVA employees

Radiological Assessment Manager (RAM)

- Briefs the CECC Director on matters concerning offsite and onsite radiological conditions
- Provides consultation, technical assistance, and obtains additional services as may be required for plant Radiological Protection and offsite environmental radiological surveys
- Conducts radiological monitoring in the environment for areas potentially affected by the emergency and evaluates the radiological information to determine the extent of actual or probable hazard to the public or environment
- Responsible for radiation dose management, including emergency dose authorizations, for personnel under his direction and control
- Provides technical support to the CECC Director for formulating protective actions for the public based on radiological conditions

Radiological Assessment Coordinator (RAC)

- Coordinates dose assessment, environs, and meteorological assessment activities in the Radiological Assessment Area (RAA)
- Directs the overall RAA function and communicates assessment results to the Radiological Assessment Manager
- Provides protective action recommendations based on dose assessments and field measurements to the RAM
- Provides information to the TSC on dose projections, recommended offsite protective activities, environs measurements, and meteorological conditions
- Coordinates requests for additional Radiological Protection equipment and personnel

Environmental Assessor

- Directs the TVA environs monitoring and assessment activities and coordinates the TVA field monitoring effort with the appropriate State agency
- Coordinates the analysis of offsite environs samples with WARL
- Provides technical support for planning and reentry/recovery operations
- Coordinates with Dose Assessor regarding the results of the environmental assessments
- Provides environmental monitoring results to the Radiological Assessment Coordinator or RAM for formulation of protective action recommendations to the CECC Director

Dose Assessor

- Initiates and performs dose assessment activities during the radiological emergency and recovery and reentry phase
- Consults with appropriate State agencies to resolve significant differences in assessments
- Coordinates with Environmental Assessor regarding the predicted position, exposure levels, concentrations, and duration of radiological effluents
- Provides dose assessment results to the Radiological Assessment Coordinator or RAM for formulation of protective action recommendations to the CECC Director

Technical Advisors

- Provides technical assistance and explanation to the State Communicator, Public Information Staff, and Public Information Manager to release accurate information to the public and state agencies

Boardwriter(s)

- Maintains the CECC Status Boards and EPZ maps with the most current information

Management Services

- Makes arrangements for and provides for clerical support, food, TVA transportation services, lodging, supplies, drawings, and controlled documents

- Authorized to issue checks for payment for emergency services of outside firms

8. Support from Contractor and Private Organizations

The principal contractor and private sector organizations that are part of the overall response organization are:

- Hollywood Volunteer Fire Department

- Highlands Medical Center Emergency Medical Services

- Westinghouse Electric Company

- Designated engineering/technical services support firms

Support is obtained from engineering/technical services firms, the reactor vendor, and other consultants and vendors as needed to respond to the emergency and recovery operations. Experienced personnel with in-depth expertise in Station design, engineering and construction provide aid in solving critical technical problems. This support is normally solicited by the CECC Director or his representative.

The Institute of Nuclear Power Operations (INPO) serves as a clearinghouse for industry-wide support during an emergency. When notified of an emergency situation, INPO provides emergency response as requested. INPO provides the following emergency support functions:

- Assistance to the affected utility in locating sources of emergency manpower and equipment.

- Analysis of the operational aspects of the incident.

- Dissemination to member utilities of information concerning the incident.

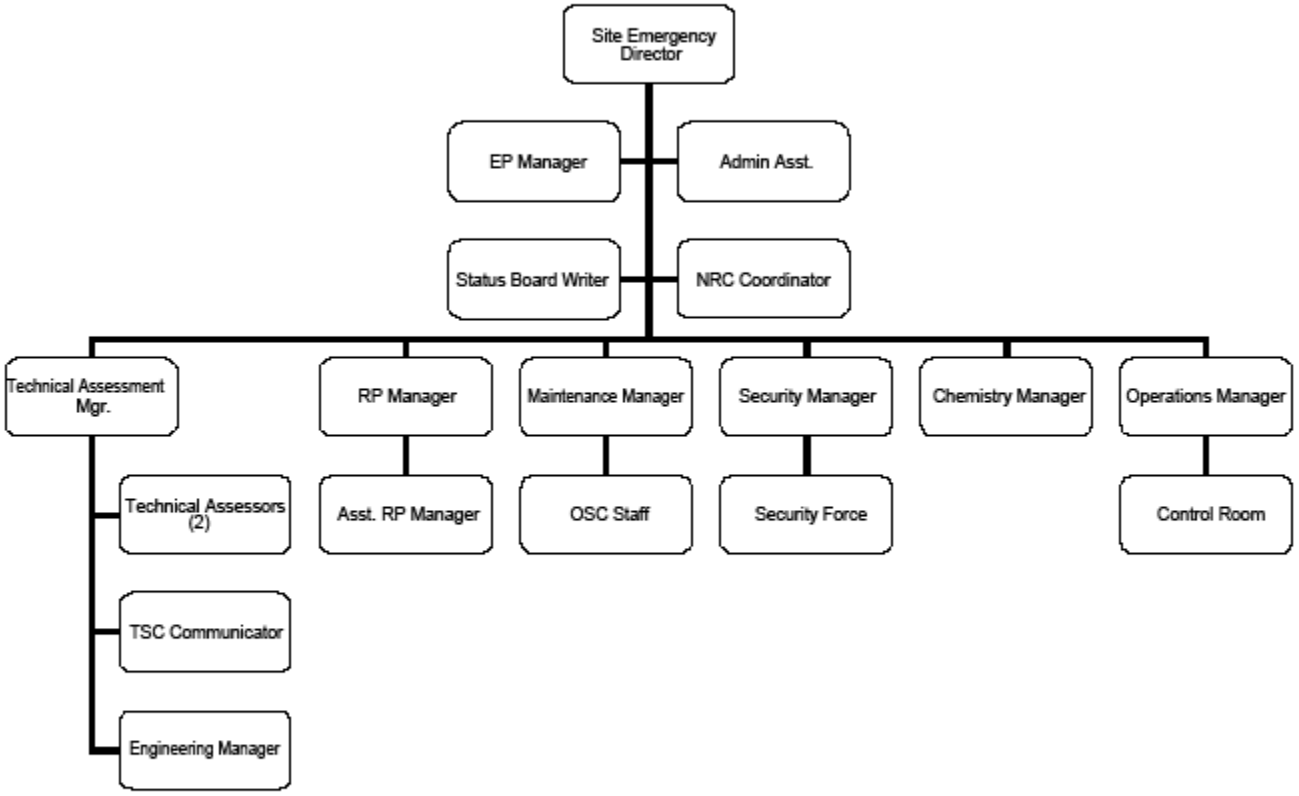
- Organization of industry experts who could advise on technical matters.

- If requested, one or more suitably qualified members of the INPO staff reports to the CECC Director and assist in coordinating INPO's response to the emergency.

9. Local Emergency Response Support

TVA has established and maintains agreements for local emergency response support services, including fire-fighting, medical and hospital services. Appendix 7 of this plan provides copies of certification letters for organizations providing these services.

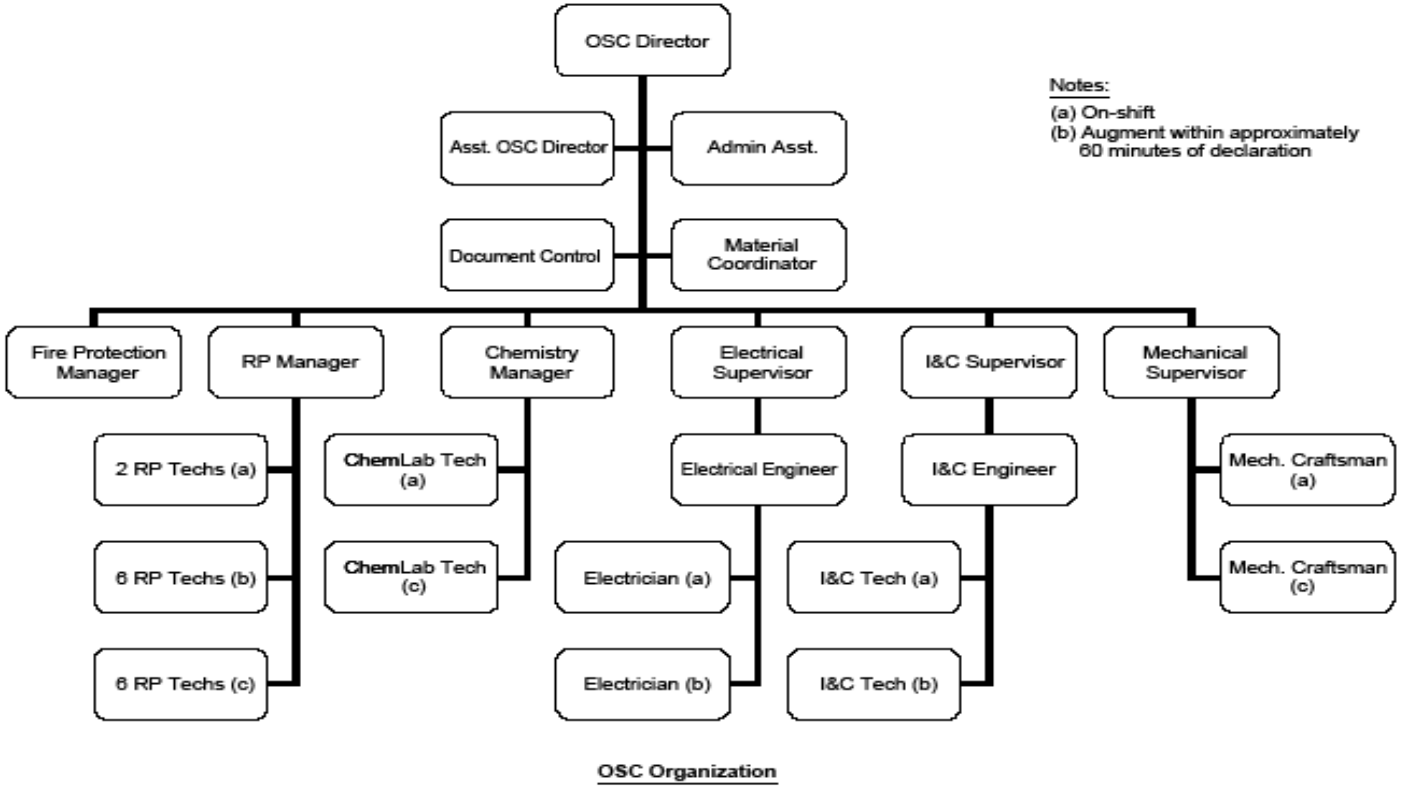
Figure II-2 - BLN Emergency Response Organization – TSC/OSC Only



TSC Organization

FIGURE II-2 (Sheet 1 of 2)

Figure II-2 - BLN Emergency Response Organization – TSC/OSC Only



OSC Organization

FIGURE II-2 (Sheet 2 of 2)

Figure II-3 - BLN Augmented Emergency Response Organization

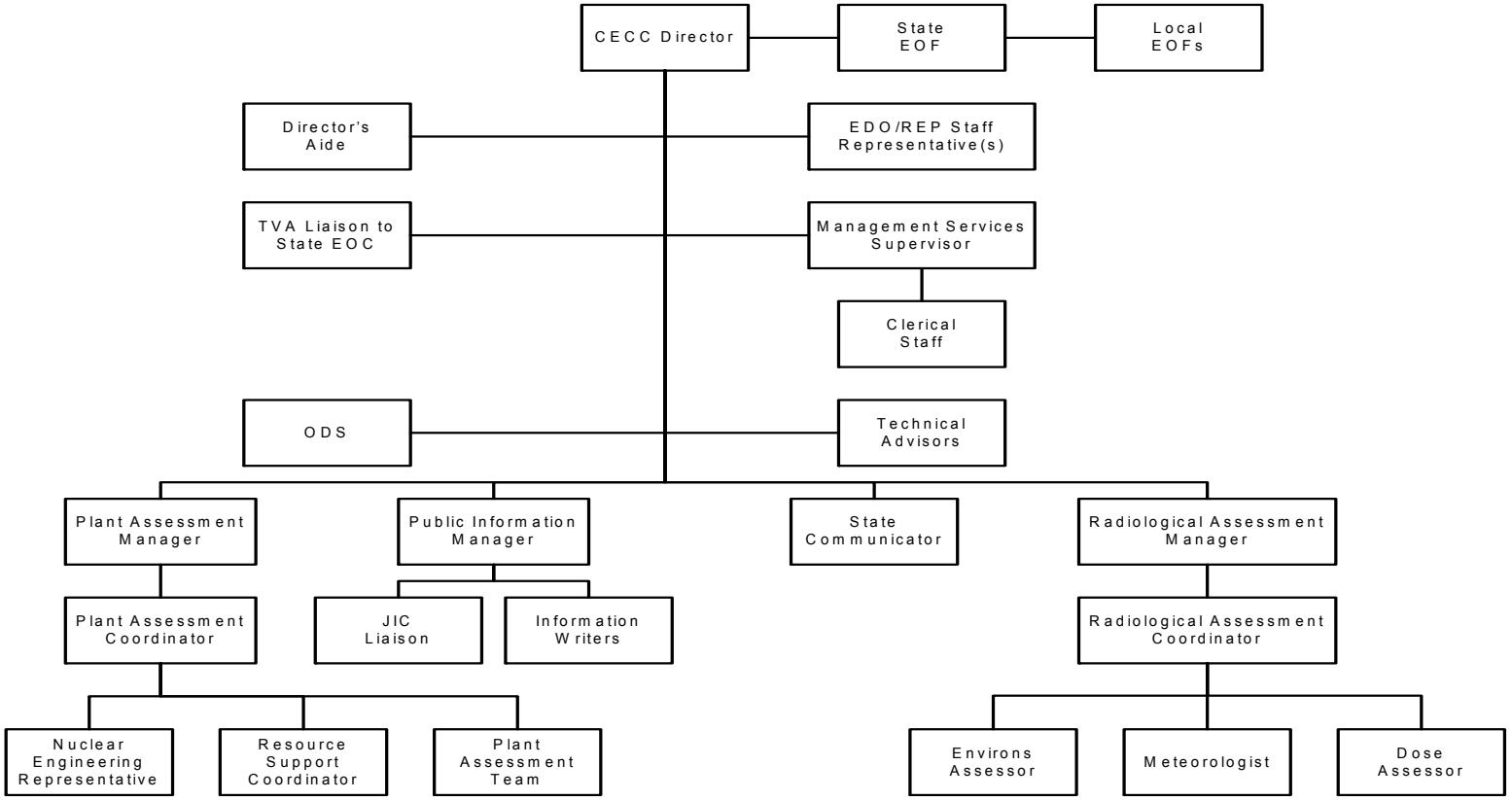


Table II-2 - Plant Staff Emergency Functions

Major Functional Area	Major Tasks	Position, Title, or Expertise	On Shift[1]	Targeted Capability for Additions	
				60 min.	90 min
Plant Operations and Assessment of Operational Aspects	Supervision of Station Operations and Assessment of Operational Aspects of Plant Operations	Shift Manager (SRO)	1		
		Control Room Supervisor (SRO)	1[2]		
		Reactor Operator (RO)	2[2]		
		Non-licensed Operator	2[2]		
Emergency Direction and Control (Site Emergency Director)	Direction and Control of On-Site Emergency Activities	Shift Manager	1[3]		
Notification and Communication[4]	Notify licensee, State, local, and Federal personnel and maintain communication	Communicator	1[5]	1[5]	2[5]
Radiological Accident Assessment and Support of Operational Accident Assessment	CECC Director	Senior Manager		1	
	Dose Assessment	Senior Radiation Protection	1[3]	1	
	Off-site surveys	Health Physics/Chemistry Technicians		2	2
	On-site (out of plant) surveys			1	1
	In-plant surveys			1	
	Chemistry/ Radiochemistry	Health Physics/Chemistry Technician	1		1
Plant System Engineering, Repair and Corrective Actions	Technical Support	Shift Technical Advisor	1		
		Core/Thermal Hydraulics		1	
		Electrical			1
		Mechanical			1
Plant System Engineering, Repair and Corrective Actions	Repair and Corrective Actions	Mechanical Maintenance	1[3]		1
		Electrical Maintenance	1[3]	1	1
		Instrumentation and Control		1	1
		Radwaste Operator	1		1

Major Functional Area	Major Tasks	Position, Title, or Expertise	On Shift[1]	Targeted Capability for Additions	
				60 min.	90 min
Protective Actions (In-Plant)	Radiation Protection a. Access Control b. Radiological control coverage for repair, corrective actions, search and rescue, first aid, and fire-fighting c. Personnel monitoring d. Dosimetry	Health Physics Technicians	2[3]	2	2
Fire-fighting	Fire-fighting	Fire Team Members	Per FSAR	Local Support	
Rescue Operations and First Aid			2[3]	Local Support	
Site Access Control and Personnel Accountability	Security, communications, personnel accountability	Security Personnel	Staffing levels for the on-shift, initial additions and supplemental additions are provided in the Security Plan.		
		Totals	16	11	15

1. The On-Shift staffing is cited as individuals per unit. Shift staffing may vary with one or more units in cold shutdown or refueling mode as provided in FSAR Table 13.1-202.
2. For each unaffected unit in operation, maintain at least one Control Room Supervisor, one Reactor Operator, and one Non-licensed Operator.
3. This coverage is initially provided by personnel assigned other functions and is assumed by the additional personnel when they arrive on-site.
4. The CECC Director may assume designated responsibilities consistent with Section II.B.4 of this plan.
5. May be performed by aide to the SED.

C. EMERGENCY RESPONSE SUPPORT AND RESOURCES

1. Federal Response Capability

a. Under some complex circumstances it may be necessary to obtain off-site radiological monitoring support from Federal government agencies. The CECC Director or Radiological Assessment Manager may request FRMAC assistance through the NRC (Federal Coordinating Agency).

b. Federal radiological monitoring assistance may be provided by DOE-Oak Ridge under the DOE Radiological Assistance Program. Support available from DOE-Oak Ridge includes medical support from the Radiation Emergency Assistance Center/Training Site (REAC/TS).

TVA estimates that a FRMAC Advance Party could be expected at the site within 3 to 4 hours following the order to deploy, based on driving time. This response time may be shortened by use of aircraft.

TVA expects NRC assistance from NRC's offices in Atlanta, GA, to arrive in the site vicinity within 7-8 hours following notification; the team may reduce this time by use of aircraft.

c. TVA provides facilities and resources needed to support the Federal response through the CECC. Available resources include office space, telephone communications, and protective clothing and equipment. TVA also provides limited office space and telephone communications facilities for NRC personnel in the TSC.

Appendix 8 of this plan provides a cross-reference to the provisions discussed above in State and local plans, as applicable.

2. Off-site Organization Representation in the CECC

a. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

b. Designated work areas have been provided in the CECC for the State of Alabama and local county Emergency Management Liaisons and Alabama Radiation Protection Liaisons.

3. Radiological Laboratories

The station has vehicles that can be set up for mobile monitoring and assessment purposes. Fixed facilities are available for gross counting and spectral analysis in the station counting laboratory. Other facilities within the TVA System could provide further analysis support within a short period of time (1-4 hours). The

above radiological laboratories are available on a 24 hour a day basis and could provide their services and equipment on demand.

TVA has aquatic monitoring teams located at Chattanooga, Tennessee and Athens, Alabama. These teams have boats that can be deployed to obtain samples from the Tennessee River for subsequent laboratory analysis. State agencies have the responsibility to coordinate and evaluate off-site assessment actions. Environmental monitoring activities are coordinated through the Radiological Monitoring Control Center (RMCC). TVA is co-located in the RMCC and coordination of TVA and State monitoring teams is conducted from that point. Environmental monitoring data is shared between the State and TVA.

Additional environmental monitoring assistance can be obtained by contacting the DOE offices at Oak Ridge, Tennessee. The EPA in Montgomery, Alabama, can also provide assistance. Environmental monitoring teams and mobile radioanalytical laboratories can be supplied. The State agencies usually request and coordinate these services.

Samples obtained by the sampling teams may be returned to TVA's Western Area Radiological Laboratory, which has the capability to perform further quantitative and qualitative analysis.

The listed laboratory facilities are available to support emergency response activities on a 24 hour per day basis.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Other Supporting Organizations

TVA obtains additional emergency response support, as needed, from:

- INPO Fixed Nuclear Facility Voluntary Assistance Agreement signatories
- Huntsville Hospital
- Hollywood Volunteer Fire Department
- Highlands Medical Center Emergency Medical Services
- Westinghouse
- The Radiation Emergency Assistance Center/Training Site (REAC/TS).

Certification letters, provided in Appendix 7 of this plan, outline the scope of the expected support.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

D. EMERGENCY CLASSIFICATION SYSTEM

TVA has developed and implemented a standard emergency classification scheme, based on system and effluent parameters, on which affected State and local response organizations may rely for determining initial off-site response measures. For BLN, the initiating conditions include the conditions provided in NEI 07-01, Rev. 0, "Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors" (Reference 6) as it applies to AP1000 facilities and postulated accidents identified in the FSAR.

The spectrum of emergencies peculiar to nuclear power stations range from accidents with minor implications on health and safety to the postulation of major occurrences resulting in the release of significant quantities of radioactive material. Examples of minor accidents include unplanned or uncontrolled releases of small amounts of radioactive material in excess of allowable limits as well as equipment malfunctions.

Major occurrences, though not expected to take place, have been postulated for planning and design purposes because their consequences could include the potential for release of significant amounts of radioactive material. The range of conditions in NEI 07-01 and the applicable FSAR have been considered in the classification system of this plan.

The classification system is not intended to include minor deviations during normal operation. Furthermore, it may be discovered that an event or condition, which met the classification criteria, had existed, but that the basis for the emergency class no longer exists at the time of discovery. For example, the event may have rapidly concluded or been discovered during a post-event review. As discussed in NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73" (Revision 1) (Reference 7), actual declaration of an emergency class is not necessary in these circumstances, although notification to the Nuclear Regulatory Commission and affected state and local agencies is warranted.

1. Classification System

Appendix E of 10 CFR Part 50 identifies four distinct classes of emergencies. The definitions of these emergency classes are more fully discussed in NEI 07-01, as follows:

- Notification of Unusual Event (NOUE) - Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

- Alert – Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are

expected to be limited to small fractions of the EPA Protective Action Guideline (PAG) exposure levels.

- Site Area Emergency - Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile actions that result in intentional damage or malicious act: 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.

- General Emergency – Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site for more than the immediate site area.

Appendix 1 of this plan provides recognition categories, the associated initiating condition matrices, and the emergency action levels.

2. Emergency Action Levels

This section incorporates by reference NEI 07-01, “Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors”, Rev.0, dated [to be provided], ADAMS No. [to be provided]. Appendix 1 provides the parameter values and equipment status that are indicative of each emergency class.

The SED, CECC Director, or Emergency Planning Manager designee provides a verbal summary to the affected off-site authorities, followed by a Licensee Event Report or written summary within 30 days.

3. State/Local Emergency Action Level Scheme

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. State/Local Emergency Action Procedures

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

E. NOTIFICATION METHODS AND PROCEDURES

An integral part of this Emergency Plan is to facilitate consistent and timely emergency classifications. Each employee on site is required to be familiar with the provisions of the Emergency Plan. Any employee, upon becoming aware of an emergency condition, shall immediately notify the Shift Manager on duty unless it is apparent notification has already taken place. This notification and the information available to the Shift Manager in the Control Room enable a timely classification of the emergency and subsequent actions.

Responsibility for off-site radiological emergency response rests primarily with the elected officials of local governments. As time is a major factor in realizing the benefits of protective action in the event of a radiological emergency, certain of these actions are predetermined and agreed upon by the local governing body and are implemented without delay upon notification of a radiological emergency. Procedures for authentication of an emergency are maintained in State and local Emergency Response Plans. When notification is received, the State and local response plans are implemented and the State agency providing direction and control initiates action to assess and evaluate the radiological situation in order to provide guidance and assistance to local governments. After the initial immediate actions, subsequent protective action recommendations are made based on the results of TVA's evaluation of the radiological situation and plant conditions. State and Federal agencies provide assistance as required.

In the event of an emergency, the Station communicates via the ODS with the State (and in the event of an initial General Emergency classification, with the affected counties) who have the capability of activating their Emergency Operations Centers. The Station relies upon these counties to provide assistance in the event of an evacuation from the site or for any services the counties are capable of providing to mitigate the results of the emergency.

TVA maintains procedures for notification of State and local response organizations and licensee emergency responders. These procedures include, or make reference to, the pre-planned content of messages to State and local organizations. Section II.E.6 of this plan discusses prompt notification to members of the public within the plume exposure pathway EPZ.

1. Notification of State and Local Authorities

TVA establishes systems and procedures needed to provide prompt notification of affected State, local, and Federal authorities following the declaration of any emergency condition, consistent with the emergency classification and action level scheme described in Appendix 1. The Site Emergency Director initiates notification of affected State authorities, through the ODS, within fifteen (15) minutes of the emergency declaration, including escalation or de-escalation of any emergency condition. The State authorities subsequently notify affected local authorities. In the event of an initial classification of a General Emergency, the ODS provides immediate notification to both State and local authorities.

Section II.F.1 of this plan provides a description of the primary and back-up notification systems. Message content and verification methods are established in implementing procedures and agreements between the affected organizations.

TVA maintains systems and procedures needed to provide prompt notification of the USNRC Operations Center following the declaration of any emergency condition. The USNRC is notified as soon as is practical following the notification of State and local authorities and within one (1) hour of the emergency declaration, including escalation or termination of any emergency declaration[6]. The primary notification system to be used is the Emergency Notification System. Back-up notification capability is maintained through the use of commercial telephone systems.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. Notification and Mobilization of Licensee Response Organizations

The Site Emergency Director directs the notification and mobilization of the site and corporate emergency response organization following the declaration of an Alert or higher level emergency. Although TVA does not expect that the augmented resources of the emergency response organization would normally be required for a Notification of Unusual Event, all or part of the emergency response organization may be mobilized at the Notification of Unusual Event level at the discretion of the Site Emergency Director.

The plant is provided with an Evacuation alarm and Remote Warning System as described in Section 9.5.2.2. of the AP1000 Design Control Document (DCD) (Reference 8). This system includes a siren tone generator, public address system speakers, and an outdoor siren and is activated from the Control Room.

The Emergency Response Organization is notified by the Emergency Preparedness Paging System in accordance with the EPIPs. Redundant notification is provided by the paging system and/or an automated telephone system which allows timely alerting of Emergency Response Organization personnel.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

3. Message Content

The content of the messages have been established in conjunction with the State and local governments and include the class of emergency, whether a release is

[6] In the event of a security-related attack on the site by a hostile force, a brief notification (site name, emergency classification, if determined, and nature of threat) is provided to the NRC following notification of the designated State and local authorities and within approximately fifteen minutes of the discovery of the event.

in progress, and any recommended protective measures. Additional information is provided as it becomes available.

4. Follow-up Messages to Off-site Authorities

Dedicated communicators are available to maintain a continuous channel of communications with designated authorities and to provide regular updates to state and local officials approximately every 60 minutes, when conditions change or as otherwise agreed.

Follow-up messages from the plant to affected State and local authorities include information as negotiated with the responsible authorities, to the extent the information is available and appropriate. The nature of the information provided is consistent with the requirements of the State plan. The information provided may include any or all of the following, based on the type of incident, needs of the affected agencies, and information requested:

a. Location and name and contact information for caller

b. Incident date and time

c. Emergency classification

d. Information regarding any actual or potential radioactive releases, including medium (i.e., airborne, waterborne, surface spill, estimated duration/impact time, release point and elevation, chemical and physical form)

e. Estimates of total and relative quantities and concentrations of noble gases, iodines, and particulates

f. Other available and pertinent information regarding the release

g. Meteorological conditions, including wind speed and direction, stability class, and precipitation

h. Actual or projected exposure rates and projected integrated dose at the site boundary

i. Projected exposure rates and integrated doses at the projected peak location and at two, five, and ten miles, including affected sectors

j. Significant in-plant radiological impacts

k. Emergency response actions underway

l. Recommended emergency actions, including protective action recommendations

m. Requests for any on-site support by off-site organizations (e.g., fire-fighting or medical transportation support)

n. Prognosis for changes in event classification or other conditions based on current assessments of plant conditions

5. Disseminating Information to the Affected Public

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

6. Instructions to the Public in the Plume Exposure EPZ

The primary method of alerting the public is by sounding the Prompt Notification System. The Prompt Notification System includes an outdoor warning system, measures for notifying special facilities and notification of the public by sirens located throughout the Plume Exposure EPZ. The system is designed to meet the acceptance criteria of Section B of Appendix 3, NUREG-0654, FEMA-REP-1, Rev. 1. As a back-up, State and local plans maintain the alert mechanism via emergency vehicles, etc. to alert the public to monitor commercial broadcasts for emergency information. Each county controls the activation of the sirens within its boundaries.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

7. Written Messages to the Public

Written pre-planned messages intended for transmittal to the public via radio and television stations are consistent with the classification scheme. They are released to the media by the State Coordinator of Emergency Management or Local Coordinator of Emergency Services or his designated representative. The messages give instructions with regard to specific actions to be taken by the occupants of the inhabited area. The messages, as appropriate, give instruction on the aspects of sheltering, thyroid blocking, evacuation, the nature of the emergency, and recommended protective actions. TVA supports development of these messages by providing supporting information.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

F. EMERGENCY COMMUNICATIONS

The station communications system is designed to provide redundant means to communicate with essential areas of the station during normal operation and under accident conditions. Communication systems vital to operation and safety are designed so that failure of one component would not impair the reliability of the total communications system. This is accomplished within the Station by using diverse systems. The EPIPs and the State and local county emergency response plans define the responsibilities of designated personnel for use of the communication systems.

TVA maintains systems and procedures that provide for prompt communications between its ERFs and between the site and off-site ERFs. Dedicated communicators are available to maintain a continuous channel of communications with the NRC and to provide regular updates to state and local officials approximately every 60 minutes, when conditions change or as otherwise agreed.

The communications systems includes those systems described in Subsection 9.5.2 of the AP1000 DCD and the following emergency communications systems:

Emergency Preparedness Telephone System

The EP telephone system includes communications equipment installed at the site and the CECC, a number of leased commercial circuits, and privately owned circuits connecting each nuclear site to the required locations.

Emergency Preparedness Paging System

The EP paging system is an automated paging system which is used to automatically page key personnel during nuclear emergencies. It is computer-activated via dedicated terminals located in the Control Room at each nuclear site and the ODS's office in Chattanooga, which are manned 24 hours a day. The EP paging system has provisions to periodically monitor its own performance to detect and report equipment failures.

Radio Communications System (On-site)

The in-plant repeater system enables transmission without interruption to various areas of the plant. A separate radio located in the plant Central Alarm Station is a direct link to the local law enforcement officials. Portable two-way radios are available for additional site communications.

The Emergency Preparedness radio system is a VHF mobile radio system which provides redundant radio coverage of the 10-mile emergency zone. It provides radiological monitoring vans with mobile communications to other van(s) and to Radiological Control personnel, the TSC, the Control Room, and the CECC.

Telephone Switching Equipment

The telephone switching equipment consists of one or more switching centers equipped with fully redundant common logic and redundant power sources. The majority of plant telecommunications services are served from this switching equipment. Principal system features include:

- Critical areas served by more than one switching center.
- Dial access to any TVA or off-site location for properly authorized personnel.
- Dial access to Federal, State, and local emergency response organizations through redundant, diverse pathways for properly authorized personnel.
- Radio paging access for summoning key employees wearing pagers.
- Consistent dialing plan with other TVA locations.
- Plant fire and medical alarm activation through dial access.
- Executive override privilege for authorized personnel requiring the ability to interrupt conversations in progress.
- Access to the plant or building loudspeaker paging system.

1. Description of Communication Links

TVA maintains reliable communications links both within the plant and between the plant and external emergency response organizations.

a. TVA maintains capabilities for 24 hour per day emergency notification to the State and county emergency response network. State/county warning points are manned 24 hours per day. Access to these agencies is provided through several redundant, diverse routes. This diversity provides off-site routing through more than one type of facility. These facilities include, but are not limited to, commercial facilities such as central office trunks, tie-lines and digital services, plus privately owned and maintained microwave and fiber-optic systems. The off-site telecommunications network is designed to facilitate traffic in a fail-safe manner to the emergency response organizations.

b. The communications links consist of the following:

- Central Emergency Control Center (CECC) to State Emergency Management Agencies.
- CECC to each nuclear site.

- State Emergency Management Agencies to County Emergency Management Agencies.

c. Separate telephone lines are dedicated for communications with the NRC and include the following:

- Emergency Notification System (ENS): Allows for initial notifications, as well as ongoing information about plant systems, status and parameters, to be provided to the NRC. ENS lines are located in the Control Room, TSC and CECC.

- Health Physics Network (HPN): Provides for communications regarding radiological and meteorological conditions, assessments, trends, and protective measures. HPN lines are located in the TSC and CECC.

- Reactor Safety Counterpart Link (RSCL): Allows for internal NRC discussions regarding plant and equipment conditions. RSCL lines are located in the TSC and CECC.

- Protective Measures Counterpart Link (PMCL): Allows for conduct of internal NRC discussions on radiological releases, meteorological conditions, and protective measures. PMCL lines are located in the TSC and CECC.

- Emergency Response Data System (ERDS) Channel: Allows transmittal of reactor parametric data from the site to the NRC. ERDS data is transmitted from the PCS computer, via modem, to the NRC Operations Center.

- Management Counterpart Link (MCL): This system has been established for internal discussions between the NRC Executive Team Director/members and the NRC Director of Site Operations or licensee management. MCL lines are located in the TSC and CECC.

- Local Area Network (LAN) Access: Provides access to the NRC local area network. Telephone jacks are provided in the TSC and CECC for NRC LAN access.

d. TVA provides capability for communications between Control Room or TSC and the CECC, county and state EOC's consistent with the system description provided in Section II.F.1.b of this plan

e. Notification, alerting and activation of emergency response personnel in the TSC, OSC, and CECC are described in Section II.E.2 of this plan.

f. Communications between Control Room/TSC/CECC to the NRC Operations Center is via the ENS or private telephone. Communications from the Control Room/TSC/CECC to the regional office is via the normal private capability. Communications between the TSC/CECC and off-site monitoring teams is via the radio system described in Section II.F.1.b.

g. TVA activates the Emergency Response Data System (ERDS) within one hour of the declaration of an Alert or higher emergency classification.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. Communication with Fixed and Mobile Medical Support Facilities

TVA maintains communications systems that allow for communications between the site and fixed and mobile medical support facilities. The communications systems include both commercial telephone communications with fixed facilities and radio communications to the ambulance.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

3. Communication System Reliability

A failure of one communication system does not affect the operation of other communications systems at the station. The communications systems within the Station have diverse power supplies. Because the on-site communication systems normally are in use, or periodically tested, equipment failure does not go unnoticed. The multiplicity of on-site communications networks reduces the potential impact of the loss of any single system. Equipment for these systems is located in different areas of the station to prevent an accident in one area of the Station from incapacitating all communication systems. Failure of normal power supplies do not deprive the station of off-site communication capability because backup power is provided. Dedicated telephone lines are checked according to specified schedules.

Communications between Station/CECC and State/local warning points are tested monthly. Communications with BLN field assessment teams are tested annually.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

G. PUBLIC EDUCATION AND INFORMATION

TVA maintains a coordinated program to educate affected members of the public regarding emergency notification methods and actions.

1. Public Information Program

TVA coordinates with affected State and local authorities to disseminate pertinent emergency response information to members of the public in the Plume Exposure Pathway EPZ on an annual basis. Information is provided via a number of methods. Distribution methods may include providing informational publications such as brochures or calendars through mailings to individual households in the Plume Exposure Pathway EPZ. Emergency public information may also be distributed in telephone directories and utility bills, through public information postings, and information distributed via local media outlets. The distributed information includes:

a. Educational information on radiation

b. Point of contact for additional information

c. Protective measures, such as information addressing evacuation routes, relocation centers, sheltering, respiratory protection, and radioprotective drugs

d. Information addressing special needs of the handicapped

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. Distribution and Maintenance of Public Information

Written information applicable to permanent residences is provided annually in a form that is likely to be maintained in the residence (e.g., calendars, brochures) so it is available during an emergency.

Information intended for transients (individuals on vacation in, camping in, or traveling through the Plume Exposure Pathway EPZ, may include public postings, publications provided to hotels, motels, and campgrounds, and information published in telephone directories. These sources of information provide transients sources for local emergency information, such as local radio and television stations.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

3. News Media Coordination

a. Public information during a drill or emergency is coordinated and disseminated through the Joint Information Center (JIC), which is located in the TVA Chattanooga Office Complex. The JIC is activated upon declaration of a Site Area Emergency or General Emergency, and may be activated upon declaration of an Alert. The CECC Director reviews and approves TVA press releases, reviews adequacy of information to news media/public; and acts as the primary point of contact for official TVA positions or recommendations.

b. The Public Information Manager coordinates the decision to activate the JIC with the CECC Director and other company and public officials. He provides required information regarding the emergency to the TVA Chief Spokesperson and the JIC Information Staff for subsequent dissemination to the public and news media. He coordinates news release drafts with the State and Federal agencies participating at the JIC and secure approval of the CECC Director prior to making a release to the media.

c. The Chief Spokesperson is the primary TVA contact for the news media.

d. To provide ready access to current information on plant status, a JIC is promptly established. The JIC can be activated as needed to support media activities.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Information Exchange

a. The Public Information Manager has access to required public information, primarily through communications with the CECC Director and his designees.

b. The Public Information Manager coordinates continuity and consistency of information with designated members of the State and local emergency response organizations on a periodic basis.

c. Rumor control is accomplished through ongoing contact between the designated spokespersons and by the activities of a licensee liaison in the JIC, who monitors communications, including public media outlets, identifies rumors, and makes appropriate contacts to obtain and disseminate accurate information through the representatives in the JIC. Elected officials and regulatory agencies are updated through public affairs and governmental affairs departments. Industry groups assist in disseminating information to other industry groups.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

5. News Media Training

News Media Training is accomplished through briefings for the news media conducted once each calendar year, which TVA coordinates with affected State authorities. These annual briefings acquaint members of the media organizations with the emergency plans, information regarding radiation hazards, and points of contact for release of public information during an emergency.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

H. EMERGENCY FACILITIES AND EQUIPMENT

The facilities required in the implementation of the Emergency Plan consist of the:

- Control Rooms
- Operations Support Centers
- Technical Support Center (TSC)
- Central Emergency Control Center

The Control Rooms, OSCs, and TSC were designed to meet the intent of the guidance in NUREG-0696) (Reference 9) and the clarification in NUREG-0737, Supplement 1 (Reference 10), as applicable.

1. On-Site Emergency Response Facilities

Control Rooms

The Control Room of the affected unit(s) shall be the initial location for command and control of the emergency response effort. Controls and instrumentation needed to diagnose plant conditions and to take immediate actions to place the affected unit(s) in a safe condition are available in the Control Room. Within the Control Room, the Site Emergency Director has access to the information needed to classify the emergency. Redundant communication systems are also available in the Control Room to make the required on-site and off-site notifications. The Control Room has the required shielding and ventilation system to remain habitable during the emergency. Access to the Control Room shall be limited to those individuals responsible for carrying out assigned emergency response tasks plus other technical advisors, as necessary.

TSC

The mission of the TSC is to provide an area and resources for use by personnel providing plant management and technical support to the plant operating staff during emergency evolutions. The TSC relieves the reactor operators of peripheral duties and communications not directly related to reactor system manipulations and prevents congestion in the Control Room. Communications needs are provided for the staff within the TSC, and between the TSC and the plant (including the control room and OSC), the CECC, TVA management, outside authorities (including the NRC), and the public.

A single TSC for both units is located in the basement of the Maintenance Support Building and is of sufficient size to support the assigned staff. The TSC location differs from that provided in the AP1000 DCD, but includes the functional and design requirements included for the TSC specified in the DCD. Display capability in the TSC includes a workstation that, at a minimum, is capable of displaying the

parameters that are required of a Safety Parameter Display System (SPDS). The SPDS function is described in Subsection 18.8.2 of the DCD. The TSC is environmentally controlled to provide room air temperature, humidity and cleanliness appropriate for personnel and equipment. The room is provided with radiological protection and monitoring equipment necessary to control radiation exposure to any person working in the TSC below 0.05 Sv (5 rem) total effective dose equivalent (TEDE) as defined in 10 CFR 50.2 for the duration of the accident. The level of protection is similar to the Control Room. However, in the event that off-site and on-site AC power is unavailable, the TSC would be evacuated and the TSC management function would be transferred to a location unaffected by the radiation release.

The TSC is provided with reliable voice and data communication with the Control Room and CECC and reliable voice communications with the OSC, NRC Operations Centers and state and local operations centers.

Appendix 10 of this plan provides additional information regarding the TSC.

Operations Support Centers

The OSC (one for each unit) provides a centralized area and the necessary supporting resources for the assembly of designated operations support personnel during emergency conditions. The OSC provides the resources for communicating with the Main Control Room and the TSC. This permits personnel reporting to the OSC to be assigned to duties in support of emergency operations.

Designated plant support personnel, as indicated in Section II.B of this plan, assemble in the designated OSC to provide support to both the Control Room and TSC. The primary function of the OSC staff is to dispatch assessment, corrective action, and rescue personnel to locations in the plant, as directed by the TSC and Control Room. TVA would provide for an OSC assembly area separate from the control room and the TSC. Personnel reporting to the OSC can be assigned duties in support of emergency operations.

The OSC is not designed to remain habitable under all projected emergency conditions; however, implementing procedures make provisions for relocating the OSC as needed, based on ongoing assessments of plant conditions and facility habitability. The Site Emergency Director directs relocation of the OSC, if required.

The OSCs are located in the space designated in the AP1000 DCD for the TSC in each unit's Annex Building.

2. Off-site Emergency Response Facilities

CECC

The purpose of the CECC and associated CECC staff is to provide the facilities and manpower for evaluating, coordinating, and directing the overall activities involved in coping with a radiological emergency.

During an emergency, the CECC Director and his staff review the response to the emergency by TVA and the appropriate State agencies to facilitate execution of an effective and cooperative effort. The CECC Director is responsible for providing TVA's recommended protective actions to the appropriate State officials.

The CECC staff coordinate with other TVA emergency centers to facilitate an effective TVA effort in response to an emergency situation. The CECC staff also provide an accurate description of the emergency situation for TVA management and public information. In addition, the CECC coordinates with off-site Federal agencies, such as NRC and DOE, to provide availability of additional outside resources to TVA.

The CECC is located in the TVA Chattanooga Office Complex (COC) in Chattanooga, Tennessee. It is designed to house the CECC Director and his staff during an emergency situation. Included in the CECC are areas for the Plant Systems Assessment, Radiological Assessment, Information Staff, and the TVA Operations Duty Specialist (ODS).

The CECC is designed to serve as the central point for information collection, assessment, and transfer during an emergency. The CECC is provided with direct communication links with State emergency response centers, other TVA emergency response organizations, the plant sites, the JIC, and off-site Federal and state organizations.

The CECC can be activated within about 60 minutes of the declaration of an Alert or higher level emergency.

Section II.F of this plan provides a description of the communications capabilities provided in the CECC.

Appendix 9 of this plan provides a description of the CECC.

3. State/County Emergency Operations Centers

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Activation and Staffing of Emergency Response Facilities

TVA staffs and activates the designated ERFs as follows:

- Notification of Unusual Event – ERF staffing not normally needed, but may be undertaken at the discretion of the Site Emergency Director.

- Alert, Site Area Emergency and General Emergency – Staffing of the TSC, OSC, and CECC required.

Following declaration of an emergency condition, the ERFs are staffed and activated in accordance with EPIPs. State and local emergency response personnel also staff their ERFs consistent with the provisions of their respective plans. Section II.A.1.b describes provisions for activating the emergency response organization under conditions that may be hazardous to emergency response personnel.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

5. On-site Monitoring Systems

TVA maintains and operates on-site monitoring systems needed to provide data that is essential for initiating emergency measures and performing accident assessment. This includes monitoring systems for geophysical phenomena, radiological conditions, plant processes, and fire hazards.

a. Subsection 3.7.4 of the AP1000 DCD and the corresponding subsection of the FSAR provide a description of the seismic monitoring system.

b. Sections 11.5 and 12.3 of the AP1000 DCD and the corresponding sections of the FSAR provide a description of the installed radiological monitoring systems. In addition to the installed systems, TVA maintains an adequate supply of portable radiation monitoring and sampling equipment, including dedicated emergency response equipment, consistent with Section II.H and Appendix 6 of this plan.

c. Section 11.5 of the AP1000 DCD and the corresponding section of the FSAR provide a description of the plant process monitoring systems.

d. Section 9.5.1 of the AP1000 DCD and the corresponding section of the FSAR provide a description of the plant fire monitoring system.

The bases for the Emergency Action Levels, as discussed in NEI 07-01, describe the bases for the selection of the designated instruments as indicators of emergency conditions.

6. Access to Data from Monitoring Systems

a. TVA acquires meteorological data from the National Weather Service (NWS) during periods when the primary system is unavailable. Back-up seismic data is available from the U.S. Geological Survey. Flooding data is available from NOAA hydrometeorological reports. Other data sources, such as commercial media outlets, may also be used.

b. The facility's Off-site Dose Calculation Manual (ODCM) describes the monitoring systems. The routine Environmental Radiological Monitoring equipment includes multiple radioiodine and particulate continuous monitors and thermoluminescent dosimeters or other dose integrating devices. The dosimeters are posted and collected in accordance with Table 1 of Revision 1 of the Branch Technical Position included with Generic Letter 79-65, "Environmental Monitoring for Direct Radiation" (Reference 11). The ODCM provides locations of posted dosimeters and air samplers.

c. In addition to the monitoring systems, equipment, and radiological laboratory facilities provided at the plant, TVA maintains arrangements to obtain back-up radiological monitoring and analysis support from off-site organizations. Section II.A of this plan provides a description of these arrangements and the capabilities of the affected organizations and facilities. Appendix 7 of this plan provides copies of certification letters from these support organizations.

   Section II.C.3 of this plan provides a description of the available laboratory facilities.

7. Off-site Radiological Monitoring Equipment

TVA provides off-site radiological monitoring equipment suitable for assessment of the off-site radiological consequences of facility incidents, for use by its off-site monitoring field teams. Appendix 6 of this plan provides a description of the types of radiological monitoring equipment provided for field team use.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

8. Meteorological Instrumentation and Procedures

The station's Meteorological Monitoring System provides the capability for predicting atmospheric effluent transport and diffusion. The system consists of a meteorological tower, the location of which was chosen so as to be representative of regional conditions. Details of the meteorological monitoring program are provided in Section 2.3 of the BLN FSAR.

A meteorological monitoring tower provides data for the meteorological monitoring program. Table 2.3.-317 of the BLN FSAR provides a description of the installed instrumentation.

Meteorological data can also be obtained from the National Weather Service.

9. Operations Support Center

See Section II.H.1 and Appendix 6 of this plan.

10. Emergency Equipment and Supplies

TVA performs inspection, inventory, and appropriate operational tests of dedicated emergency equipment and instruments at least once each calendar quarter. Implementing procedures establish requirements for performing inventories and operational tests. TVA maintains sufficient reserves of equipment and instruments to replace any items that are removed from the emergency kits for calibration or repair.

Emergency equipment is periodically tested to identify and correct deficiencies. The specific scope and responsibilities for performing these tests are provided in administrative procedures.

Appendix 6 of this plan provides a description of the emergency equipment and supplies typically provided for use by emergency response personnel.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

11. Emergency Kits

Appendix 6 of this plan provides a description of the emergency equipment and supplies to be provided.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

12. Receipt of Field Monitoring Data

Radiological Control personnel located in the CECC are designated as the central point for the receipt of off-site monitoring data results and sample media analysis results collected by TVA personnel. Resources exist within the organization to evaluate the information and make recommendations based upon the evaluations. Radiological Control personnel perform these evaluations and review the results with designated State personnel.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

I. ACCIDENT ASSESSMENT

1. Parameters Indicative of Emergency Conditions

Appendix 1 of this plan describes the plant system and effluent parameter values that are indicative of off-normal conditions. Appendix 1 of this plan includes the various indications that correspond to the emergency initiating conditions based on the methodology provided in NEI 07-01, Rev. 0. Plant procedures specify the types and capabilities of the instruments used to indicate emergency conditions.

2. Plant Monitoring Systems

Initial values and continuing assessment of plant conditions through the course of an emergency may rely on reactor coolant sample results, radiation and effluent monitors, in-plant iodine instrumentation, and containment radiation monitoring.

Subsection 9.3.3 of the AP1000 DCD and the corresponding subsection of the BLN FSAR describe provisions for obtaining samples under accident conditions.

Section 11.5 of the AP1000 DCD and the corresponding section of the BLN FSAR describe the BLN radiation monitoring systems.

3. Determination of Source Term and Radiological Conditions

a. Appendix 2 of this plan describes the means for relating various measured parameters, including containment radiation monitor reading, to the source term available for release within plant systems.

b. Appendix 2 of this plan describes the means for relating various measured parameters, including effluent monitor readings, to the magnitude of the release of radioactive materials.

4. Relationship Between Effluent Monitor Reading and Exposure and Contamination Levels

Dose assessment procedures include the relationship between effluent monitor readings and on-site and off-site exposures and contamination for various meteorological conditions. Appendix 2 provides a description of the emergency dose assessment program used at BLN. Information includes dose and dose rate determinations based on plant effluent monitors, and contamination estimates based on deposition assumptions and meteorological conditions.

5. Meteorological Information

Section II.H.8 and Appendix 2 of this plan provide a description of the meteorological monitoring systems that are used to provide initial values and continuing assessment of meteorological conditions under emergency conditions.

6. Determination of Release Rates and Projected Doses When Installed Instruments are Inoperable or Off-Scale

Plant implementing procedures establish processes for estimating release rates and projected doses if the associated instrumentation is inoperable or off-scale. These procedures include the following considerations:

- Estimated releases based on field monitoring data
- Surrogate instrumentation and methods to estimate extent of fuel damage

7. Field Monitoring Capability

TVA provides Emergency Response field teams composed of one or more radiation protection technicians qualified in accordance with Regulatory Guide 1.8 and the emergency preparedness training requirements established in Section II.O of this plan.

Appendix 6 of this plan provides a description of the instrumentation that is available for performance of field monitoring in the Plume Exposure Pathway EPZ. In addition to the required instrumentation, TVA provides suitable vehicles, protective equipment (including respiratory protection and radioprotective drugs), communications equipment, and supplies to facilitate performance of radiation, surface contamination, and airborne radioactivity monitoring. Implementing procedures provide guidance for field monitoring teams' performance of monitoring activities. Field monitoring teams act under the direction of Radiological Control personnel in the TSC prior to activation of the CECC and, following activation of the CECC, under the direction of Radiological Control personnel in that facility.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

8. Assessing Hazards Through Liquid or Gaseous Release Pathways

TVA trains, designates, equips, dispatches, and coordinates field teams consistent with Section II.I.7 of this plan. The field teams perform sampling of off-site media samples as needed to assess the actual or potential magnitude and locations of radiological hazards. TVA notifies and activates field team personnel consistent with Section II.E of this plan. Mobilization times are consistent with Section II.B of this plan.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

9. Measuring Radioiodine Concentrations

TVA equips field teams with portable air samplers, appropriate sample media, and analysis equipment capable of detecting radioiodine concentrations at or below 10^{-7} microcuries per milliliter under field conditions, taking into consideration potential interference from noble gas activity and background radiation. Appendix 6 of this plan provides information regarding emergency supplies, equipment, and instruments.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

10. Relating Measured Parameters to Dose Rates

Appendix 2 of this plan describes the means established to relate measured parameters, such as surface, airborne, or waterborne activity levels, to dose rates for those key isotopes listed in Table 3 of NUREG-0654, Rev. 1. Appendix 2 also describes the means established to estimate the projected dose based on projected and actual dose rates. Radiological Control personnel are responsible for directing implementation of these procedures under emergency conditions.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

11. Tracking of Plume Using Federal and State Resources

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

J. PROTECTIVE RESPONSE

1. On-Site Notification

TVA establishes and maintains methods to inform personnel within the site boundary of an emergency condition requiring individual action. TVA informs individuals located within the Protected Area primarily via use of the plant public announcement system and audible warning systems. In addition to employees and contractors with emergency response assignments, these individuals include:

a. Employees not having emergency assignments

b. Visitors

c. Contractor and construction personnel, and

d. Other persons who may be in the public access areas on or passing through the site or within the owner controlled area

In high noise areas or other areas where these systems may not be audible, other measures, such as visible warning signals or personal notifications, may be used.

TVA informs individuals located outside of the Protected Area via audible warnings provided by warning systems and the activities of the Security Force (e.g., vehicle-mounted public address systems) and if needed, local law enforcement personnel. TVA provides information regarding the meaning of the various warning systems, and the appropriate response actions, via plant training programs, visitor orientation, escort instructions, posted instructions, or within the content of audible messages.

TVA maintains the ability to notify individuals within the Protected Area within about 15 minutes of the declaration of any emergency requiring individual response actions, such as accountability or evacuation.

2. Evacuation Routes and Transportation

The Shift Manager/Site Emergency Director or designee uses station and local area maps, information available from meteorological tower instrument readouts and current radiological data for determining the evacuation route. Provisions for evacuation of on-site individuals include evacuation by private automobile. The designated relocation site has decontamination and contamination control capability and equipment in the event it is needed. High traffic density is not considered in estimating evacuation times due to the sparsely populated area selected for the site.

Affected individuals evacuate the site via personal vehicles. If any individual on site does not have access to a personal vehicle, the Security Force makes

arrangements for transportation with another evacuating individual. TVA directs evacuees to the designated assembly area.

TVA informs individuals of the evacuation routes and appropriate instructions via plant training programs, visitor orientation, escort instructions, posted instructions, or within the content of audible messages.

Should site evacuation via either designated evacuation route be determined to be inadvisable due to adverse conditions (e.g., weather-related, radiological, or traffic density conditions), TVA directs affected individuals to a safe on-site area (as determined by the Site Emergency Director or his designee) for accountability and, if necessary, contamination monitoring and decontamination.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable

3. Personnel Monitoring and Decontamination

The Site Emergency Director directs contamination monitoring of personnel, vehicles, and personal property arriving at the designated assembly area when there is a likelihood that individuals and their property may have become contaminated before or during the site evacuation.

4. Non-Essential Personnel Evacuation and Decontamination

In the event of a Site Area Emergency or General Emergency, TVA evacuates non-essential personnel (i.e., personnel who do not have an emergency response assignment) consistent with the provisions of Section II.J.2 of this plan.

5. Personnel Accountability

TVA provides the capability to account for individuals within the Protected Area and to identify any missing individuals within 30 minutes following initiation of assembly and accountability measures. TVA also provides a capability to account for individuals on-site continuously after making the initial accountability. TVA maintains these capabilities consistent with the requirements of the facility Security Plan.

6. Protective Measures

TVA provides equipment and supplies to provide adequate protection for individuals remaining or arriving on-site during an emergency. The equipment and supplies includes:

a. Respiratory Protection and Engineering Controls:

- Protective measures are utilized to minimize the ingestion and/or inhalation of radionuclides and to maintain internal exposure below the limits specified in 10 CFR Part 20, Appendix B.

- Engineering (ventilation) controls are utilized in the TSC and Control Room to control concentrations of radioactive material in air. Otherwise, when not practical to apply process or other engineering controls to limit intakes of radioactive material in air, one or more of the following protective measures is utilized:

    - Control of access.

    - Limitation of exposure times.

    - Use of individual respiratory protection equipment.

- Self-contained breathing apparatus (SCBA) are used in areas that are deficient in oxygen or when fighting fires. Respiratory protective equipment is issued by Radiation Protection or Safety and Health Services. SCBAs are available with other firefighting equipment for use by the station fire brigade.

b. Use of Protective Clothing:

Protective clothing is issued when contamination levels exceed 1000 dpm/ 100 cm^2 beta-gamma and 20 dpm/100 cm^2 alpha of smearable contamination. Protective clothing items are provided for emergency use consistent with Appendix 6 of this plan. Special firefighting protective clothing and equipment is available in designated station supply storage areas for use by fire brigade personnel.

c. Individual Thyroid Protection:

Protective measures are utilized to minimize the ingestion and/or inhalation of radioactive iodine. However, if an unplanned incident involves the accidental or potential ingestion or inhalation of radioactive iodine, Potassium Iodide (KI) tablets are available for distribution in accordance with facility procedures.

On-site supplies of protective clothing and respiratory protection equipment may be augmented by that provided by off-site responders, such as fire-fighters responding to the site.

In the event of a hostile attack against the site, conditions may dictate initiation of protective measures other than personnel assembly, accountability and evacuation. The SED makes decisions regarding appropriate protective

measures based on evaluation of site conditions, including input from the Security force. If, based on the judgment of the SED, personnel assembly, accountability, and evacuation may result in undue hazards to site personnel, the SED may direct other protective measures, including:

- Evacuation of personnel from areas and buildings perceived as high-value targets
- Site evacuation by opening, while continuing to defend, security gates
- Dispersal of key personnel
- On-site sheltering
- Staging of ERO personnel in alternate locations pending restoration of safe conditions
- Implementation of accountability measures following restoration of safe conditions

Appendix 6 provides a description of the emergency response supplies and equipment to be provided.

7. Protective Action Recommendations and Bases

The CECC Director or the Site Emergency Director (if the CECC is not yet activated) is responsible for recommending off-site protective actions to the State. The State and local governments are responsible for notification of the public and implementation of the appropriate protective measures. Protective action recommendations are required to be made to the State within 15 minutes of declaring a General Emergency and also within 15 minutes of any change to the recommendations. Specific protective action recommendations tied to plant and meteorological conditions are provided in an EPIP specifically designed to facilitate meeting this time requirement. This guidance is based on Supplement 3 (Criteria for Protective Action Recommendations for Severe Accidents) to NUREG-0654.

A Site Area Emergency is declared when off-site doses are projected to exceed 0.1 Rem TEDE or 0.5 Rem Thyroid CDE. A General Emergency is declared when off-site Protective Action Guides (PAGs) of 1.0 Rem TEDE and/or 5.0 Rem Thyroid CDE are projected to be exceeded due to a direct radiation or inhalation hazard, or when non-radiological conditions exceed General Emergency EALs.

Public Protective Action Recommendations (PARs) are based on plant conditions, estimated off-site doses, or some combination of both. The Emergency Action Levels correspond to the projected dose to the population at risk and are determined consistent with the methodology discussed in NEI 07-01.

The initial PAR for any event classified as a General Emergency is:

- If there is insufficient time to evacuate affected areas, then shelter the Plume Exposure Pathway EPZ

- If there is time to complete required evacuations, then evacuate a two mile radius and either five or ten miles downwind, depending on projected radiological conditions.

Sheltering may be appropriate when a release is controlled or terminated and its radiological consequences fall below evacuation thresholds. Sheltering may be appropriate when known conditions make evacuation dangerous, e.g., severe weather or overriding threat to public safety. Follow-up protective action recommendations that the station may make to the state are based on current meteorological data such as wind direction, wind speed and stability class, and dose projections. Also, recommendations are made for use of potassium iodide by the public consistent with approved strategies.

In addition to the plant condition-based PARs, TVA provides PARs based on off-site dose projections. The Radiological Control staff is responsible for conducting off-site dose projections periodically throughout any emergency during which there is an actual or potential release of an amount of radioactive material that is likely to result in off-site consequences. Implementing procedures establish requirements for performing required calculations and projections.

The Radiological Assessment Manager is responsible for making dose projections on a periodic basis. These calculations use existing plant procedures to calculate projected dose to the population-at-risk for either potential or actual release conditions. For conditions in which a release has not occurred, but fuel damage has taken place and radiation levels in the containment building atmosphere are significant, a scoping analysis is performed to determine what recommendations would be made if containment integrity were lost at that time. The analysis is based upon a design leak rate and upon a projected penetration failure indicated by a hole size of certain diameter. This analysis includes the use of actual containment pressure, realistic meteorology, and actual source term. A Total Effective Dose Equivalent (TEDE) and Committed Dose Equivalent (CDE) thyroid are calculated at various distances from the plant (site boundary, 2 miles, 5 miles, 10 miles and beyond, if needed). These dose projections are compared to the Protective Action Guides, which are derived from EPA 400-R-92-001, “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents” (Reference 12). Based on these comparisons, PARs are developed by the Radiological Assessment Manager. If these recommendations involve sheltering or evacuation of the public around the plant, the Radiological Assessment Manager informs the CECC Director of the situation and recommendations for protective actions.

If dose projections show that PAGs have been exceeded at 10 miles, the dose assessment code and in-field measurements, when available, are used to calculate doses at various distances downwind to determine how far from the site

PAG levels are exceeded. The Radiological Assessment Manager forwards the results to the CECC Director who communicates this information to the off-site authorities.

The projected doses are compared to the Protective Action Guides shown in Table II-3, as derived from EPA 400-R-92-001, and Protective Action Recommendations are developed based on the results of these comparisons.

Table II-3 - Protective Action Guides

Projected Dose		Protective Action Recommendation
Total Effective Dose Equivalent (TEDE)	**Committed Dose Equivalent Thyroid (CDE Thyroid)**	
< 1 rem	< 5 rem	No protective action required based on projected dose
≥ 1 rem	≥ 5 rem	Evacuate affected zones and shelter the remainder of the Plume Exposure Pathway EPZ

8. Evacuation Time Estimates

TVA has conducted an Evacuation Time Estimate (ETE) (Reference 13). The methodology used for conduct of the ETE is summarized in Appendix 4. The ETE is consistent with the guidance provided in Appendix 4 of NUREG-0654 and NUREG/CR-6863, “Development of Evacuation Time Estimate Studies for Nuclear Power Plants” (Reference 14). The ETE did not reveal the existence of any significant impediments to the development of emergency plans.

Evacuation zones, routes, and relocation centers have been established in the event that an evacuation is recommended. This information is published in brochures and distributed by the State. Population distribution and evacuation time estimates are maintained on file by Emergency Preparedness personnel.

Population distribution and a summary of evacuation time estimates are included in Appendix 4 of this plan.

9. State and Local Government Implementation of Protective Measures

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

10. Protective Measures Implementation

a. Appendix 4 provides a map of the Plume Exposure Pathway EPZ illustrating evacuation routes, evacuation areas, pre-selected radiological sampling and monitoring points, and locations of shelter areas and relocation centers.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

b. Appendix 4 provides a map of the Plume Exposure Pathway EPZ illustrating population distribution around the facility by evacuation area. Appendix 4 also provides a map of the Plume Exposure Pathway EPZ illustrating population distribution around the facility in a sector format.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

c. Warnings to the public within the Plume Exposure Pathway EPZ are the responsibility of State and local officials, assisted by the State Department of Police upon request. The primary method of warning the public is by the use of the Prompt Notification System (PNS).

Appendix 3 of this plan provides a description of the PNS.

The state and local governments have ultimate responsibility for warning the public. Should it be necessary, state and local authorities alert the public within the Plume Exposure Pathway EPZ using alternative methods described in the applicable plans.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

d. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

e. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

f. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

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i. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

j. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

k. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

l. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

m. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Specific protective action recommendations, based on NUREG-0654, Supplement 3 (Reference 15) and on plant and meteorological conditions, are included in an implementing procedure. Section II.J.8 and Appendix 4 of this plan provide discussions of the ETE that has been prepared for the Plume Exposure Pathway EPZ.

11. Protective Measures Specified by the State(s)

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

12. Registering and Monitoring Evacuees

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

K. RADIOLOGICAL EXPOSURE CONTROL

Emergency exposures may be authorized consistent with the provisions of this plan and EPA Emergency Worker and Life Saving Activity Protective Action Guides. Guidelines for emergency exposure limits, including life saving actions, are specified in Table II-4 of this plan.

1. On-Site Exposure Guidelines and Authorizations

TVA implements on-site exposure guidelines for emergency response personnel consistent with those published in EPA 400-R-92-001, Table 2-2, "Guidance on Dose Limits for Workers Performing Emergency Services." The applicable guidelines are provided in Table II-4 of this plan.

The Site Emergency Director, in consultation with senior Radiological Control personnel, is responsible for authorization of any on-site emergency exposures resulting in doses exceeding the numerical values of the occupational dose limits provided in 10 CFR Part 20. If exposures in excess of the numerical values of the occupational dose limits provided in 10 CFR Part 20 are required, these exposures are limited to individuals who are properly trained and knowledgeable of the tasks to be completed and the risks associated with the exposures. Selection criteria for volunteer emergency workers include consideration of those who are in good physical health, are familiar with the consequences of emergency exposure, and are not a "declared pregnant worker." It is preferable, though not mandatory, that volunteers be older than 45 years of age and not be a female capable of reproduction. Efforts are made to maintain personnel doses ALARA.

In the absence of the extenuating circumstances identified in Table II-4, BLN applies the routine radiation dose limits to each of the following activities:

a. Removal of injured persons

b. Undertaking corrective actions

c. Performing assessment actions

d. Providing first aid

e. Performing personnel decontamination

f. Providing ambulance service

g. Providing medical treatment services

If any of the extenuating circumstances identified in Table II-4 exist, then the associated exposure guidelines identified in Table II-4 may be applied, subject to the authorization processes discussed above.

Table II-4 - Emergency Worker Exposure Guidelines

Activity	Dose Guideline in rem		
	TEDE	Lens of the Eye	Other Organs
Any activity other than those specifically authorized below	5	15	50
Protecting Valuable Property	10	30	100
Lifesaving or Protection of Large Populations	25	75	250
Lifesaving or Protection of Large Populations[Note 1]	>25	>75	>250

Note 1: This guideline applies only to volunteers who are fully aware of the risks involved.

2. Radiation Protection Program

Chapter 12 of the FSAR describes a radiation protection program consistent with the requirements of 10 CFR Part 20. The radiation protection program, in concert with the EPIPs, includes provisions for implementing emergency exposure guidelines. Implementing procedures, developed consistent with Section II.K.1 of this plan, establish procedures for allowing on-site volunteers to receive radiation doses in the course of carrying out life-saving and other emergency response activities, including provisions for expeditious decision-making and consideration of the relative risks.

3. Dosimetry and Dose Assessment

BLN provides and distributes self-reading and cumulative type dosimeters to personnel involved in emergency on-site response regardless of their affiliation. Dose records are maintained and checked throughout the emergency.

a. TVA maintains a site personnel radiation dosimetry program that includes the capability to determine both external and internal doses consistent with the requirements of 10 CFR Part 20. The external dosimetry program includes provisions and requirements for use of both permanent record and self-reading dosimeters (e.g., pocket or electronic dosimeters). Procedures associated with this plan or the radiation protection program establish requirements for determining internal doses. Dose assessment capabilities are available on a 24-hour per day basis.

b. Station procedures also establish guidance for wearers to periodically read their self-reading dosimeters to monitor compliance with emergency exposure guidelines. TVA maintains individual dose records in accordance with the requirements of 10 CFR Part 20 and the radiation protection program and its supporting procedures.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. State and Local Responder Exposure Authorizations

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

5. Decontamination Action Levels

TVA implements requirements for personnel and area decontamination, including decontamination action levels and criteria for returning areas and items to normal use, in procedures supporting the radiation protection program.

a. TVA implements procedures for decontamination of on-site emergency personnel wounds, supplies, instruments and equipment, and for waste disposal. TVA provides decontamination supplies with emergency kits consistent with Appendix 6 of this plan.

b. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

6. Contamination Control Measures

a. The FSAR and Security Plan establish requirements for site access control. Following a site evacuation, law enforcement agencies control access to the owner-controlled area consistent with the requirements of the supporting State and local plans.

b. Should the potential exist for contamination of on-site food or drinking water supplies that renders these supplies non-consumable, the CECC staff make arrangements for transport of non-contaminated off-site supplies to the site.

c. TVA permits areas and items to be returned to normal (i.e., non-contaminated) use following conduct of appropriate surveys and verification that the contamination levels meet the criteria provided in the radiation protection program or its supporting procedures.

7. Decontamination of Relocated Site Personnel

TVA makes provisions for protective clothing, contamination monitoring, and decontamination, including decontamination of radioiodine contamination on the skin, at the designated relocation site. Appendix 6 of this plan provides a description of the emergency equipment and supplies to be provided.

L. MEDICAL AND PUBLIC HEALTH SUPPORT

1. Hospital and Medical Support

TVA has established an agreement with Huntsville Hospital in Huntsville, AL under which Huntsville Hospital provides medical services for injured personnel from BLN. Radiation monitoring equipment, dosimeters, and protective clothing are available at Huntsville Hospital.

Huntsville Hospital maintains the capability to evaluate the radiation exposure and/or uptake of accident victims and to handle contaminated victims. These capabilities are established and maintained through training courses supported by TVA consistent with Section II.O of this plan, periodic drills and exercises consistent with Section II.N of this plan, and material support provided consistent with agreements to be developed between TVA and the medical support providers.

TVA maintains an agreement with REAC/TS in Oak Ridge, TN for backup medical support, as needed.

Appendix 7 of this plan provides copies of the relevant certification letters.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. On-Site First Aid Capability

TVA maintains a trained Medical Emergency Response Team (MERT) at the site to provide 24 hour per day first aid support. First Aid stations are located throughout BLN providing the normal complement of first aid supplies and equipment necessary to treat those injuries not involving hospitalization or professional medical services. As a minimum, the MERT personnel are Multi-Media first aid trained. In addition, the following medical facilities and services are available:

- Hollywood (AL) Volunteer Fire Department
- Huntsville Hospital facilities

TVA provides for First Aid Team readiness through training consistent with Section II.O of this plan and drills and exercises consistent with Section II.N of this plan. Appendix 6 of this plan provides a description of first aid supplies and equipment to be maintained at the facility.

3. Emergency Medical Facilities Within the Affected States

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Medical Emergency Transportation

Initial off-site support for a medical emergency is provided by the Hollywood Volunteer Fire Department. Highlands Medical Center Emergency Medical Services provides an ambulance to transport contaminated injured personnel.

Contaminated injured personnel are suitably clothed or prepared to prevent the spread of contamination in the transporting vehicle, if practical considering the medical condition of the injured person. Communication can be maintained from the station to the site ambulance or to the ambulance through the dispatching station. Response team members receive training concerning transportation of contaminated injured individuals. A Radiological Control technician, with appropriate instrumentation, would normally accompany contaminated injured personnel to the hospital. The approximate time to transport a patient to Huntsville Hospital is 45 minutes. The estimated time for local rescue squads to arrive at the station is 30 minutes or less.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

M. RECOVERY AND RE-ENTRY

1. Recovery Plans and Procedures

TVA develops recovery plans and procedures that provide guidance for a range of recovery and re-entry activities, including:

- Recovery/re-entry organization.
- Responsibilities for recovery/re-entry decision-making, including decisions for relaxing protective measures based on existing and potential hazardous conditions.
- Means for informing members of the emergency response organization that recovery operations are to be initiated and related changes in the organizational structure.
- Methods for periodically updating estimates of total population exposure.

Re-entry into affected areas is conducted under the control of the Recovery Organization following performance of adequate characterization of hazardous conditions, establishment of appropriate engineering and administrative controls, and using personal protective equipment consistent with proper ALARA practices.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. Recovery Organization

Most emergencies will not require long-term recovery operations. Recovery operations will vary greatly depending upon the circumstances of the emergency situation. Criteria and procedures are developed as required considering maximum protection for plant personnel and the public.

The decision to terminate an event for which the onsite and offsite emergency response facilities have not been activated is made by the SED.

The decision to terminate and/or enter recovery from an incident for which onsite and offsite emergency response facilities have been activated is made by the SED after consultation with the plant technical and operations staffs and will be coordinated with the CECC Director. This decision is based upon a comprehensive review of plant status and system parameters. The State has the authority and responsibility for offsite recovery efforts. TVA provides assistance, as requested, through the recovery organization. Procedures and plans are then developed to implement the most expeditious recovery sequence to return the plant to normal operation.

Under some circumstances, particularly those involving significant damage to the facility or off-site consequences, there may be a need for ongoing assessment and recovery actions following the cessation of emergency response activities. Prior to entering the recovery/re-entry phase of operations following an emergency, TVA establishes a recovery organization consistent with the existing conditions and continuing organizational needs.

The Recovery Organization is established in accordance with TVA corporate requirements, including the TVA Radiological Emergency Plan (Generic Part). The basic organization may be modified, as required, to address the needs of the given situation. The Executive, Nuclear Operations assumes control and direction of the recovery operation.

Decisions to relax protective actions for the public are made by the appropriate State representatives. The CECC Director provides information to the appropriate State agencies to facilitate the decision. The following conditions are considered appropriate for the recommendation to relax protection measures:

- Station parameters of operation no longer indicate a potential or actual emergency exists.

- The release of radioactivity is controllable, no longer exceeds permissible levels and does not present a credible danger to the public.

- The Station is capable of sustaining itself in a long term shutdown condition.

Because it is not possible to foresee all of the consequences of an event, specific recovery procedures may need to be written to address specialized requirements. Where possible, existing station procedures are utilized in the areas of operations, maintenance and radiological controls. Any special recovery procedures require the same review and approval process accorded other station procedures and, as such, require the approval of the facility's safety review committee.

The recovery organization discharges its activities from the Local Recovery Center, which may be located in one or more designated ERFs or from other locations as specified by the responsible recovery organization managers. As recovery operations progress, the recovery organization may be augmented or reduced as needed to meet ongoing operational needs.

3. Changes in Organizational Structure

The recovery process is implemented when the facility's emergency response organization managers, with concurrence of State and Federal agencies, have determined the station to be in a stable and controlled condition. The decision to terminate and/or enter recovery from an incident for which on-site and off-site emergency response facilities have been activated is made by the SED after consultation with the plant technical and operations staffs and is coordinated with

the CECC Director. This decision is based upon a comprehensive review of plant status and system parameters.

Upon the determination, the CECC Director notifies the NRC Operations Center, the State EOC, and the local EOCs that the emergency has been terminated and any required recovery has commenced.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Updating Total Population Exposure During Recovery Operations

Total population doses are periodically estimated in the affected sectors and zones utilizing population distribution data from within the emergency planning zones. Dose Assessment Team personnel determine population doses in accordance with the process discussed in Appendix 2 of this plan. The methodology used is consistent with that presented in EPA-400-R-92-001. After termination of accidental releases to the atmosphere, integrated doses are calculated to assist in recovery/reentry operations. A combination of inputs including results from modeling field exposure rate and air concentration measurements, and laboratory analyses of soil, vegetation, and water samples are used to assess doses. Recommendations are made regarding evacuation sector clearance and reentry based on doses calculated for exposure from ground contamination, inhalation of re-suspended radioactivity, and ingestion of radioactivity in vegetables and milk.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

N. EXERCISES AND DRILLS

TVA implements a program of periodic drills and exercises to evaluate major portions of emergency response capabilities and to develop and maintain key emergency response skills. Identified deficiencies are corrected.

1. Exercises

a. Exercise Scope and Frequency

TVA conducts emergency exercises in accordance with NRC and FEMA rules (e.g., 10 CFR 50.47(b)(14) and 44 CFR 350.9). Unless otherwise specified by NRC, emergency exercises simulate an emergency that results in off-site radiological releases requiring response by off-site authorities.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

b. Exercise Scenarios and Participation

TVA conducts exercises on a biennial basis. The exercises:

- Verify the integrated capability of the various emergency response organizations to respond to an emergency.
- Test a major portion of the basic elements existing within the emergency response plans and organizations.
- Test the adequacy of timing and content of implementing procedures and methods.
- Test emergency equipment and communications networks.
- Test the public notification system.
- Evaluate the familiarity of emergency organization personnel with their duties.
- Disclose deficiencies which may require corrective action.

The exercise scenarios are varied in a manner that tests the major elements of the plans and preparedness organizations within a six year period. Exercises include:

- An emergency classification of at least Site Area Emergency.
- A mobilization of as many elements of the state, local, and station plans as is reasonably achievable without mandatory public participation.

- Invitation for involvement of Federal Emergency Response Agencies at least once every 5 years.

TVA conducts exercises involving participation by each off-site authority having a role under the plan at least biennially. For those off-site authorities, such as Alabama State agencies, that have a role under radiological response plans for more than one site, TVA offers those authorities an opportunity to participate either fully or partially in at least one exercise every two years.

TVA offers the affected state(s) an opportunity to participate in the ingestion pathway portion of exercises, regardless of the state's participation in other licensed facility's emergency exercises.

TVA plans and conducts remedial exercises if the emergency plan is not satisfactorily tested during the biennial exercise, such that NRC, in consultation with FEMA, cannot find reasonable assurance that adequate protective measures can be taken in the event of a radiological emergency. TVA coordinates with the affected State and local authorities to facilitate their participation in remedial exercises to demonstrate that appropriate corrective measures have been taken regarding the elements of the plan not properly tested in the previous exercises.

On an unannounced date at least once every 6 years, an exercise is initiated during off-hours (between 6 pm and 4 am on a weekday or during a weekend). Requirements for unannounced and off-hours exercises may be satisfied concurrently. TVA conducts unannounced exercises on a periodic basis, to the extent such exercises can be supported by affected external organizations. To the extent practicable, as limited by the exercise planning process, some exercises are conducted under adverse weather conditions.

The unannounced and/or off-hours demonstration may be conducted during or independent of the biennial exercise.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. Drills

TVA maintains adequate emergency response capabilities between biennial exercises by conducting drills, including at least one drill involving a combination of some of the principal functional areas of on-site emergency response capabilities. The principal functional areas of emergency response include activities such as management and coordination of emergency response, accident assessment, protective action decision making, and plant system repair and corrective actions.

Upon request, TVA allows affected State and local governments located within the plume exposure pathway EPZ to participate in the drills.

During these drills, activation of all of the ERFs may not be necessary. TVA may use the drills to consider accident management strategies, provide supervised instruction, allow the operating staff to resolve problems and focus on internal training objectives. TVA may include one or more drills as portions of an exercise. The primary objectives of drills are to:

- Verify that facilities, equipment, and communication systems function as required.
- Demonstrate the adequacy of station procedures used during an emergency.
- Familiarize station emergency response personnel with planned emergency response actions.
- Disclose deficiencies which may require corrective action.

Drills may be conducted independently, in conjunction with another drill or conducted as part of an exercise. The individual responsible for the drill implements measures to maintain necessary documentation.

TVA prepares a scenario to support the conduct of each drill. The scenario allows for open decision-making (free-play). If a drill is conducted in conjunction with another drill or as part of an exercise, the drill scenario, objectives and narrative are incorporated into the overall drill/exercise package. Drill packages include:

- Objectives of the drill.
- Evaluation criteria.
- Date and time period of the drill.
- Participating personnel or organizations.
- A narrative summary describing the overall integration of scenario events (e.g., simulated casualties, off-site assistance, rescue of personnel, simulated activity levels, and deployment of monitoring teams).
- A time schedule of the real and simulated events.

It is not required that all emergency response personnel assigned a particular emergency function participate in a drill covering that function. State and local governments are allowed to participate in drills at their request. Participation by off-site organizations may be simulated.

Drills shall be controlled and observed by individuals qualified to conduct and evaluate the drill. TVA uses critiques to document evaluation of the drill. Deficiencies identified as a result of the drill evaluation are presented to Station

Management, and corrective actions are coordinated through Emergency preparedness personnel.

Records of each drill, including the drill scenario package and the post-drill critique are maintained in accordance with records management retention requirements. Records of drills held in conjunction with an exercise may be integrated into the emergency exercise package (i.e. scope, objectives, critique, etc.).

The activities undertaken in the event of an actual declared emergency may be used to satisfy emergency drill requirements, provided that these activities demonstrate adequate execution of the specified activities.

The drill program includes the following:

a. Communications Drills

TVA tests communications with State and local governments within the Plume Exposure Pathway EPZ, as identified in Section II.A of this plan on a monthly basis.

TVA tests communications with Federal emergency response organizations and States within the Ingestion Pathway EPZ, as identified in Section II.A of this plan on a quarterly basis.

TVA tests communications between the facility, State and local EOCs, and field assessment teams on an annual basis.

Communications drills evaluate both the operability of the communications system(s) and the ability to understand message content.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

b. Fire Drills

TVA conducts fire drills as required by Subsection 9.5.1 of the FSAR.

c. Medical Emergency Drills

TVA conducts medical emergency drills that include a simulated contaminated injured individual and participation by the local support services agencies (e.g., medical transportation and off-site medical treatment facility) at least once each calendar year.

Medical Emergency drills include:

- A simulated contaminated injured individual

- Participation by a local rescue squad
- Transport to an off-site medical facility
- Participation by the off-site medical facility

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

d. Radiochemistry Drills

TVA conducts radiochemistry drills, involving both on-site and off-site radiological monitoring activities, at least once each calendar year. Radiochemistry drills include:

- Use of the appropriate procedures for collecting and analyzing samples and recording results.
- Collection and analysis of the sample media for which the facility is responsible.
- Communications with monitoring teams.
- Recordkeeping activities.

TVA may coordinate Radiochemistry drills with those drills conducted by State and local government entities or may conduct these drills independently.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

e. Radiological Control Drills

TVA conducts on-site Radiological Control drills. Radiological Control drills include:

(1) Response to and analysis of simulated elevated airborne and liquid activity levels and simulated elevated area radiation levels in the environment, conducted at least semi-annually, with a maximum allowable grace period of 25 percent.

(2) Analysis of in-plant liquid samples with actual or simulated elevated radiation levels (consistent with ALARA practices), conducted at least annually.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

f. Combined Functional Drills

TVA conducts Combined Functional drills at least once during the interval between biennial exercises. These drills involve a combination of some of the principal functional areas of on-site emergency response capabilities, such as:

- Management and coordination of emergency response.
- Accident assessment.
- Protective action decision making.
- Plant system repair and corrective actions.

g. Augmentation Drills

TVA performs an augmentation capability assessment at least once per calendar quarter. This activity assesses the elements involved in notification processes for augmenting the emergency response organization.

3. Conduct of Drills and Exercises

TVA develops drill and exercise scenarios and related materials that clearly establish the following:

a. Basic performance objectives of the exercise, evaluation criteria used to verify demonstration of performance objectives.

b. Date, initiation time, affected locations, and exercise duration, participating organizations.

c. Simulated events.

d. Time schedule of the real and simulated events.

e. A narrative summary describing the overall integration of scenario events such as simulated casualties, off-site assistance, rescue of personnel, use of protective equipment, simulated activity and radiation levels, and deployment of monitoring teams.

f. A description of the arrangements made for, and advance materials to be provided to, the facilitators. Advance knowledge of the scenario is minimized to facilitate realistic participation by those involved.

The emergency exercise is initiated and supervised by designated facilitators. The number, location, and basic duties of the facilitators are described in the exercise materials. These facilitators are responsible for:

- Provision of information to the participants to allow realistic analysis of the simulated events and to provide a basis for rational decision making.

- Provision of information on a real time basis.

- Execution of the exercise in a manner that allows free play and independent decision-making on the part of the participants.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Exercise and Drill Evaluation

One or more qualified instructors/evaluators supervise and evaluate drills and exercises. A qualified instructor/evaluator is an individual whose knowledge, skills, and abilities have been evaluated by the Emergency Preparedness Manager or designee and determined to be sufficient for observing and evaluating the planned activities against the established criteria. For example, a qualified instructor/evaluator may be an individual who has been trained to fill the emergency response position to be observed or may be a supervisor or instructor for the position.

TVA makes arrangements for exercises to be critiqued by Federal, State, and local observers/evaluators. Specific areas to be evaluated by the facilitators are defined in the form of pre-printed critique sheets.

TVA conducts a critique as soon as practicable following each exercise. Participants include selected TVA, NRC, State, local, and other participants and observers/evaluators. Facilitators shall complete critique sheets documenting their observations. Critique sheets shall be submitted in accordance with the schedule established for the exercise.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

5. Drill and Exercise Critiques

TVA records the input from the critique participants, evaluates the need for changes to the plan, procedures, equipment, facilities, and other components of the emergency preparedness and response program, and develops an action plan to address the identified substantive issues. Within 60 days of the exercise, a Post-Exercise Critique Report shall be issued, including suggested corrective actions. Identified corrective actions are then assigned for implementation.

TVA tracks identified corrective actions to completion using the facility's corrective action program. The exercise scenario package and Post-Exercise Critique are retained as station records.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

O. RADIOLOGICAL EMERGENCY RESPONSE TRAINING

1. General

The BLN training program provides for initial training and retraining for individuals who have been assigned emergency response duties.

a. Off-site Emergency Response Training

TVA conducts, or supports the conduct of, site-specific training for off-site personnel who may be called upon to provide assistance in the event of an emergency. This includes emergency responders employed by agencies identified in Section II.A of this plan.

TVA provides or supports training for affected hospital, ambulance/rescue, police, and fire-fighting personnel that includes their expected emergency response roles, notification procedures, and radiation protection precautions. For these and any other off-site emergency responders who may be required to enter the site under emergency conditions, TVA provides or supports training that addresses site access procedures and identifies (by position) the individual who controls their activities on site.

Training for off-site support personnel includes the following, to the extent appropriate to the assigned duties and responsibilities:

- The basic scope of the emergency plan.
- Emergency classifications.
- Notification methods.
- Basic radiation protection.
- Station access procedures.
- The individual, by title, in the station emergency response organization who directs their activities on-site.
- Definition of support roles.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

b. Mutual Aid Agreements

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. On-site Emergency Response Training

Plant training procedures establish requirements for emergency response training for TVA personnel who may be called upon to respond to an emergency.

3. First Aid Team Training

MERT members assigned to render treatment during a medical emergency receive training from the Safety and Emergency Response Training Academy, consistent with the projected hazards and events.

4. Emergency Response Training and Qualification

TVA conducts a program for instructing and qualifying personnel who implement this plan in accordance with plant training procedures. Plant training procedures establish the scope, nature, and frequency of the required training and qualification measures. The training program may include practical drills, consistent with Section II.N of this plan.

TVA implements a program to provide position-specific emergency response training for designated members of the emergency response organization. The content of the training program is appropriate for the duties and responsibilities of the assigned position. The affected positions include:

a. Emergency response directors and coordinators.

b. Accident assessment personnel.

c. Radiological monitoring and analysis personnel.

d. Police, Security and fire-fighting personnel (Note: Off-site police and fire-fighting personnel receive training consistent with Section II.O.1.a of this plan).

e. Damage control/repair/corrective action teams.

f. First aid/rescue personnel.

g. Local support services/emergency service personnel – Training consistent with Section II.O.1.a of this plan.

h. Medical support personnel - Training consistent with Section II.O.1.a of this plan.

i. Corporate office support personnel.

j. Emergency communicators.

TVA provides training for local support services personnel, including emergency service, police, and firefighting personnel, consistent with Section II.O.1.a of this plan.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

5. Retraining

TVA conducts, or supports the conduct of, annual retraining for those categories of emergency response personnel listed in Section II.O of this plan.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

P. RESPONSIBILITY FOR THE PLANNING EFFORT

TVA implements an organizational structure and processes for periodic review, update, audit, distribution, and control of this plan consistent with facility quality assurance and document control requirements. TVA also implements a program to provide to personnel responsible for the emergency planning effort training appropriate to their duties and responsibilities.

1. Training

TVA develops and implements a process to provide training to the Emergency Preparedness Manager and support staff so as to allow for effective implementation of the emergency planning effort, consistent with applicable regulatory requirements and guidance, license conditions, other commitments, and accepted good practices. Training may include formal education, professional seminars, plant-specific training, industry meetings, and other activities and forums that provide for an exchange of pertinent information.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

2. Responsibility for Radiological Emergency Response Planning

The Site Executive, Plant Management holds the overall authority and responsibility for ensuring that an adequate level of emergency preparedness is maintained. Responsibility for the planning effort is delegated to the Emergency Preparedness Manager and staff.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

3. Emergency Preparedness Manager

TVA establishes an Emergency Preparedness Manager position. The incumbent is responsible for developing and updating site emergency plans and coordination of these plans with other response organizations. The TVA corporate staff may augment these on-site efforts as needed to provide a comprehensive emergency preparedness effort.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

4. Plan Reviews and Updates

The site Emergency Plan shall be reviewed, updated as needed, and certified to be current on an annual basis. Any changes identified by drills and exercises are incorporated into the Emergency Plan.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

5. Distribution of Revised Plans

Upon completion of the annual review, the Emergency Preparedness Manager or his designee incorporates any necessary changes. Changed pages are marked and dated to highlight the changes. The Emergency Preparedness Manager forwards the updated plan to the plant's safety review committee for review and approval. If a proposed revision is judged to decrease the effectiveness of these documents with respect to the requirements of 10 CFR 50.47(b) or 10 CFR Part 50, Appendix E, the proposed changes are submitted to the NRC for approval in accordance with the requirements of 10 CFR 50.54(q) prior to implementation.

Following approval of the updated plan by the Site Executive, Plant Management, the facility's document control organization distributes the updated plan to organizations/individuals with responsibility for implementing the plans.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

6. Supporting Plans

The following list identifies supporting plans and their sources:

- State of Alabama Emergency Operations Plan
- State of Alabama Radiological Emergency Preparedness Plan
- Jackson County Radiological Emergency Plan for Bellefonte Nuclear Plant
- DeKalb County Radiological Emergency Plan for Bellefonte Nuclear Plant

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

7. Implementing Procedures

Appendix 5 of this plan provides a topical listing of EPIPs that support this plan.

The details associated with certain emergency plan features recommended by NUREG-0654 (e.g., Evaluation Criterion I.3, which addresses methods and techniques for determining source terms and the magnitude of releases) are procedural in nature. Consistent with NRC Regulatory Information Summary (RIS) 2005-02, "Clarifying the Process for Making Emergency Plan Changes" (Reference 16), these features are addressed in facility procedures, including EPIPs. These NUREG-0654 Emergency Plan features are identified throughout this plan as being addressed in procedures. Appendix 5 of this plan provides a

listing of those topics addressed in EPIPs. Changes to these procedures, or the affected portions of these procedures, are developed and approved consistent with the requirements of 10 CFR 50.54(q) and the guidance provided in RIS 2005-02.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

8. Table of Contents

The format for this Emergency Plan directly follows the format of NUREG-0654, Rev. 1. Appendix 8 of this plan provides a cross-reference between this plan, affected State and local plans, and to the evaluation criteria in Part II of NUREG-0654, Rev. 1.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

9. Emergency Plan Audits

TVA's independent assessment organization performs, or oversees the performance of, periodic independent audits of the emergency preparedness program consistent with the requirements of 10 CFR 50.54(t). The audits include, at a minimum, the following:

- The Emergency Plan
- EPIPs and practices
- The emergency preparedness training program
- Readiness testing (e.g., drills and exercises)
- ERFs, equipment, and supplies
- Interfaces with State and local government agencies
- Required records and documentation

TVA's independent assessment organization subjects audit findings to management controls consistent with the facility's corrective action program.

TVA establishes and maintains the frequency of the periodic audits based on an assessment of performance as compared to performance indicators; however, the audit frequency may not be less than once every 24 months. In addition, TVA conducts a program audit as soon as reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that potentially could

adversely affect emergency preparedness, but no longer than twelve months after the change.

TVA's independent assessment organization documents audit results and improvement recommendations and reports these results to BLN facility and TVA management. TVA makes those portions of the audits that address the adequacy of interfaces with State and local governments available to the affected governments.

TVA's Records Management organization shall file and maintain the following records for five years:

- The review results and recommended improvements
- The responses to the recommended improvements
- A description of the corrective actions taken

10. Emergency Telephone Numbers

The Emergency Preparedness Manager or his designee is responsible for performing a quarterly review of emergency telephone numbers and for ensuring required revisions are completed.

Appendix 8 of this plan provides a cross-reference to these provisions in State and local plans, as applicable.

III. REFERENCES AND APPENDICES

A. CITED REFERENCES

1. U.S. Nuclear Regulatory Commission, “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, October 1980.

2. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.101, “Emergency Planning and Preparedness for Nuclear Power Reactors,” Revision 3, August 1992.

3. U. S. Department of Energy, “Federal Radiological Monitoring and Assessment Center Operations Plan,” DOE/NV 11718-080, December 2005.

4. U.S. Nuclear Regulatory Commission, “NRC Incident Response Plan,” NUREG-0728, Rev. 4, April 2005.

5. U.S. Department of Homeland Security, “National Response Framework,” January 2008.

6. Nuclear Energy Institute, “Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors,” NEI 07-01, Rev. 0, September 2007.

7. U.S. Nuclear Regulatory Commission, “Event Reporting Guidelines: 10 CFR 50.72 and 50.73,” NUREG-1022, Rev. 2, October 2000.

8. Westinghouse Electric Company, LLC, “AP1000 Design Control Document,” APP-GW-GL-700, Revision 17, August 2008.

9. U.S. Nuclear Regulatory Commission, “Functional Criteria for Emergency Response Facilities,” NUREG-0696, February 1981.

10. U.S. Nuclear Regulatory Commission, “Clarification of TMI Action Plan Requirements,” NUREG-0737, Supplement 1, January 1983.

11. U.S. Nuclear Regulatory Commission, “Environmental Monitoring for Direct Radiation,” Generic Letter 79-65, November 1979.

12. U.S. Environmental Protection Agency, “Manual of Protective Action Guides for Nuclear Incidents,” EPA-400-R-92-001, October 1991.

13. KLD Associates, Inc., “Bellefonte Nuclear Plant Development of Evacuation Time Estimates,” August, 2007.

14. U.S. Nuclear Regulatory Commission, “Development of Evacuation Time Estimate Studies for Nuclear Power Plants,” NUREG/CR-6863, January 2005.

15. U.S. Nuclear Regulatory Commission, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants - Criteria for Protective Action Recommendations for Severe Accidents,” NUREG-0654/FEMA-REP-1, Supplement 3, July 1996.

16. U.S. Nuclear Regulatory Commission, “Clarifying the Process for Making Emergency Plan Changes,” RIS 2005-02, February 2005.

B. APPENDICES

Appendix 1 – Emergency Action Levels
Appendix 2 – Radiological Assessment and Monitoring
Appendix 3 – Public Alert and Notification System
Appendix 4 – Evacuation Time Estimate
Appendix 5 – Emergency Plan Implementing Procedures – Topical List
Appendix 6 – Emergency Equipment and Supplies
Appendix 7 – Certification Letters
Appendix 8 – Cross-References to Regulations, Guidance, and State and Local Plans
Appendix 9 – Justification for CECC
Appendix 10 – Technical Support Center Decription

Appendix 1 - Emergency Action Levels

Executive Summary

This appendix provides the set of Emergency Action Levels and Initiating Conditions based on industry guidance provided in NEI 07-01, “Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors,” Rev. 0 Draft September 2007.

Emergency Action Levels are presented by Recognition Category:

- A - Abnormal Rad Levels/Radiological Effluent
- C - Cold Shutdown./ Refueling System Malfunction
- F - Fission Product Barrier Degradation
- H - HAZARDS or OTHER Conditions Affecting Plant Safety
- S - System Malfunction

Each of these Recognition Categories is structured in the following way:

- Recognition Category - As described above.
- Emergency Class – Notice of Unusual Event (NOUE), Alert, Site Area Emergency or General Emergency.
- Initiating Condition - Symptom- or Event-Based, Generic Identification and Title.
- Operating Mode Applicability - Power Operation, Hot Standby, Safe/Stable Shutdown, Cold Shutdown, Refueling, Defueled, All, or Not Applicable.
- Emergency Action Level(s) corresponding to the IC.
- Basis information for plant-specific readings and factors that may relate to changing the generic IC or EAL to a different emergency class, such as for Loss of All ac Power.

For Recognition Category F, the information is presented in a matrix format. The presentation method was chosen to clearly show the synergism among the Emergency Action Levels and to support more accurate dynamic assessments. For Recognition Category F, the Emergency Action Levels are arranged by safety function or fission product barrier. Classifications are based on various combinations of safety function or fission product barrier challenges.

The primary threshold for Notification of Unusual Event is operation outside the safety envelope for the plant as defined by plant Technical Specifications, including Limiting Conditions for Operation (LCOs) and Action Statement Times. In addition, certain precursors of more serious events, such as earthquakes, are included in Notification of Unusual Event Emergency Action Levels. This provides a clear demarcation between the lowest emergency class and "non-emergency" notifications specified by 10 CFR 50.72.

The approved Design Certification does not include detailed design data for those items specific to a site location. In many cases this data is necessary to determine EAL thresholds. In these cases this appendix provides a [site-specific] placeholder.

The approved Design Certification does not include some detailed design information such as setpoints and some instrument numbers which are being developed by Westinghouse. In many cases this data is necessary to determine EAL thresholds. Appropriately, this appendix provides a [TBD] placeholder for future inclusion. This applies to certain site-specific values, as well. Development of the site-specific EAL scheme was based on this concept.

ACRONYMS

ac	Alternating Current
ADS	Automatic Depressurization System
AP1000	Advanced Passive 1000 Mw PWR (Westinghouse)
APRM	Average Power Range Monitor
CDE	Committed Dose Equivalent
CET	Core Exit Thermocouple
CFR	Code of Federal Regulations
Ci	Curie
CMT/CNMT	Containment
CSF	Critical Safety Function
CSFST	Critical Safety Function Status Tree
DAS	Diverse Actuation System
dc	Direct Current
DG	Diesel Generator
EAL	Emergency Action Level
EFS	Communication System
EOF	Emergency Operations Facility
EOP	Emergency Operating Procedure
EPA	Environmental Protection Agency
EPG	Emergency Procedure Guideline
EPIP	Emergency Plan Implementing Procedure
EPRI	Electric Power Research Institute
ERG	Emergency Response Guideline
ESBWR	Economic Simplified Boiling Water Reactor (General Electric)
FAA	Federal Aviation Administration
FAQ	Frequently Asked Question
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FSAR	Final Safety Analysis Report
GE	General Emergency
HCTL	Heat Capacity Temperature Limit
IC	Initiating Condition
IRWST	In Containment Refueling Water Storage Tank
Keff	Effective Neutron Multiplication Factor
LCO	Limiting Condition of Operation
LOCA	Loss of Coolant Accident
LWR	Light Water Reactor
MCR	Main Control Room
MSL	Main Steam Line
MSIV	Main Steam Isolation Valve

ACRONYMS

mR	milliRoentgen
Mw	Megawatt
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NOUE	Notification Of Unusual Event
OBE	Operating Basis Earthquake
ODCM	Off-site Dose Calculation Manual
PA	Protected Area
PAG	Protective Action Guideline
PCS	Primary Containment System
PIP	Plant Investment Protection
PLS	Plant Control System
PMS	Plant Monitoring and Control System
POAH	Point of Adding Heat
PRA/PSA	Probabilistic Risk Assessment / Probabilistic Safety Assessment
PWR	Pressurized Water Reactor
psig	Pounds per Square Inch Gauge
Q-DCIS	Safety Related Distributed Control and Information System
R	Rem
RCS	Reactor Coolant System
RMS	Radiation Monitoring System
RNS	Normal Residual Heat Removal System
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
RWCU/SDC	Reactor Water Cleanup/Shutdown Cooling System
SAG	Severe Accident Guideline
SCBA	Self Contained Breathing Apparatus
SBGTS	Stand-By Gas Treatment System
SG	Steam Generator
SPDS	Safety Parameter Display System
SRNM	Source Range Neutron Monitor
SRO	Senior Reactor Operator
SSE	Safe Shutdown Earthquake
TEDE	Total Effective Dose Equivalent
TBD	To Be Determined
TOAF/TAF	Top of Active Fuel
TSC	Technical Support Center
TVS	Closed Circuit Television System (AP1000)

1.0 Methodology For Development Of Emergency Action Levels

This appendix provides the set of Emergency Action Levels and Initiating Conditions based on industry guidance provided in NEI 07-01, “Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors,” Rev. 0 Draft September 2007.

The approved Design Certification does not include detailed design data for those items specific to a site location. In many cases this data is necessary to determine EAL thresholds. In these cases this document provides a [site-specific] placeholder.

The approved Design Certification does not include some detailed design information such as setpoints and some instrument numbers which are being developed by Westinghouse. In many cases this data is necessary to determine EAL thresholds. Appropriately, this document provides a [TBD] placeholder for future inclusion. This applies to certain site-specific values, as well. Development of the site-specific EAL scheme was based on this concept.

2.0 Changes

Reserved.

3.0 Development Of Basis For Generic Approach

The Emergency Action Levels (EALs) and Initiating Conditions (ICs) provided in this appendix address the emergency classification scheme discussed in Section II.D of the Emergency Plan. In addition to radiological events, non-radiological events are included in the classification scheme only to the extent that these events represent challenges to the continued safety of the reactor plant and its operators. There are existing reporting requirements (EPA, OSHA) under which utilities operate. There are also requirements for emergency preparedness involving hazardous chemical releases. While the proposed classification structure could be expanded to include these non-radiological hazards, these events are beyond the scope of this appendix.

This classification scheme is based on the four classification levels described in Section II.D of the Emergency Plan.

3.1 Emergency Action Levels

ICs/EALs are for unplanned events. A planned evolution involves preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition. Planned evolutions to test, manipulate, repair, or perform maintenance or modifications to systems and equipment that result in an EAL Threshold Value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

Classifications are based on evaluation of each unit. All classifications are to be based upon VALID indications, reports or conditions. Indications, reports or conditions are considered VALID when they are verified by: (1) an instrument channel check; or (2) indications on related or redundant indications; or (3) direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

With the emergency classes defined, the thresholds that must be met for each EAL to be placed under the emergency class can be determined. There are two basic approaches to determining these EALs. EALs and emergency class boundaries coincide for those continuously measurable, instrumented ICs, such as radioactivity, core temperature, coolant levels, etc. For these ICs, the EAL will be the threshold reading that most closely corresponds to the emergency class description using the best available information.

The Site Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is IMMINENT. Under certain plant conditions, an alternate instrument or a temporary instrument may be installed to facilitate monitoring the parameter. In addition, visual observation may be sufficient to detect that a parameter is approaching or has reached a classifiable threshold. In these cases, the classification of the event is appropriate even if the instrument normally used to monitor the parameter is inoperable or has otherwise failed to detect the threshold. If, in the

judgment of the Site Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

For discrete (discontinuous) events, the approach will have to be somewhat different. Typically, in this category are internal and external hazards such as FIRE or earthquake. The purpose for including hazards in EALs is to assure that station personnel and off-site emergency response organizations are prepared to deal with consequential damage these hazards may cause. If, indeed, hazards have caused damage to safety functions or fission product barriers, this should be confirmed by symptoms or by observation of such failures. Therefore, it may be appropriate to enter an Alert status for events approaching or exceeding design basis limits such as Operating Basis Earthquake, design basis wind loads, FIRE within VITAL AREAs, etc. This would give the operating staff additional support and improved ability to determine the extent of plant damage. If damage to barriers or challenges to Critical Safety Functions (CSFs) have occurred or are identified, then the additional support can be used to escalate or terminate the Emergency Class based on what has been found. Security events must reflect potential for increasing security threat levels.

The Emergency Operating Procedures (EOPs) contain detailed instructions regarding the monitoring of these functions and provides a scheme for classifying the significance of the challenge to the functions. In providing EALs based on these schemes, the emergency classification can flow from the EOP assessment rather than being based on a separate EAL assessment. This is desirable as it reduces both ambiguity and the time necessary to classify the event.

3.2 Treatment of Multiple Events and Emergency Class Upgrading

When multiple simultaneous events occur, the emergency classification level is based on the highest EAL reached. For example, two Alerts remain in the Alert category. Or, an Alert and a Site Area Emergency is a Site Area Emergency.

Although the majority of the EALs provide very specific thresholds, the Site Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is IMMINENT. If, in the judgment of the Site Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classes (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classes.

3.3 Classifying Transient Events

There may be cases in which a plant condition that exceeded an EAL threshold was not recognized at the time of occurrence, but is identified well after the condition has occurred (e.g., as a result of routine log or record review) and the condition no longer exists. In these cases, an emergency should not be declared.

Reporting requirements of 10 CFR 50.72 are applicable and the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, should be applied.

Existing guidance for classifying transient events addresses the period of time of event recognition and classification (15 minutes). However, in cases when an EAL declaration criterion may be met momentarily during the normal expected response of the plant, declaration requirements should not be considered to be met when the conditions are a part of the designed plant response or result in appropriate operator actions.

3.4 Operating Mode Applicability

The plant operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Safe/Stable Shutdown (or a higher mode) is entered during any subsequent heatup. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Safe/Stable Shutdown or higher.

Power Operations (1):	Reactor Power greater than 5%, Keff greater than or equal to 0.99
Startup (2):	Reactor Power less than or equal to 5%, Keff greater than or equal to 0.99
Hot Standby (3):	RCS greater than 420 °F, Keff less than 0.99
Safe Shutdown (4):	RCS less than or equal to 420°F, but greater than 200°F , Keff less than 0.99
Cold Shutdown (5):	RCS less than or equal to 200 °F, Keff less than 0.99
Refueling (6):	One or more vessel head closure bolts less than fully tensioned
Defueled (None)	All reactor fuel removed from reactor pressure vessel.

4.0 Human Factors Considerations

Human factors considerations were included in the development of NEI 07-01.

5.0 EMERGENCY ACTION LEVELS

This section of the appendix specifies each IC and EAL including basis information

5.1 Generic Arrangement

The information is presented by Recognition Categories:

- A - Abnormal Rad Levels / Radiological Effluent
- C - Cold Shutdown./ Refueling System Malfunction
- F - Fission Product Barrier Degradation
- H - HAZARDS or OTHER Conditions Affecting Plant Safety
- S - System Malfunction

The Initiating Conditions for each of the above Recognition Categories are in the order of NOUE, Alert, Site Area Emergency, and General Emergency. For all Recognition Categories, an Initiating Condition matrix versus Emergency Class is first shown. For Recognition Category F, the barrier-based EALs are presented in Table A1-F-2.

With the exception of Recognition Category F, each of the EAL guides in Recognition Categories is structured in the following way:

- Recognition Category - As described above.
- Emergency Class - NOUE, Alert, Site Area Emergency or General Emergency.
- Initiating Condition – Symptom- or Event-Based, Generic Identification and Title.
- Operating Mode Applicability - These modes are defined in the Technical Specifications
- Emergency Action Level(s) – These EALs are conditions and indications that were considered to meet the criteria of the IC..
- Basis – Provides information that explains the IC and EALs. The bases are written to assist the personnel developing operator aids and procedures.

For Recognition Category F, basis information is presented in a format consistent with Tables A1-F-1 and A1-F-2. The presentation method shown for Fission Product Barrier Function Matrix was chosen to clearly show the synergism among the EALs and to support more accurate dynamic assessments.

5.2 Generic Bases

The primary threshold for NOUEs is operation outside the safety envelope for the plant as defined by plant Technical Specifications, including LCOs and Action Statement Times. In addition, certain precursors of more serious events are included in NOUE IC/EALs. This provides a clear demarcation between the lowest emergency class and "non-emergency" notifications specified by 10 CFR 50.72.

For a number of Alerts, IC/EALs are chosen based on hazards which may cause damage to plant safety functions (i.e., tornadoes, hurricanes, FIRE in plant VITAL AREAs) or require additional help directly (Control Room evacuation) and thus increased monitoring of the plant is warranted. The symptom-based and barrier-based IC/EALs are sufficiently anticipatory to address the results of multiple failures, regardless of whether there is or is not a common cause. Declaration of the Alert will already result in the staffing of the TSC for assistance and additional monitoring. Thus, direct escalation to the Site Area Emergency is unnecessary. Other Alerts that have been specified correspond to conditions which are consistent with the emergency class description.

The basis for declaring a Site Area Emergency and General Emergency is primarily the extent and severity of fission product barrier challenges, based on plant conditions as presently known or as can be reasonably projected.

With regard to the Hazards Recognition Category, the existence of a hazard that represents a potential degradation in the level of safety of the plant is the basis of NOUE classification. If the hazard results in VISIBLE DAMAGE to plant structures or equipment associated with safety systems or if system performance is affected, the event may be escalated to an Alert. The reference to “duration” or to “damage” to safety systems is intended only to size the event. Consequential damage from such hazards, if observed, would be the basis for escalation to Site Area Emergency or General Emergency, by entry to System Malfunction or Fission Product Barrier IC/EALs.

5.3 Site-Specific Implementation

Reserved

5.4 Definitions

In the IC/EALs, selected words have been set in all capital letters. These words are defined terms having specific meanings as they relate to this procedure. Definitions of these terms are provided below:

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONTAINMENT CLOSURE: The site-specific procedurally-defined action taken to secure primary containment.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized equipment, that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

FAULTED: In a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Sources of smoke, such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

FORECAST: Prediction of weather conditions based on correlated meteorological observations provided by the National Weather Service or applicant meteorologist.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (i.e., violent acts between individuals in the OWNER CONTROLLED AREA).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where “IMMINENT” timeframes are specified, they shall apply.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

POINT OF ADDING HEAT: A reactor power level at which sufficient energy is being added to the reactor coolant from the reactor to result in a bulk coolant temperature increase. [This value may vary slightly based on plant core loading and time of life.

PROJECTILE: An object directed toward a nuclear power plant that could have an effect sufficient to cause concern for its continued operability, reliability, or safety of personnel.

PROTECTED AREA: An area encompassed by physical barriers and to which access is controlled. For the purposes of this plan, the Protected Area refers to the designated security area around the reactor and turbine buildings.

RUPTURED: n a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and automatic depressurization.

SECURITY CONDITION: Any security event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback greater than 25% thermal reactor power; (2) electrical load rejection greater than 25% full electrical load; (3) Reactor Trip; (4) Safety Injection Actuation; or (5) thermal power oscillations greater than10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on TVA. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is verified by: (1) an instrument channel check; or (2) indications on related or redundant indicators; or (3) direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

5.5 Abnormal Rad Levels/Radiological Effluent EALs

Table A1-A-1: Recognition Category "A" Initiating Condition Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
AG1 Off-site Dose Resulting from an Actual or IMMINENT Release of Gaseous Radioactivity Greater Than 1000 mrem TEDE or 5000 mrem Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology. *Op. Modes: All*	**AS1** Off-site Dose Resulting from an Actual or IMMINENT Release of Gaseous Radioactivity Greater Than 100 mrem TEDE or 500 mrem Thyroid CDE for the Actual or Projected Duration of the Release. *Op. Modes: All*	**AA1** Any Release of Gaseous or Liquid Radioactivity to the Environment Greater Than 200 Times the Off-site Dose Calculation Manual for 15 Minutes or Longer. *Op. Modes: All*	**AU1** Any Release of Gaseous or Liquid Radio-activity to the Environment Greater Than Two Times the Off-site Dose Calculation Manual for 60 Minutes or Longer. *Op. Modes: All*
		AA3 Rise in Radiation Levels Within the Facility that Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown *Op. Modes: All*	**AU2** UNPLANNED Rise in Plant Radiation Levels. *Op. Modes: All*
		AA2 Damage to Irradiated Fuel or Loss of Water Level that Has Resulted or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel. *Op. Modes: All*	

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AU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Any Release of Gaseous or Liquid Radioactivity to the Environment Greater Than 2 Times the Off-site Dose Calculation Manual for 60 Minutes or Longer.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2 or 3)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the following radiation monitors greater than 2 times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.

Plant Vent	VFS-RICA-103	[TBD]
Turbine Island Vent	TDS-JE-RE001	[TBD]
Gaseous Radwaste Discharge	WGS-RICA-017	[TBD]
Liquid Radwaste discharge	WLS-RIA-229	[TBD]
Wastewater Discharge	WWS-JE-RE021	[TBD]

2. VALID reading on any of the following radiation monitors greater than the reading shown for 60 minutes or longer:

Steam Generator Blowdown	BDS-RE-010	[TBD]
	BDS-RE-011	[TBD]
Main Steam Line	SGS-RIA-026, RIA-027	[TBD]
Service Water Blowdown	SWS-RIA-008	[TBD]
Containment Air Filtration Exhaust	VFS-MA-02A, MA-02B	[TBD]

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates greater than 2 times [site-specific ODCM] for 60 minutes or longer.

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Basis:

This IC addresses a potential or actual decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in ICs AU1 and AA1 only to distinguish between non-emergency conditions and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, NOT the magnitude of the associated dose or dose rate.

This EAL includes any release for which a radioactivity discharge permit was not prepared or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit. The Site Emergency Director should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, the Site Emergency Director should, in the absence of data to the contrary, assume that the release has exceeded 60 minutes.

Threshold #1 addresses radioactivity releases that, for whatever reason, cause effluent radiation monitor readings to exceed two times the Technical Specification limit and releases are not terminated within 60 minutes.

Threshold #2 addresses effluent or accident radiation monitors on non-routine release pathways (i.e., for which a discharge permit would not normally be prepared).

Threshold #3 addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

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AU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Rise in Plant Radiation Levels.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2)

1. a. UNPLANNED water level drop in a refueling pathway as indicated by:

   Spent Fuel Pool Low-Low Alarm 22.75 ft. on SFS-LICA-19A/B/C
   AND
   Visual observation that fuel is not uncovered

   AND

   b. VALID rise in area radiation reading indicated by:

Fuel Handling Area Exhaust Radiation Monitor	VAS-RE 001
Containment High Range	PXS-RICA-160, 161, 162, 163
Refueling Bridge Portable Monitor	[site-specific TBD]

2. VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels.

   *Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

Basis:

This IC addresses elevated radiation levels as a result of water level lowering but above the RPV flange or events that have resulted, or may result, in unexpected rise in radiation dose rates within plant buildings. These radiation levels represent a loss of control over radioactive material and may represent a potential degradation in the level of safety of the plant.

Classification as a NOUE is warranted as a precursor to a more serious event. The refueling pathway is a site-specific combination of cavities, tubes, canals and pools.

While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered. For refueling events where the water level drops below the RPV flange, classification would be via CU2. This event escalates to an Alert per IC AA2 if irradiated fuel outside the reactor vessel is uncovered. For events involving

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irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Matrix for events in operating modes 1-4.

Threshold #2 addresses elevated in-plant radiation levels encountered during operation of plant processes that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. This EAL excludes in-plant radiation levels that may result from use of radiographic sources. A specific list of ARMs is not required as it would restrict the applicability of the Threshold. The intent is to identify loss of control of radioactive material in any monitored area. This event escalates to an Alert per IC AA3 if the increase in dose rates impedes personnel access necessary for safe operation.

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AA1

Initiating Condition -- ALERT

Any Release of Gaseous or Liquid Radioactivity to the Environment Greater Than 200 Times the Off-site Dose Calculation Manual for 15 Minutes or Longer.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2 or 3)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any effluent monitor that exceeds 200 times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer.

Plant Vent	VFS-RICA-103	[TBD]
Turbine Island Vent	TDS-JE-RE001	[TBD]
Gaseous Radwaste Discharge	WGS-RICA-017	[TBD]
Liquid Radwaste discharge	WLS-RIA-229	[TBD]
Wastewater Discharge	WWS-JE-RE021	[TBD]

2. VALID reading on any of the following radiation monitors greater than the reading shown for 15 minutes or longer:

Steam Generator Blowdown	BDS-RE-011	[TBD]
	BDS-RE-010	[TBD]
Main Steam Line	SGS-RIA-026, RIA-027	[TBD]
Service Water Blowdown	SWS-RIA-008	[TBD]
Containment Air Filtration Exhaust	VFS-MA-02A, MA-02B	[TBD]

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, greater than 200 times [site-specific ODCM value] for 15 minutes or longer.

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Basis:

The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This IC addresses a potential or actual decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in the features and/or controls established to prevent unintentional releases, or control and monitor intentional releases.

The ODCM multiples are specified in ICs AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, NOT the magnitude of the associated dose or dose rate.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

The Site Emergency Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, the Site Emergency Director should, in the absence of data to the contrary, assume that the release has exceeded 15 minutes.

Threshold #1 addresses radioactivity releases that for whatever reason cause effluent radiation monitor readings that exceed two hundred times the alarm setpoint established by the radioactivity discharge permit. This alarm setpoint may be associated with a planned batch release, or a continuous release path.

Threshold #2 addresses effluent or accident radiation monitors on non-routine release pathways (i.e., for which a discharge permit would not normally be prepared).

Threshold #3 addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

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AA2

Initiating Condition -- ALERT

Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2)

1. A VALID alarm or elevated reading on any of the following due to damage to irradiated fuel or loss of water level

Fuel Handling Area Exhaust Radiation Monitor	VAS-RE-001
Containment High Range	PXS-RICA-160, 161, 162, 163
Refueling Bridge Portable Monitor	[site-specific TBD]

2. A water level drop in the reactor refueling pathway resulting in irradiated fuel becoming uncovered as indicated by:

Spent Fuel Pool Low-Low Alarm 22.75 ft. SFS-LICA-19A/B/C

AND

Visual observation that fuel is uncovered

Basis:

This IC addresses specific events that have resulted, or may result, in unexpected rise in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent degradation in the level of safety of the plant.

Threshold #1 addresses radiation monitor indications of fuel uncovery and/or fuel damage. Elevated readings on ventilation monitors may be indication of a radioactivity release from the fuel, confirming that damage has occurred. Raised background at the monitor due to water level lowering may mask raised ventilation exhaust airborne activity and needs to be considered. Application of this threshold requires understanding of the actual radiological conditions present in the vicinity of the monitor.

In Threshold #2, site-specific indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. The refueling pathway is a site specific combination of cavities, tubes, canals and pools.

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Escalation, if appropriate, would occur via IC AS1 or AG1 or Site Emergency Director judgment.

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AA3

Initiating Condition -- ALERT

Rise in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown

Operating Mode Applicability: All

Emergency Action Levels:

1. Dose rate greater than 15 mR/hr in the following areas requiring continuous occupancy to maintain plant safety functions:

Main Control Room Area Monitor	RMS-JE-RE010
Technical Support Center Area Monitor	RMS-JE-RE016
Central Alarm Station	RMS-JE-RE009

Basis:

The cause and/or magnitude of the increase in radiation levels is not a concern of this IC. The Site Emergency Director must consider the source or cause of the increased radiation levels and determine if any other IC may be involved.

Areas requiring continuous occupancy include the Control Room and TSC.

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AS1

Initiating Condition -- SITE AREA EMERGENCY

Off-site Dose Resulting from an Actual or IMMINENT Release of Gaseous Radioactivity Greater Than100 mrem TEDE or 500 mrem Thyroid CDE for the Actual or Projected Duration of the Release.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2 or 3)

Note: *If dose assessment results are available at the time of declaration, the classification should be based on dose assessment instead of radiation monitor values. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.*

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time.*

1. VALID reading on any of the following radiation monitors greater than the reading shown for 15 minutes or longer:

Plant Vent (Mid Range Gas)	VFS-RIA-104A	[Setpoint TBD]
Plant Vent (High Range Gas)	VFS-RIA-104B	[Setpoint TBD]
Gaseous Radwaste discharge	WGS-RICA-017	[Setpoint TBD]

2. Dose assessment using actual meteorology indicates doses greater than 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the site boundary.

3. Field survey results indicate closed window dose rates greater than100 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 500 mrem for one hour of inhalation, at or beyond the site boundary.

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed a small fraction of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public

The Site Emergency Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes.

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AG1

Initiating Condition -- GENERAL EMERGENCY

Off-site Dose Resulting from an Actual or IMMINENT Release of Gaseous Radioactivity Greater Than 1000 mrem TEDE or 5000 mrem Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2 or 3)

Note: *If dose assessment results are available at the time of declaration, the classification should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.*

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time.*

1. VALID reading on any of the following radiation monitors greater than the reading shown for 15 minutes or longer:

Plant Vent (Mid Range Gas)	VFS-RIA-104A	[Setpoint TBD]
Plant Vent (High Range Gas)	VFS-RIA-104B	[Setpoint TBD]
Gaseous Radwaste discharge	WGS-RICA-017	[Setpoint TBD]

2. Dose assessment using actual meteorology indicates doses greater than 1000 mrem TEDE or 5000 mrem thyroid CDE at or beyond the site boundary.

3. Field survey results indicate closed window dose rates greater than 1000 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 5000 mrem for one hour of inhalation, at or beyond site boundary.

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

The Site Emergency Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes.

5.6 Cold Shutdown/refueling System Malfunction EALS

Table A1-C-1: Recognition Category "C" Initiating Condition Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
CG1 Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged. *Op. Modes: Cold Shutdown, Refueling*	**CS1** Loss of RPV Inventory Affecting Core Decay Heat Removal Capability. *Op. Modes: Cold Shutdown, Refueling*	**CA1** Loss of RCS/RPV Inventory. *Op. Modes: Cold Shutdown, Refueling*	
			CU2 UNPLANNED Loss of RCS/ RPV Inventory *Op. Mode: Refueling*
			CU3 All Safety Related dc Batteries Not Being Charged for Greater Than 30 Minutes Due to Loss of Power to PIP Busses. *Op. Modes: Cold Shutdown, Refueling, Defueled*
		CA4 Inability to Maintain Plant in Cold Shutdown. *Op. Modes: Cold Shutdown, Refueling*	**CU4** UNPLANNED Loss of Decay Heat Removal Capability. *OP. Modes: Cold Shutdown, Refueling*

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
			CU6 UNPLANNED Loss of All On-site or Off-site Communications Capabilities. *Op. Modes: Cold Shutdown, Refueling, Defueled*
			CU7 UNPLANNED Loss of Required dc Power for 15 Minutes or longer. *Op. Modes: Cold Shutdown, Refueling*
			CU8 Inadvertent Criticality. *Op Modes:, Cold Shutdown, Refueling*

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of RCS/RPV Inventory.

Operating Mode Applicability: Refueling

Emergency Action Levels: (1 or 2)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED RCS level drop below the top of the RPV flange either visually or as indicated by RCS Hot Leg level at 9.7% and lowering as indicated on RCS-LT-160A or -160B for 15 minutes or longer.

2. RCS level cannot be monitored with a loss of RCS inventory as indicated by:

   - Visual observations inside containment
   - Unexplained rise in Containment sump level on WLS-LICR-034, WLS-LICR-035, OR WLS-LICR-036.

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. Refueling evolutions that decrease RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level decreasing below the RPV flange warrants declaration of a NOUE due to the reduced RCS inventory that is available to keep the core covered. The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists. Continued loss of RCS Inventory will result in escalation to the Alert level via either IC CA1 (Loss of RCS/RPV Inventory with Irradiated Fuel in the RPV) or CA4 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU3

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

All Safety Related dc Batteries Not Being Charged for 30 Minutes or Longer Due to Loss of Power to PIP Busses.

Operating Mode Applicability: Cold Shutdown
Refueling
Defueled

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Loss of all ac power capability to Busses ECS-ES-1 and ECS-ES-2 busses for 30 minutes or longer.

Basis:

The off-site ac power system supplies power for the unit in cold shutdown, refueling, and defueled conditions. Both the normal off-site and standby on-site ac power systems are non-Class 1E with no Technical Specification requirements. All safety-related functions associated with the unit in cold shutdown and refueling are provided by the safety-related on-site Class 1E dc power systems.

Loss of dc power potentially compromises all safety related plant systems requiring electric power.

Escalation to an Alert, if appropriate, is by Abnormal Radiation Levels / Radiological Effluent, or Site Emergency Director Judgment ICs. Thirty minutes was selected as a threshold to exclude transient or momentary power losses, and is appropriate because of the passive cooling systems and the on-site safety-related Class 1E dc power systems.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU4

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of Decay Heat Removal Capability.

Operating Mode Applicability:	Cold Shutdown Refueling
Emergency Action Levels:	(1 or 2)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. An event results in RCS temperature exceeding 200 F on RCS-TI-135A or -135B

2. Loss of all RCS temperature and RPV level indication for 15 minutes or longer.

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. Monitoring RCS temperature and RPV level will determine if escalation to the Alert level via CA4 or CA1 will occur if required.

Any reduction of RCS inventory to the predetermined setpoint will result in an Alert based on CA1 or CA4.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of All On-site or Off-site Communications Capabilities.

Operating Mode Applicability:	Cold Shutdown Refueling Defueled
Emergency Action Levels:	(1 or 2)

1. Loss of all of the following on-site communications capability affecting the ability to perform routine operations:

   - EFS
   - TVS
   - In-Plant/Party Line System
   - Radio Communications System (On-site)

2. Loss of all of the following off-site communication methods affecting the ability to perform offsite notifications:

   - Emergency Preparedness Telephone System
   - Emergency Preparedness Paging System
   - Emergency Notification System
   - Health Physics Network
   - Reactor Safety Counterpart Link
   - Protective Measures Counterpart Link
   - Management Counterpart Link

Basis:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

The availability of one method of ordinary off-site communications is sufficient to inform state and local authorities of plant conditions.

EFS and TVS are comprised of the following:

- Wireless Telephone System
- Telephone-Page System
- Sound Powered System
- Security Communication System
- Closed Circuit Television System

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU7

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of Required dc Power for 15 minutes or longer.

Operating Mode Applicability: Cold Shutdown
Refueling

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. Loss of Required UPS System Power based on [voltage indications TBD] for ALL of the following ac instrumentation and control busses:

   - Division A 24-Hour Bus IDSA-EA-1
   - Division B 24-Hour Bus IDSB-EA-1
   - Division B 72-Hour Bus IDSB-EA-3
   - Division C 24-Hour Bus IDSC-EA-1
   - Division C 72-Hour Bus IDSC-EA-3
   - Division D 24-Hour Bus IDSD-EA-1

   AND

   b. Failure to restore power to at least one required bus in less than 15 minutes from the time of loss.

Basis:

The purpose of this IC and its associated EALs is to recognize a loss of the Class 1E dc, which provides electrical power for safety related and vital control and monitoring instrumentation loads. It also provides power for safe shutdown when all the on-site and off-site ac power sources are lost and cannot be recovered for 72 hours.

UNPLANNED is included in this IC to preclude the declaration of an emergency as a result of planned maintenance activities.

Bus voltage of [TBD] Vac is the minimum bus voltage necessary for the operation of safety-related instrumentation and controls. This voltage value incorporates a margin

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

significantly longer than the allowed 15 minutes of operation before the onset of inability to operate those loads.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent Criticality.

Operating Mode Applicability: Cold Shutdown
Refueling

Emergency Action Levels:

1. An UNPLANNED sustained positive startup rate.

Basis:

This IC addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel assembly loading errors (mis-located and mis-oriented). This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification.

Escalation would be by Site Emergency Director judgment.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

Initiating Condition -- ALERT

Loss of RCS/RPV Inventory.

Operating Mode Applicability:	Cold Shutdown Refueling
Emergency Action Levels:	(1 or 2)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. Pressurizer level at 12% and lowering on RCS-LT-200

OR

b. RCS Hot Leg level is at 9.7% and lowering as indicated on RCS-LT-160A OR -160B

2. RCS level cannot be monitored for 30 minutes or longer with a loss of RCS/RPV inventory as indicated by unexplained rise in Containment sump level on WLS-LICR-034, WLS-LICR-035, OR WLS-LICR-036.

Basis:

These thresholds serve as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level lowering and potential core uncovery. This condition will result in a minimum classification of Alert. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the RCS barrier.

The RCS Pressurizer level and Hot Leg level setpoints were chosen to indicate that actions must be taken to prevent reaching a level that would cause a loss of RNS cooling. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the RCS barrier. The pressurizer level setpoint is 12%, which is the pressurizer level low-2 setpoint. This provides CMT actuation for Core Heat Removal. The hot leg level setpoint is 9.7%, which is the hot leg level low-2 setpoint. This activates ADS 4 and IRWST injection for Core Heat Removal.

If all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump or tank level changes.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

The 30-minute duration for the loss of level indication was chosen to allow CA1 to be an effective precursor to CS1. This provides time to increase makeup and isolate leakage prior to core uncovery. Whether or not the actions in progress will be effective should be apparent within 30 minutes.

If RPV level continues to decrease then escalation to Site Area Emergency will be via CS1 (Loss of RPV Inventory Affecting Core Decay Heat Removal Capability).

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA4

Initiating Condition -- ALERT

Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV.

Operating Mode Applicability: Cold Shutdown

Refueling

Emergency Action Levels: (1 or 2)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. An UNPLANNED event results in RCS Temperature greater than 200ºF as indicated on RCS-TI-135A OR -135B for greater than the specified duration on table.

Table: RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Open	Established	20 minutes*
	Not Established	0 minutes

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.

2. An UNPLANNED event results in RCS Pressure increase greater than 10 psi due to a loss of RCS cooling. (This does not apply in Solid Plant conditions.)

Basis:

For Threshold 1, the RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. [The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established.

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

In Threshold 2, the 10 psi pressure increase covers situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The RCS pressure setpoint chosen should be 10 psi or the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psi.

Escalation to Site Area Emergency would be via CS1 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

The Site Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is IMMINENT. If, in the judgment of the Site Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

Initiating Condition -- SITE AREA EMERGENCY

Loss of RCS/RPV Inventory Affecting Core Decay Heat Removal Capability.

Operating Mode Applicability:	Cold Shutdown Refueling
Emergency Action Levels:	(1 or 2 or 3)

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. WITH CONTAINMENT CLOSURE NOT established:

   RPV level less than Lo-2 (3 inches above the inside surface of the bottom of the Hot Leg) on RCS LT-160A or -160B

   OR

2. With CONTAINMENT CLOSURE established

   RCS LT-160A or LT-160B Offscale low

   OR

3. RPV level cannot be monitored for 60 minutes or longer with a loss of RPV inventory as indicated by:

   - Containment radiation monitor reading GREATER THAN [TBD] rad/hr on PXS-JE-RE-160, -161, -162, OR -163
   - Unexplained containment sump level rise on WLS-LICR-034, WLS-LICR-035, OR WLS-LICR-036
   - Erratic Source Range Monitor Indication

Basis:

Under the conditions specified by this IC, continued lowering in RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RPV breach, pressure boundary leakage, or continued boiling in the RPV.

The 60-minute duration allows sufficient time for actions to be performed to recover needed cooling equipment and is considered to be conservative.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

Declaration of a Site Area Emergency is warranted under the conditions specified by the IC. Escalation to a General Emergency is via CG1 (Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged with Irradiated Fuel in the RPV) or radiological effluent IC AG1 (Off-site Dose Resulting from an Actual or IMMINENT Release of Gaseous Radioactivity Exceeds 1000 mrem TEDE or 5000 mrem Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology).

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Initiating Condition -- GENERAL EMERGENCY

Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged.

Operating Mode Applicability: Cold Shutdown
Refueling

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. CONTAINMENT challenged as indicated by one or more of the following:

   - CONTAINMENT CLOSURE not established
   - Explosive mixture inside containment
   - Pressure above [TBD] psig value

   AND

   b. Core uncovery 30 minutes or longer as indicated by **EITHER**:

   - RCS LT-160A or LT-160B Offscale low.

     OR

   - CANNOT be monitored with indication of core uncovery by ANY of the following:
   - PXS-JE-RE160, -161, -162, -163 radiation monitor reading greater than [TBD] (Hi2 setpoint).
   - Core Exit Thermocouple temperature equal to or greater than [700°F] on [TBD].
   - Erratic Source Range Monitor Indication
   - Unexplained containment sump level rise on WLS-LICR-034, WLS-LICR-035, OR WLS-LICR-036

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

Basis:

These conditions represent the inability to restore and maintain RPV level to above the top of active fuel. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, conservatively, 30 minutes was chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to General Emergency would not occur.

Sump or tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the RPV lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in up-scaled radiation monitor indication and possible alarm. Additionally, post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered.

The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers. RCS barrier failure resulting in core uncovery for 30 minutes or more may cause fuel clad failure. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency.

5.7 Fission Product Barrier Degradation EALs

Table A1-F-1: Recognition Category "F" Initiating Condition Matrix

See Table A1--F-2 for EAL Thresholds

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		NOUE	
FG1	Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier *Op. Modes: Power Operation, Hot Standby, Startup, Safe/Stable Shutdown*	**FS1**	Loss or Potential Loss of ANY Two Barriers *Op. Modes: Power Operation, Hot Standby, Startup, Safe/Stable Shutdown*	**FA1**	ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS *Op. Modes: Power Operation, Hot Standby, Startup, Safe/Stable Shutdown*	**FU1**	ANY Loss or ANY Potential Loss of Containment *Op. Modes: Power Operation, Hot Standby, Startup, Safe/Stable Shutdown*

NOTES

1. The logic used for these initiating conditions reflects the following considerations:
   - The Fuel Clad Barrier and the RCS Barrier are weighted more heavily than the Containment Barrier (See Sections 3.4 and 3.8). NOUE ICs associated with RCS and Fuel Clad Barriers are addressed under System Malfunction ICs.
   - At the Site Area Emergency level, there must be some ability to dynamically assess how far present conditions are from the threshold for a General Emergency. For example, if Fuel Clad and RCS Barrier "Loss" EALs existed, that, in addition to off-site dose assessments, would require continual assessments of radioactive inventory and containment integrity. Alternatively, if both Fuel Clad and RCS Barrier "Potential Loss" EALs existed, the Site Emergency Director would have more assurance that there was no immediate need to escalate to a General Emergency.
   - The ability to escalate to higher emergency classes as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety.
   - The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

FISSION PRODUCT BARRIER DEGRADATION

Table A1-F-2: EAL Fission Product Barrier Reference Table

Thresholds For LOSS or POTENTIAL LOSS of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or Potential loss thresholds is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the thresholds are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of ANY two Barriers AND Loss or Potential Loss of Third Barrier	Loss or Potential Loss of ANY two Barriers	ANY loss or ANY Potential Loss of EITHER Fuel Clad or RCS	ANY loss or ANY Potential Loss of Containment

Fuel Clad Barrier Threshold Values		RCS Barrier Threshold Values		Containment Barrier Threshold Values	
LOSS	**POTENTIAL LOSS**	**LOSS**	**POTENTIAL LOSS**	**LOSS**	**POTENTIAL LOSS**
1. Critical Safety Function Status		**1. Critical Safety Function Status**		**1. Critical Safety Function Status**	
Core-Cooling Red Entry Conditions Met	Core Cooling-Orange Entry Conditions Met OR Heat Sink-Red Entry Conditions Met	Not Applicable	RCS Integrity-Red Entry Conditions Met OR Heat Sink-Red Entry Conditions Met	Not Applicable	Containment-Red Entry Conditions Met
OR		**OR**		**OR**	
2. Primary Coolant Activity Level		**2. RCS Leak Rate**		**2. Containment Pressure**	
Dose Equivalent [300 µCi/gm I-131 OR 280 µCi/gm Xe-133] as indicated on [Instrument TBD]	Not Applicable	RCS leak rate greater than available makeup capacity as indicated by RCS subcooling less than 30 degrees on [TBD]	RCS leak rate greater than 135 gpm on [TBD] with Letdown isolated	A containment pressure rise followed by a rapid unexplained drop in containment pressure. **OR** Containment pressure or sump level response not consistent with LOCA or MSL break conditions	59 psig and rising on PCS-PI-012, PCS-PI-013 or PCS-PI-014 **OR** 4% H_2 on VLS-AE001, 002 or 003 **OR** Containment Pressure Hi/Hi Alarm on PCS-P005, PCS-006 or PCS-007 AND PCS does NOT actuate.
OR		**OR**		**OR**	

FISSION PRODUCT BARRIER DEGRADATION

Table A1-F-2: EAL Fission Product Barrier Reference Table

Thresholds For LOSS or POTENTIAL LOSS of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or Potential loss thresholds is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the thresholds are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of ANY two Barriers AND Loss or Potential Loss of Third Barrier	Loss or Potential Loss of ANY two Barriers	ANY loss or ANY Potential Loss of EITHER Fuel Clad or RCS	ANY loss or ANY Potential Loss of Containment

Fuel Clad Barrier Threshold Values		RCS Barrier Threshold Values		Containment Barrier Threshold Values	
LOSS	**POTENTIAL LOSS**	**LOSS**	**POTENTIAL LOSS**	**LOSS**	**POTENTIAL LOSS**
3. Core Exit Thermocouple Readings		**3. Not Applicable**		**3. Core Exit Themocouple Reading**	
Greater than 1200°F	Greater than 700°F	Not applicable	Not applicable	Not applicable	Core exit thermocouples in excess of 1200 °F AND Restoration procedures not effective within 15 minutes AND Stage 4 ADS actuated.
OR		**OR**		**OR**	
4. Reactor Vessel Water Level		**4. SG Tube Rupture**		**4. SG Secondary Side Release with P-to-S Leakage**	
Not Applicable	RCS Hot Leg Level LESS than [9.7%] on RCS-LT-160A or RCS-LT-160B. **OR** Inventory CSF – Yellow Entry Conditions met	Ruptured S/G results in a CMT/PRHR Actuation	Not Applicable	RUPTURED S/G is also FAULTED outside of containment **OR** Primary-to-Secondary leakrate greater than 10 gpm with UNISOLABLE steam release from affected S/G to the environment	Not applicable
OR		**OR**		**OR**	

FISSION PRODUCT BARRIER DEGRADATION

Table A1-F-2: EAL Fission Product Barrier Reference Table

Thresholds For LOSS or POTENTIAL LOSS of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or Potential loss thresholds is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the thresholds are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of ANY two Barriers AND Loss or Potential Loss of Third Barrier	Loss or Potential Loss of ANY two Barriers	ANY loss or ANY Potential Loss of EITHER Fuel Clad or RCS	ANY loss or ANY Potential Loss of Containment

Fuel Clad Barrier Threshold Values		RCS Barrier Threshold Values		Containment Barrier Threshold Values	
LOSS	**POTENTIAL LOSS**	**LOSS**	**POTENTIAL LOSS**	**LOSS**	**POTENTIAL LOSS**
5. Not Applicable		**5. Not Applicable**		**5. CNMT Isolation Failure or Bypass**	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Failure of all valves in any one line to close AND direct downstream pathway to the environment exists after CTMT isolation signal	Not Applicable
OR		**OR**		**OR**	
6. Containment Radiation Monitoring		**6. Containment Radiation Monitoring**		**6. Containment Radiation Monitoring**	
Containment radiation monitor reading greater than [TBD] rad/hr on PXS-JE-RE-160, -161, -162, OR -163	Not Applicable	Containment radiation monitor reading greater than 2 rad/hr on PXS-JE-RE-160, -161, -162, OR -163	Not Applicable	Not Applicable	Containment radiation monitor reading GREATER THAN [TBD] rad/hr on PXS-JE-RE-160, -161, -162, OR -163
OR		**OR**		**OR**	
7 Other Indications		**7. Other Indications**		**7. Other Indications**	
Not applicable	Not applicable	Not as applicable	Not as applicable	Not as applicable	Not as applicable
OR		**OR**		**OR**	
8. Site Emergency Director Judgment		**8. Site Emergency Director Judgment**		**8. Site Emergency Director Judgment**	
Any condition in the judgment of the Site Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier		Any condition in the judgment of the Site Emergency Director that indicate Loss or Potential Loss of the RCS Barrier		Any condition in the judgment of the Site Emergency Directorthat indicates Loss or Potential Loss of the Containment barrier	

FISSION PRODUCT BARRIER DEGRADATION

Basis Information For Table A1--F-2
Emergency Action Level
Fission Product Barrier Reference Table

FUEL CLAD BARRIER THRESHOLDS: (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)

1. Critical Safety Function Status

These Thresholds serve as precursors to a loss of fuel clad. Core cooling orange path indicates subcooling has been lost and that some clad damage may occur. Core cooling red path indicated significant superheating and core uncovery and is considered to indicate a loss of the fuel clad. Heat Sink Red when heat sink is required indicates the steam generator heat sink function is under extreme challenge and provides the potential for loss of the fuel clad. Meeting the entry conditions satisfies these thresholds.

2. Primary Coolant Activity Level

This is a site specific value corresponding to 300 μCi/gm I-131 equivalent or 280 μCi/gm Xe-133. This amount of radioactivity indicates significant clad damage and the fuel barrier is considered lost.

There is no equivalent Potential Loss for this item.

3. Core Exit Thermocouple Readings

The core exit thermocouples (CETs) provide an adequate measure of core temperatures to estimate temperatures at which potential cladding damage and core over temperature may be occurring. CETs with readings greater than 700 °F indicate the onset of inadequate core cooling. Continued operation in this state can lead to a core damage sequence if Emergency Operating Procedures are not effective in restoring core cooling.

CETs with readings above 1200 °F indicate significant clad heating and the loss of the fuel clad barrier. Core exit thermocouples are included in addition to the Critical Safety Functions to include conditions when the status trees may not be in use.

4. Reactor Vessel Water Level

There is no Loss Threshold corresponding to this item.

The potential loss corresponds to a level 3 inches above the bottom of the Hot Leg. This is defined by the CSFSTs as an Inventory Yellow path. Meeting the entry conditions satisfies this threshold.

The value for the Potential Loss Threshold corresponds to the 3 inches above the bottom of the Hot Leg. This Potential Loss Threshold is defined by the Inventory Yellow path.

5. Not Applicable

FISSION PRODUCT BARRIER DEGRADATION

6. Containment Radiation Monitoring

The reading of 100 rad/hr on PXS-JE-RE160, RE161, RE162 or RE163 is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment. Use of a confirmed radiation monitoring reading can lead to an earlier Alert classification. A reactivity excursion or mechanical damage may cause fuel damage that is first detected by radiation monitors.

Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage.

There is no Potential Loss Threshold associated with this item.

7. Other Indications

Not Applicable

8. Site Emergency Director Judgment

The Site Emergency Director can declare an Alert based on the judgment that conditions exist which indicate the Loss or Potential Loss of the Fuel Cladding barrier. This can take any other factors into consideration including the inability to monitor the barrier.

RCS BARRIER THRESHOLDS: (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)

1. Critical Safety Function Status

There is no Loss Threshold associated with this item.

These Thresholds serve as precursors to a loss of fuel clad. Heat Sink Red when heat sink is required indicates the steam generator heat sink function is under extreme challenge and provides the potential for loss of the fuel clad. An Integrity Red path indicates an extreme challenge to the safety function and a potential loss of the RCS barrier. Meeting the entry conditions satisfies these thresholds.

2. RCS Leak Rate

The Loss Threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

The potential loss is based on the inability to maintain normal liquid inventory within the reactor coolant system by the Chemical and Volume Control System (CVS). Where leakage is greater than available inventory control a loss of subcooling can occur. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-

FISSION PRODUCT BARRIER DEGRADATION

RCS leakage path such as a CVS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful.

3. Not Applicable

4. Steam Generator Tube Rupture (SGTR)

A SGTR is based on the inability to maintain normal liquid inventory within the RCS by normal operation of the CVS system. The loss of the RCS barrier is based on leakage large enough to cause CMT/PRHR actuation.

There is no Potential Loss Threshold for this condition.

5. Not Applicable

6. Containment Radiation Monitoring

The reading of 100 rad/hr on PXS-JE-RE160, RE161, RE162 or RE163 is a value which indicates the release of reactor coolant to the containment. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage.

There is no Potential Loss Threshold associated with this item.

7. Other Indications

Not Applicable

8. Site Emergency Director Judgment

The Site Emergency Director can declare an Alert based on the judgment that conditions exist which indicate the Loss or Potential Loss of the RCS Barrier. This can take any other factors into consideration including the inability to monitor the barrier.

CONTAINMENT BARRIER THRESHOLDS: (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)

1. Critical Safety Function Status

There is no Loss Threshold associated with this item.

A Containment Red path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment. Meeting the entry condition satisfies this threshold.

2. Containment Pressure

FISSION PRODUCT BARRIER DEGRADATION

Rapid unexplained loss of pressure following an initial pressure rise indicates a loss of containment integrity. Containment pressure should increase as a result of mass and energy release into the containment. In addition, containment pressure or sump level response not consistent with design basis accident conditions can also be an indicator of a Loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

Containment Pressure at 59 psig (design pressure) and the existence of an explosive mixture of hydrogen means there is potential for damage to containment. Containment pressure at 6.2 psig or greater indicates the pressure has reached the PCS actuation setpoint. Should the PCS system not actuate at this point, this condition would represent a Potential Loss of Containment. This represents a challenge to containment that requires operation of the containment isolation and pressure suppression systems.

3. Core Exit Thermocouples (CETs)

The Core Cooling Red path represents an imminent core melt sequence, which if not corrected, could lead to RPV failure and an increased potential for containment failure. It is appropriate to allow 15 minutes for functional restoration procedures to address the core melt sequence. Whether or not the procedures will be effective should be apparent in 15 minutes. In addition, if the CETs continue to be at or greater than 1200°F for 15 minutes after the ADS Valves have actuated, the conditions in this Potential Loss Threshold represent IMMINENT core melt sequences which, if not corrected, could lead to vessel failure and increased potential for containment failure. If the Emergency Operating Procedures have been ineffective in restoring reactor vessel level above the RCS and Fuel Clad barriers, there is not a success path and a core melt sequence is in progress.

4. SG Secondary Side Release With Primary To Secondary Leakage

Steam generator tube leakage can represent the bypass of containment and the loss of the RCS barrier. This recognizes the non-isolable release path directly to the environment. The first Loss Threshold addresses the condition in which a RUPTURED steam generator is also FAULTED.

The second loss Threshold addresses SG tube leaks that exceed 10 gpm in conjunction with a UNISOLABLE release path to the environment.

5. Containment Isolation Failure or Bypass

The failure of the isolation of a containment penetration allows a direct path to the environment and represents failure of the Containment barrier. The Containment barrier must be considered breached if isolation fails.

6. Containment Radiation Monitoring

FISSION PRODUCT BARRIER DEGRADATION

There is no Loss Threshold associated with this item.

The 100 rad/hr reading is a value which indicates significant fuel damage well in excess of the Thresholds associated with both loss of Fuel Clad and loss of RCS barriers. A major release of radioactivity requiring off-site protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted.

7. Other Indications

Not Applicable

8. Site Emergency Director Judgment

The Site Emergency Director can declare an Alert based on the judgment that conditions exist which indicate the Loss or Potential Loss of the Containment Barrier. This can take any other factors into consideration including the inability to monitor the barrier. The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification Action Statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

5.8 Hazards Or Other Conditions Affecting Plant Safety EALs

Table A1-H-1: Recognition Category "H" Initiating Condition Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
		HA1 Natural or Destructive Phenomena Affecting VITAL AREAS. *Op. Modes: All*	**HU1** Natural or Destructive Phenomena Affecting the PROTECTED AREA. *Op. Modes: All*
		HA2 FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe/Stable Shutdown. *Op. Modes: All*	**HU2** FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection OR EXPLOSION within the Protected Area Boundary *Op. Modes: All*
		HA3 Access To a VITAL AREA Is Prohibited Due To Release of Toxic, Corrosive, Asphyxiant or Flammable Gases Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Safely Shutdown the Reactor *Op. Modes: All*	**HU3** Release of Toxic, Corrosive, Asphyxiant, or Flammable Gases Deemed Detrimental to NORMAL PLANT OPERATIONS. *Op. Modes: All*

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
	HS2 Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established. *Op. Modes: All*	**HA5** Control Room Evacuation Has Been Initiated. *Op. Modes: All*	
HG1 HOSTILE ACTION Resulting in Loss Of Physical Control of the Facility. *Op. Modes: All*	**HS4** HOSTILE ACTION within the PROTECTED AREA *Op. Modes: All*	**HA4** HOSTILE ACTION within the OWNER CONTROLLED AREA or Airborne Attack Threat. *Op. Modes: All*	**HU4** Confirmed SECURITY CONDITION or Threat Which Indicates a Potential Degradation in the Level of Safety of the Plant. *Op. Modes: All*
HG2 Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of a General Emergency. *Op. Modes: All*	**HS3** Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of a Site Area Emergency. *Op. Modes: All*	**HA6** Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of an Alert. *Op. Modes: All*	**HU5** Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of a NOUE. *Op. Modes: All*

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Natural or Destructive Phenomena Affecting the PROTECTED AREA.

Operating Mode Applicability: All

Emergency Action Level: (1 or 2 or 3)

1. Seismic event identified by any 2 of the following:
   - Earthquake felt in plant.
   - Seismic event confirmed by [site-specific indication or method TBD].
   - National Earthquake Center.
2. Tornado striking within PROTECTED AREA boundary or a FORECAST of sustained high winds greater than 73 mph.
3. Turbine failure resulting in casing penetration or damage to turbine or generator seals.

Basis:

These Thresholds are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators

Threshold #1: Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm that an earthquake has occurred in the area of the plant.

Threshold #2 is based on the assumption that a tornado striking (touching down) or a FORECAST of high winds within the PROTECTED AREA may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

Threshold #3 addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. This Threshold is consistent with the definition of a NOUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by projectiles generated by the failure. These events would be classified by the radiological ICs or Fission Product Barrier ICs.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

Threshold #4, in NEI 07-01, is used for other site-specific phenomena, such as hurricane, flood, or seiche, that can also be precursors of more serious events. These events cannot be experienced at the Bellefonte Nuclear Plant site and this NEI 07-01 EAL is not included.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

FIRE Within the PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection OR EXPLOSION within the PROTECTED AREA Boundary.

Operating Mode Applicability: All

Emergency Action Level: (1 or 2)

1. FIRE not extinguished in less than 15 minutes of Control Room notification or receipt of a Control Room FIRE alarm in any of the following areas:

   - Containment
   - Shield Building
   - Aux Building
   - Annex Building
   - Turbine Building
   - Radwaste Building

2. EXPLOSION within the Protected Area boundary.

Basis:

The purpose of Threshold #1 is to address the magnitude and extent of FIREs that may be potentially significant precursors to damage to safety systems. As used here, “detection” is visual observation and report by plant personnel or sensor alarm indication. The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a VALID fire detection system alarm. Validation of a fire detection system alarm includes actions that can be taken with the Control Room or other nearby site-specific location to ensure that the alarm is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene.

The 15 minute duration is to size the FIRE and to discriminate against small FIREs that are readily extinguished. Fires inside the protected area, located near equipment, that last 15 minutes or longer can result in a challenge to the site fire brigade. This represents a degradation in plant operational status.

For Threshold #2 only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA should be considered. The Site Emergency Director also needs to consider any security aspects of the EXPLOSION, if applicable.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

Escalation to a higher emergency class is by IC HA2, "FIRE Affecting the Operability of Plant Safety Systems Required for the Current Operating Mode".

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Release of Toxic, Corrosive, Asphyxiant, or Flammable Gases Deemed Detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2)

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an off-site event.

Basis:

This IC is based on the existence of uncontrolled releases of toxic or flammable gas that may enter the site boundary and affect NORMAL PLANT OPERATIONS.

During the initial stages of a potential gas release, actions that are taken as precautions (such as pre-cautionary evacuation of a room or area while conditions are assessed) do not constitute an adverse affect on NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

It is intended that releases of toxic, corrosive, asphyxiant or flammable gases are of sufficient quantity, and the release point of such gases is such that NORMAL PLANT OPERATIONS would be affected.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this Threshold is via HA3, which involves a quantified a release of toxic or flammable gas affecting access to VITAL AREAs.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Confirmed SECURITY CONDITION or Threat Which Indicates a Potential Degradation in the Level of Safety of the Plant.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2 or 3)

1. A SECURITY CONDITION that does NOT constitute a HOSTILE ACTION as reported by the security shift supervision.

2. A credible site-specific security threat notification.

3. A validated notification from NRC providing information of an aircraft threat.

Basis:

Reference is made to security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

Threshold #1 is based on Site Security Plans. Security events which do not represent a potential degradation in the level of safety of the plant, are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under HA4, HS4 and HG1.

This threshold is based on site-specific security plans.

Threshold #2 is to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat.
Threshold #3 is to ensure that notifications for the security threat are made in a timely manner and that Off-site Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. Only the plant to which the specific threat is made need declare the Notification of Unusual Event.

A higher initial classification could be made based upon the nature and timing of the threat and potential consequences.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of a NOUE.

Operating Mode Applicability: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Site Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Site Emergency Director to fall under the NOUE emergency class.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition -- ALERT

Natural or Destructive Phenomena Affecting the Plant VITAL AREAS.

Operating Mode Applicability: All

Emergency Action Levels: (1 or 2 or 3 or 4)

1. Seismic event greater than Operating Basis Earthquake (OBE) –(0.10g) as indicated by the time history analyzer initiation of the Control Room alarm.

   AND

   Confirmed by **EITHER**:

   - Earthquake felt in plant
   - National Earthquake Center

2. Tornado striking or FORECAST of sustained high winds greater than 73 mph with VISIBLE DAMAGE to any of the following structures containing safety systems or components OR Control Room indication of degraded performance of those systems.

   - Containment Building
   - Shield Building
   - Aux Building

3. Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following structures containing safety systems or components OR Control Room indication of degraded performance of those safety systems:

   - Containment
   - Shield Building
   - Aux Building

4. Internal flooding in any areas of the plant that creates an industrial safety hazard (e.g., electric shock) that precludes access necessary to operate or monitor equipment.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

Basis:

These Thresholds escalate from HU1 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this Threshold to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation. Escalation to higher classifications occur on the basis of System Malfunctions.

Seismic events of this magnitude can result in a plant VITAL AREA being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

Wind loads of this magnitude can cause damage to safety functions.

Threshold #4 addresses the effect of internal flooding that has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment.

Threshold #6 , in NEI 07-01, is used for other site-specific phenomena such as hurricane, flood, or seiche, that can also be precursors of more serious events. These events cannot be experienced at the Bellefonte Nuclear Plant site and this NEI 07-01 EAL is not included.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition -- ALERT

FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe/Stable Shutdown.

Operating Mode Applicability: All

Emergency Action Level:

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the following structures containing safety systems, or components **OR** Control Room indication of degraded performance of those safety systems:

   - Containment
   - Shield Building
   - Aux Building

Basis:

The reference to damage of systems is used to identify the magnitude of the FIRE / EXPLOSION and to discriminate against minor FIREs / EXPLOSIONs. The reference to safety systems is included to discriminate against FIREs / EXPLOSIONs in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE / EXPLOSION was large enough to cause damage to these systems.

The inclusion of a "VISIBLE DAMAGE" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this Threshold to assess the actual magnitude of the damage. The occurrence of the EXPLOSION with reports of evidence of damage is sufficient for declaration. The Site Emergency Director also needs to consider any security aspects of the EXPLOSIONs.

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels / Radiological Effluent, or Site Emergency Director Judgment ICs.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition -- ALERT

Access to a VITAL AREA Is Prohibited Due To Release of Toxic, Corrosive, Asphyxiant or Flammable Gases Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Safely Shutdown the Reactor.

Operating Mode Applicability: All

Emergency Action Levels:

1. Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant, or flammable gases which jeopardizes operation of systems required to maintain safe operations or safely shutdown the reactor.

Basis:

Gases in a Plant Vital Area can affect the ability to safely operate or safely shutdown the reactor.

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels / Radioactive Effluent, or Site Emergency Director Judgment ICs.

During the initial stages of a potential gas release, actions that are taken as precautions (such as pre-cautionary evacuation of a room or area while conditions are assessed) do not constitute jeopardizing operation of systems required to maintain safe operations or safely shutdown the reactor.

The fact that self contained breathing apparatus (SCBA) may be worn does not eliminate the need to declare the event

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

This Threshold addresses concentrations at which gases can ignite/support combustion. An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition - ALERT

HOSTILE ACTION Within the OWNER CONTROLLED AREA or Airborne Attack Threat.

Operating Mode Applicability: All

Emergency Action Level: (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLED AREA as reported by the [site-specific security shift supervision – Title TBD].

2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

Basis:

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

Threshold #1 addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OWNER CONTROLLED AREA. Those events are adequately addressed by other EALs.

Threshold #2 addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that OROs and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Alert.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

The NRC Headquarters Operations Officer will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by the NRC.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition -- ALERT

Control Room Evacuation Has Been Initiated.

Operating Mode Applicability: All

Emergency Action Level:

1. GW-GJP-306, Evacuation of Control Room, requires Control Room evacuation.

Basis:

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities is necessary. Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition -- ALERT

Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of an Alert.

Operating Mode Applicability: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Site Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

This Threshold addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Site Emergency Director to fall under the Alert emergency class.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition – - SITE AREA EMERGENCY

Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established.

Operating Mode Applicability: All

Emergency Action Level:

1. a. Control room evacuation has been initiated.

   AND

   b. Control of the plant cannot be established per [procedure TBD] within [TBD] minutes.

Basis:

Expeditious transfer of safety systems has not occurred but fission product barrier damage may not yet be indicated. The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. The determination of whether or not control is established at the remote shutdown panel is based on Site Emergency Director judgment. The Site Emergency Director is expected to make a reasonable, informed judgment within the site-specific time for transfer that control of the plant from the remote shutdown panel has been achieved.

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. These safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown),.

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or Site Emergency Director Judgment ICs.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HS3

Initiating Condition – -SITE AREA EMERGENCY

Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of a Site Area Emergency.

Operating Mode Applicability: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Site Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of; or (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Site Emergency Director to fall under the emergency class description for Site Area Emergency.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HS4

Initiating Condition – - SITE AREA EMERGENCY

HOSTILE ACTION Within the PROTECTED AREA.

Operating Mode Applicability: All

Emergency Action Level:

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site security shift supervision).

Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires offsite emergency response organization readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition – GENERAL EMERGENCY

HOSTILE ACTION Resulting in Loss of Physical Control of the Facility.

Operating Mode Applicability: All

Emergency Action Level: (1 or 2)

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool.

Basis:

This IC encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the above initiating condition is not met.

This EAL also addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMINENT fuel damage is likely.

HAZARDS OR OTHER CONDITIONS AFFECTING PLANT SAFETY

HG2

Initiating Condition – GENERAL EMERGENCY

Other Conditions Existing Which in the Judgment of the Site Emergency Director Warrant Declaration of a General Emergency.

Operating Mode Applicability: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Site Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels at or beyond, the site boundary.

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Site Emergency Director to fall under the General Emergency class.

5.9 System Malfunction EALs

Table A1-S-1: Recognition Category "S" Initiating Condition Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
SG1 All Safety Related dc Batteries Not Being Charged for Greater Than 72 Hours Due to Loss of Power to PIP Busses. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*	**SS1** All Safety Related dc Batteries Not Being Charged for 24 Hours or Longer Due to Loss of Power to PIP Busses. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*	**SA1** All Safety Related dc Batteries Not Being Charged for 60 Minutes or Longer Due to Loss of Power to PIP Busses. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*	**SU1** All Safety Related dc Batteries Not Being Charged for 30 Minutes or Longer Due to Loss of Power to PIP Busses. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*
SG2 Automatic Scram (Trip) and All Manual Actions Fail to Shutdown the Reactor and Indication of an Extreme Challenge to the Ability to Cool the Core Exists. *Op. Modes: Power Operation, Startup*	**SS2** Automatic Scram (Trip) Fails to Shutdown the Reactor and Manual Actions Taken From the Reactor control Console are NOT Successful in Shutting Down the Reactor *Op. Modes: Power Operation, Startup*	**SA2** Automatic Scram (Trip) Fails to Shutdown the Reactor and the Manual Actions Taken From the Reactor Control Console are Successful in Shutting Down the Reactor *Op. Modes: Power Operation, Startup*	**SU2** Inability to Reach Required Shutdown Mode Within Technical Specification Limits. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*

SYSTEM MALFUNCTION

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
	SS6 Inability to Monitor a SIGNIFICANT TRANSIENT in Progress. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*	**SA4** Loss of Indicating and Monitoring Functions *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*	
	SS3 Loss of All Vital dc Power for 15 Minutes or Longer. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*		**SU4** Fuel Clad Degradation. *Op. Modes: Power Operation, Startup, Hot Standby*
			SU5 RCS Leakage. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*
			SU6 UNPLANNED Loss of All On-site OR Off-site Communications Capabilities. *Op. Modes: Power Operation, Startup, Hot Standby, Safe/Stable Shutdown*

SYSTEM MALFUNCTION

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
			SU8 Inadvertent Criticality. *Op Modes: Hot Standby, Safe/Stable Shutdown*

SYSTEM MALFUNCTION

SU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

All Safety Related dc Batteries Not Being Charged for 30 Minutes or Longer Due to Loss of Power to PIP Busses.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. PIP Busses ECS-ES-1 and ECS-ES-2 de-energized for 30 minutes or longer.

Basis:

Prolonged de-energization of the PIP busses reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of dc Power. 30 minutes was selected as a threshold to exclude transient or momentary losses of ac power.

SYSTEM MALFUNCTION

SU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inability to Reach Required Shutdown Mode Within Technical Specification Limits.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. An immediate NOUE is required when the plant is not brought to the required operating mode within the allowable Action Statement time in the Technical Specifications. Declaration of a NOUE is based on the time at which the LCO-specified Action Statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed**.**

SYSTEM MALFUNCTION

SU4

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Fuel Clad Degradation.

Operating Mode Applicability:	Power Operation Startup Hot Standby
Emergency Action Levels:	(1 or 2)

1. Liquid Sample Radiation Monitor PSS-RICA-050 High Alarm Setpoint [TBD] µCi/cc indicating fuel clad degradation greater than Technical Specification 3.4.10 allowable limits.

   OR

2. Dose equivalent I-131 greater than 60 µCi/gm OR dose equivalent Xe-133 greater than 280 µCi/gm for more than 6 hours from sampling and analysis.

Basis:

This IC is included as a NOUE because it is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. EAL #1 addresses site-specific radiation monitor readings such as BWR air ejector monitors, PWR failed fuel monitors, etc., that provide indication of fuel clad integrity. EAL #2 addresses coolant samples exceeding coolant Technical Specifications for iodine spike. Escalation of this IC to the Alert level is via the Fission Product Barrier Degradation Monitoring ICs.

SYSTEM MALFUNCTION

SU5

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS Leakage.

Operating Mode Applicability:	Power Operation Startup Hot Standby Safe/Stable Shutdown
Emergency Action Levels:	(1 or 2)

1. Unidentified leakage greater than 5 gpm.

2. Identified leakage greater than 25 gpm.

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The value for the unidentified leakage (including the pressure boundary) was selected as it is observable with normal Control Room indications and is 10 times the Technical Specification limit. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage and is 2.5 times the Technical Specification limit. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation ICs.

SYSTEM MALFUNCTION

SU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of All On-site or Off-site Communications Capabilities.

Operating Mode Applicability:	Power Operation Startup Hot Standby Safe/Stable Shutdown
Emergency Action Levels:	(1 or 2)

1. Loss of all of the following on-site communication methods affecting the ability to perform routine operations:

   - EFS
   - TVS
   - In-Plant/Party Line System
   - Radio Communications System (On-site)

2. Loss of all of the following off-site communication methods affecting the ability to perform offsite notifications:

   - Emergency Preparedness Telephone System
   - Emergency Preparedness Paging System
   - Emergency Notification System
   - Health Physics Network
   - Reactor Safety Counterpart Link
   - Protective Measures Counterpart Link
   - Management Counterpart Link

Basis:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems with off-site authorities. The loss of

SYSTEM MALFUNCTION

off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform state and local authorities of plant conditions. EFS and TVS are comprised of the following:

- Wireless Telephone System
- Telephone-Page System
- Sound Powered System
- Security Communication System
- Closed Circuit Television System

SYSTEM MALFUNCTION

SU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent Criticality.

OPERATING MODE APPLICABILITY — Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

1. UNPLANNED sustained positive startup rate.

Basis:

This IC addresses inadvertent criticality events. This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification. This IC excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups.

Escalation would be by the Fission Product Barrier Matrix, as appropriate to the operating mode at the time of the event, or by Site Emergency Director judgment.

SYSTEM MALFUNCTION

SA1

Initiating Condition -- ALERT

All Safety Related dc Batteries Not Being Charged for Greater Than 60 Minutes Due to Loss of Power to PIP Busses.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

1. PIP Busses ECS-ES-1 and ECS-ES-2 de-energized for greater than 60 minutes.

Basis:

This IC and the associated EALs are intended to provide an escalation from IC SU1. Prolonged de-energization of the PIP busses reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of dc Power. 60 minutes was selected as an escalation to ensure augmented support is available to the operating crew.

The condition indicated by this IC is the degradation of the ac power systems.

SYSTEM MALFUNCTION

SA2

Initiating Condition -- ALERT

Automatic Scram (Trip) Fails to Shutdown the Reactor AND the Manual Actions Taken from the Reactor Control Console are Successful in Shutting Down the Reactor

Operating Mode Applicability: Power Operation
Startup

Emergency Action Level:

1. a. An Automatic PMS Trip failed to shutdown the reactor

   AND

   b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by Intermediate Range Nuclear Instrumentation less than [1.0E-8 amps].

Basis:

A manual actuation is any set of actions by the reactor operator(s) at the reactor control console which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor (e.g., reactor trip button, Alternate Rod Insertion).

If actions taken at the reactor control console fail to shutdown the plant, the event would escalate to a Site Area Emergency.

This condition indicates failure of the automatic protection system to scram (trip) the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS.

SYSTEM MALFUNCTION

SA4

Initiating Condition -- ALERT

Loss of Indicating and Monitoring Functions.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Loss of All PLS and PMS Indicating and Monitoring Functions for 15 minutes or longer.

Basis:

This IC recognizes the difficulty associated with monitoring changing plant conditions without the use of a major portion of the control and indication systems.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress.

SYSTEM MALFUNCTION

SS1

Initiating Condition -- SITE AREA EMERGENCY

All Safety Related dc Batteries Not Being Charged for 24 Hours or Longer Due to Loss of Power to PIP Busses.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. PIP Busses ECS-ES-1 and ECS-ES-2 de-energized for 24 hours or longer.

Basis:

Prolonged de-energization of the PIP busses reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of dc Power. 24 hours was selected as a threshold to escalate for recognition of the seriousness of the issue in that power has been unable to be restored through normal and abnormal operating procedures.

Escalation to General Emergency is via Fission Product Barrier Degradation or IC SG1, “Prolonged Loss of All Off-site and On-site ac Power for greater than 72 hours."

SYSTEM MALFUNCTION

SS2

Initiating Condition -- SITE AREA EMERGENCY

Automatic Scram (Trip) Fails to Shutdown the Reactor AND Manual Actions Taken from the Reactor Control Console are NOT Successful in Shutting Down the Reactor

Operating Mode Applicability: Power Operation
Startup

Emergency Action Level:

1. An Automatic PMS Trip failed to shutdown the reactor

   AND

   Manual actions taken at the reactor control console DO NOT shutdown the reactor as indicated by Intermediate Range Nuclear Instrumentation greater than [1.0E-8 amps].

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed [*typically 3 to 8% power*]. A Site Area Emergency is indicated because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

A manual trip/scram initiation is not considered successful if action away from the Control Room control panels was required to trip/scram the reactor.

A manual trip/scram is any set of actions by the reactor operator(s) at the Control Room control panels which causes control rods to be rapidly inserted into the core and brings the reactor subcritical.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to challenges in maintaining core-cooling or heat sink.

SYSTEM MALFUNCTION

SS3

Initiating Condition -- SITE AREA EMERGENCY

Loss of All Vital dc Power for 15 Minutes or Longer.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

Note: *The Site Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Less than [TBD] bus voltage on all of the following IE dc Busses for 15 minutes or longer.

IDSA-EA-1	IDSC-EA-1
IDSA-EA-2	IDSC-EA-2
IDSB-EA-1	IDSC-EA-3
IDSB-EA-2	IDSD-EA-1
IDSB-EA-3	IDSD-EA-2

Basis:

Loss of all dc power compromises ability to monitor and control plant safety functions. Prolonged loss of all dc power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. Fifteen minutes for the initiating condition was selected as a threshold to exclude transient or momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation, or Site Emergency Director judgment ICs.

SYSTEM MALFUNCTION

SS6

Initiating Condition -- SITE AREA EMERGENCY

Inability to Monitor a SIGNIFICANT TRANSIENT in Progress.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

1. a. Loss of all PLS, PMS and DAS Indication and Monitoring capability

AND

b. A SIGNIFICANT TRANSIENT in progress.

Basis:

This IC recognizes the inability of the Control Room staff to monitor the plant response to a transient. A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public.

SYSTEM MALFUNCTION

SG1

Initiating Condition -- GENERAL EMERGENCY

All Safety Related dc Batteries Not Being Charged for Greater Than 72 Hours Due to Loss of Power to PIP Busses.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Safe/Stable Shutdown

Emergency Action Level:

1. PIP Busses ECS-ES-1 and ECS-ES-2 de-energized for greater than 72 hours.

Basis:

The dc Battery design is for at least 72 hours of safety related power. If the dc busses have been de-energized, then the reactor is being maintained in a safe shutdown condition by gravity and natural circulation. This reduces the fission product barrier protection for the plant to being dependent on the non-safety related ancillary diesels to ensure safety, creating a potential threat to all three fission product barriers. As the batteries would be beyond their design capability, operators would also be dependent upon indications powered by the ancillary diesels for monitoring plant status and other functions.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

Under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, it is necessary to give the Site Emergency Director a reasonable idea of how quickly to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that Loss or Potential Loss of Fission Product Barriers is IMMINENT?

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

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Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on Site Emergency Director judgment as it relates to IMMINENT Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers.

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SG2

Initiating Condition -- GENERAL EMERGENCY

Automatic Scram (Trip) and All Manual Actions Fail to Shutdown the Reactor and Indication of an Extreme Challenge to the Ability to Cool the Core Exists.

Operating Mode Applicability: Power Operation
Startup

Emergency Action Level:

1. Failure of PLS, PMS and DAS to complete a Reactor Trip

   AND

   EITHER of the following exists or has occurred due to continued power generation:

   a. Core Cooling CSF - Red.

   OR

   b. Heat Sink CSF - Red.

Basis:

Automatic and manual trip/scram are not considered successful if action away from the Control Room control panels was required to trip/scram the reactor.

Under the conditions of this EAL, efforts to bring the reactor subcritical to the extent that the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed are not successful. This situation could be a precursor for a core melt sequence.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the Safety System Design, a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier matrix declaration to permit maximum off-site intervention time.

Appendix 2 - Radiological Assessment and Monitoring

1.0 Introduction

This appendix provides information regarding atmospheric transport and diffusion assessment as discussed in Appendix 2 to NUREG-0654, Rev. 1, "Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants."[7] Three topics are identified in Appendix 2 to NUREG-0654:

- Meteorological measurements.
- Atmospheric transport and diffusion assessment.
- Remote interrogation.

Because meteorological measurements are discussed elsewhere in this COL application, only a brief discussion of this topic is provided in this Appendix. Similarly, information regarding remote polling is discussed in FSAR Subsection 2.3 and is only briefly discussed below. The majority of this Appendix provides a description of the design for the atmospheric transport and diffusion assessment models used by TVA.

2.0 Discussion

10 CFR 50.47 requires that the Emergency Plan provide "adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use."[8] Appendix E to 10 CFR 50 requires that emergency facilities and equipment include "equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment."[9]

2.1 Meteorological Measurements

Appendix 2 to NUREG-0654 provides clarification of the requirement in 10 CFR Part 50, Appendix E, that "the nuclear power plant operator shall have meteorological measurements from primary and backup systems."[10] The design of the meteorological measurement system is discussed in BLN FSAR Subsection 2.3. This design addresses the guidance provided in Supplement 1 to NUREG-0737.[11] The meteorological measurements program is consistent with Revision 1 to NRC Regulatory Guide 1.23[12].

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[7] U.S. Nuclear Regulatory Commission, 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," Washington, DC, November 1980.

[8] 10 CFR 50.47(b)(9).

[9] 10 CFR 50, Appendix E, IV.E.2.

[10] U.S. Nuclear Regulatory Commission, NUREG-0654, Rev. 1, Appendix 2, "Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants," Washington, DC, November 1980.

[11] U.S. Nuclear Regulatory Commission, NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements," Washington, DC, January 1983.

[12] U.S. Nuclear Regulatory Commission, Regulatory Guide 1.23, Rev. 1, "Meteorological Monitoring Programs for Nuclear Power Plants," Washington, DC, March 2007.

2.2 Atmospheric Transport and Diffusion Assessment

Atmospheric transport and diffusion assessment requirements are discussed in Appendix E to 10 CFR 50 which states, "the means to be used for determining the magnitude of and for continually assessing the impact of the release of radioactive material shall be described."[13] Two classes of atmospheric transport and diffusion models are discussed in NUREG-0654. This Appendix discusses the model used for the Bellefonte Nuclear Plant, which addresses guidance associated with the "Class B" model described in Appendix 2 of NUREG-0654: "a numerical model which predicts the spatial and temporal variations of plume distribution and provides estimates of deposition and relative concentration of radioactivity within the plume exposure and ingestion pathway emergency planning zones for the duration of any radioactive materials releases during a declared emergency."[14]

2.3 Remote Access

Appendix 2 of NUREG-0654/FEMA-REP-1 provides guidance concerning remote interrogation. The guidance supports the requirement in 10 CFR 50, Appendix E for "provisions for communications among the nuclear power reactor control room, the onsite technical support center and the near-site emergency operations facility; and among the nuclear facility, the principal State and local emergency operations centers, and field assessment teams."[15] NRC Regulatory Guide 1.23 also discusses remote interrogation capability. FSAR Subsection 2.3 addresses provisions for remote access to the meteorological system.

3.0 Design Description: Atmospheric Transport and Diffusion Assessment

The remainder of this Appendix focuses on the design for the atmospheric transport and diffusion assessment models used by TVA. The design addresses the following program elements for accident assessment that demonstrate compliance with requirements in 10 CFR 50.47(b)(9) and address evaluation criteria from NUREG-0654 discussed in Section II.I of this plan:

1. The means exist to provide initial and continuing radiological assessment throughout the course of an accident.

2. The means exist to determine the source term of releases of radioactive material within plant systems, and the magnitude of the release of radioactive materials based on plant system parameters and effluent monitors.

3. The means exist to continuously assess the impact of the release of radioactive materials to the environment, accounting for the relationship between effluent

[13] 10 CFR 50, Appendix E, IV.B.

[14] NUREG-0654, Rev. 1, Appendix 2, "Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants," Washington, DC, November 1980.

[15] 10 CFR 50, Appendix E, IV.E.9.c.

monitor readings, and onsite and offsite exposures and contamination for various meteorological conditions.

4. The means exist to make rapid assessment of potential magnitude and locations of any radiological hazards through gaseous release pathways.

5. The means exist to estimate integrated dose from the projected and actual dose rates, and for comparing these estimates with the EPA Protective Action Guides (PAGs) [16].

The three computer codes described below work together as an integrated accident dose assessment package. These codes are used by TVA's emergency dose assessment staff to perform dose assessment calculations during a drill or actual emergency. These codes provide near real time estimates of potential doses to individuals from releases of radioactive materials via the atmospheric pathway and back-calculate release rates from measurements around the plants. These codes are:

- Radiological Emergency Dose (RED) code which is a dose assessment code used to track impacts and plume location and to compare the results of field measurements to the estimated impacts.

- Forecast Radiological Emergency Dose (FRED) code which is the code with which projected dose impacts are calculated and is used to recommend protective actions in accordance with EPA PAGs.

- Back-calculation Radiological Emergency Dose (BRED) code which is used to estimate release rates based on measured external dose rates or I-131 concentrations.

Using FRED, forecast meteorological information and current or projected radionuclide release rates are entered to calculate the radiological impact of a release to a radial “grid” of points covering the Plume Exposure Pathway EPZ and the Ingestion Exposure Pathway EPZ. The operators use this hypothetical projected future dose out to locations on the grid to make protective action recommendations against EPA guidelines. The forecasting capability allows the user to make hypothetical calculations to examine the effects that changing the meteorological or release rate conditions might have on the progress of the event.

RED, FRED, and BRED are interactive Gaussian segmented plume models.[17] The Gaussian assumption is that the vertical and cross-plume distributions of mass can be described by a Gaussian probability distribution function.

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[16] U. S. Environmental Protection Agency, U.S. Office of Radiation Programs, “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents,” EPA-400-R-92-001, October 1991.

[17] D. C. Powell et al, “MESODIF-II: A Variable Trajectory Plume Segment Model to Assess Ground Level Air Concentrations and Deposition of Effluent Releases from Nuclear Power Facilities,” Battelle Pacific Northwest Laboratories, NUREG/CR-0523 (1979).

RED, FRED, and BRED compute the transport, diffusion and radionuclide inventories as time-dependent properties. RED and BRED calculate impacts based on data supplied for fifteen minute time steps. FRED calculates impacts for one hour time steps. The radioactive material released during a time step is placed in a straight plume segment. Consecutive segments are arranged at different angles with respect to each other due to changes in wind directions. This allows for realistic plume tracking and trajectories. RED can store data for 80 fifteen minute time segments (i.e., 20 hours). After that time, the RED model drops the oldest segment. The RED code will retain the previous impact of segments as they are dropped (e.g., ground deposition concentrations), but no additional impacts from any plumes still airborne in the EPZ after 20 hours will be included. BRED can back-calculate for 20 fifteen minute time segments (i.e., 5 hours). After that, the BRED model informs the user that the measurement location was not impacted by the plume using the data for those segments. FRED will accept up to 8 one hour segments.

Plume transport and diffusion are based on meteorological data measured on the meteorological tower at the nuclear plant site. RED and BRED use fifteen minute averaged meteorological data. FRED uses one hour averaged forecast meteorological data developed by persisting the last 15-minute average value of the actual data received from the tower for one hour. Ground level or elevated release modes are considered by the models based on the release characteristics and the wind speed. A particular vent may sometimes be considered as an elevated release and at other times as a ground level release point depending on these characteristics. Plume heights are estimated for elevated releases consistent with the guidance provided in Regulatory Guide 1.111.[18] The models can consider only one release point at a time for any segment. They can switch between release points for consecutive segments, even between elevated and ground level releases, but each segment can consider only one release point at a time.

Terrain heights are considered for each receptor if the release is elevated. The plume is assumed to move over terrain with the receptor at an elevation relative to (above) plant grade. Channeling effects of hills, ridges, rivers and other geographic features are not considered.

The radioisotopes and mixes used by the models[19, 20] are consistent with those discussed in the RASCAL Version 2.1 User's Guide (NUREG/CR-5247).[21] The inventories and release fractions are consistent with NUREG-1465 methodology[22]. NRC Regulatory Guide 1.183[23] endorses NUREG-1465 methodology for development of the "Alternate Source Terms" used with

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[18] U. S. Nuclear Regulatory Commission, Regulatory Guide1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light Water-Cooled Reactors (Revision 1)," Office of Standards Development, July 1977.

[19] R. M. Nicoll, "Revisions to RED/FRED/BRED Codes," TVA internal memorandum to B. W. McKenna, August 26, 1997, L63 970826 800.

[20] R. M. Nicoll, "Corrections to RED/FRED/BRED Code Revisions," TVA internal memorandum to B. W. McKenna, April 28, 1998, L61 980428 800.

[21] U. S. Nuclear Regulatory Commission, "RASCAL Version 2.1 User's Guide," NUREG/CR-5247, Volume 1, Revision 2, December 1994.

[22] U. S. Nuclear Regulatory Commission, "Accident Source Terms for Light-Water Nuclear Power Plants," NUREG-1465, June 1992.

[23] U.S. Nuclear Regulatory Commission, Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," Washington, DC, July 2000.

advanced light-water reactors. The AP1000 DCD § 1.9.5.1.2 specifies the alternative source term in Regulatory Guide 1.183 will be used, along with the accident source term models as described in NUREG-1465.

This results in the use of four main release types: reactor coolant system (RCS) coolant, gap, core damage, and core melt. In addition to these default release types, the models allow a fifth type which lets the user identify a custom mix, selecting from the 39 available nuclides. Within these five release types, the user can select between filtering and tritium production options. This results in a total of nineteen release types, with the nineteenth option being user selected custom mix. The user has the option of entering either a noble gas release rate or noble gas and I-131 release rates. If just a noble gas release rate is entered, the release rate for the radionuclides is determined using a release mix from a provided table. If a non-zero I-131 release rate is also entered, the iodine radionuclide release rates are determined using a release mix from another identified table.

The activity of each plume segment is estimated by considering up to 39 radionuclides. The decay and buildup of radionuclides after release is calculated for all but the first time step with at most one daughter being produced.

The FRED model defines a plume impact zone within a polar receptor grid. Each receptor represents a ground-level point at which the code computes a radiological impact. The receptor grid has 768 receptors arranged on 19 concentric circles centered at the source. There are 24 receptors on each of the first six circles (at radii of 0.62, 1.25, 2.00, 2.50, 3.00, and 3.75 miles) with a receptor every 15 degrees. There are 48 receptors on each of the last 13 circles (at radii of 5, 6.25, 7.5, 8.75, 10, 15, 20, 25, 30, 35, 40, 45, and 50 miles) with a receptor every 7.5 degrees. Receptors on adjacent rings are radially offset by half the distance between each receptor. This reduces the possibility of a narrow plume segment missing all receptors.

The RED and BRED models have an enhanced close-in receptor grid which includes radii at additional distances of 0.1, 0.25, 0.5, 0.75, 1.0, 1.5, 3.5, 4.0, 4.5, 6.0, 7.0, 8.0, and 9.0 miles. This helps to increase the possibility that impacts are calculated at locations closer to points where measurements might be taken.

The use of a fixed receptor grid does not ensure that centerline values will be calculated. Because the maximum estimated impacts are desired, the models perform a centerline calculation at radii distances out to and including the 10-mile radii. The receptor nearest the centerline on these radii is assigned the centerline value.

Impact determination begins with a check to determine if concentrations are significant. A value of 10^{-4} $\mu Ci/m^3$ is used as the minimum significant concentration. This is based on an I-131 inhalation dose rate of 10^{-3} rem/hour to the thyroid (using Regulatory Guide 1.109 dose factors),[24] but will be applied to the most abundant nuclide in the mix for determination of significance. The edge of the plume is defined as the location at which this minimum air concentration exists at the height of the plume centerline. This approach restricts calculation of

[24] U. S. Nuclear Regulatory Commission, Regulatory Guide 1.109; "Calculation of Annual Doses to Man From Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50, Appendix I (Revision 1)," Office of Standards Development, October 1977.

air concentrations and dose rates to those which are above the level of interest. A plume stepping technique is used to provide appropriate representation of the plume. This technique consists of dividing each plume segment into an appropriate number of substeps that will estimate the impact over the time step.

- The pathways addressed by the RED and FRED models include:
- Plume Effective Dose Equivalent
- Thyroid Committed Dose Equivalent
- Inhalation EDE
- Ground EDE
- Total Effective Dose Equivalent
- Cow-milk ingestion dose

Doses due to exposure to the plume are estimated using one of two techniques: the semi-infinite cloud model (for immersion in a plume) or the finite cloud model (for exposure to an elevated plume).

Semi-infinite Cloud Model

The semi-infinite cloud model assumes that the plume of radioactivity extends from the ground upward to infinity with a uniform concentration of activity throughout. The semi-infinite cloud model is used for any of the following combinations: ground level releases, elevated releases where the mix has been customized by the user, and when an elevated plume has been determined to be uniformly mixed in the vertical direction.

Finite Cloud Model

Plume EDE dose estimates from elevated plumes are calculated using a finite cloud model. The finite cloud methodology was developed by Hamawi[25] based on the equations in Slade.[26] The values are in the form of a "gamma χ/Q" which enables consistency with the typical air concentration determination used for semi-infinite calculations. The finite cloud model is used for elevated releases. Once the plume is vertically mixed; however, the semi-infinite cloud model is used.

RED and FRED calculate doses from the ingestion of cow's milk for the infant thyroid. These doses are based on calculated ground level air concentrations of I-131. RED also calculates peak I-131 concentrations in milk from ground deposition values.

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[25] J. N. Hamawi, "Methodology and Software Routines for Computation of the Finite-Cloud Radiation Fields from a Straight-Line Gaussian Plume," ENTECH Engineering, Inc., P100-R22 Volume A, Revision 0, January 1998.

[26] D. H. Slade, "Meteorology and Atomic Energy 1968," Air Resources Laboratories, July 1968, p. 103.

RED estimates ground concentrations for particulate radionuclides. These concentrations are based on the dry deposition only, the model does not account for washout due to precipitation. The treatment of dry deposition is quite conservative because it uses a relatively high deposition velocity and the plume activity is never depleted by deposition.

Dose pathways considered by RED and FRED (Plume EDE, Ground EDE, Thyroid CDE, Inhalation EDE, and Cow-milk ingestion) are calculated from the ground level air concentration for each radionuclide. This methodology is taken from EPA Protective Action Guides.[27]

Output from the RED and FRED codes is available in chart and graphic form. Charts may be printed which show the dose impacts for each receptor which has been impacted. Charts in this format are also available from the RED code for the cow milk concentration, I-131 air concentrations, and deposition of individual radionuclides. Additional charts, called the RED Model Radiological Impact Estimates and the FRED State Update Form, are available. These forms present a summary of the information used in the time step and current and/or cumulative impacts. Both codes also provide graphic output in the form of plume plots. The RED code can also show a graphic estimation of the area in which deposition of particulate radionuclides may have occurred. In addition, the RED and FRED codes and the BRED code include an Input Hardcopy which lists the input information for each segment.

Output from the BRED code is available in two forms. The first is a summary of the input information and calculated release rates. The second is a listing of impacted receptors and their χ/Q values.

RED, FRED and BRED are written in VAX FORTRAN which meets or exceeds ANSI standards.[28] These programs are executed as interactive programs on a server-based Charon VAX 4000 emulator. Pericom software is used to emulate a Tektronix Color Graphic Terminal on a standard PC. Data tables and maps are output to a printer.

The TVA "Radiological Emergency Dose (RED), Forecast Radiological Emergency Dose (FRED), Back-Calculation Radiological Emergency Dose (BRED) Code Documentation Technical Basis"[29] provides detailed information on the models and subroutines. Technical bases and flow descriptions are included in this document. Sample model output, data files, references and an index are also included. This document is not included with the COL application. It forms the basis for subsequent inspection and supports testing necessary to satisfy the acceptance criteria.

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[27] U. S. Environmental Protection Agency, U.S. Office of Radiation Programs, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA-400-R-92-001, October 1991.

[28] American National Standards Institute, "American National Standard Programming Language FORTRAN," ANSI X3.9-1978, April 1978.

[29] D. E. Pittman, "Radiological Emergency Dose (Red), Forecast Radiological Emergency Dose (Fred), and Back-Calculation Radiological Emergency Dose (Bred) Code Documentation Technical Basis," Tennessee Valley Authority, March 2001.

Appendix 3 - Public Alert and Notification System

1.0 Summary

This document provides a design for the prompt notification system used for alerting the public in the event of a radiological emergency at the Bellefonte Nuclear Plant. Historically a system of outdoor warning devices (i.e., sirens) has been used for this purpose in the plume exposure pathway emergency planning zones of nuclear power stations.

2.0 Design Objective/Basis

The design parameters are intended to meet or exceed the applicable criteria in Appendix 3 of NUREG-0654/FEMA-REP-1, “Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.”

2.1 Inputs/Assumptions/Criteria

2.1.1 Inputs

Initial inputs for the design of the siren system are based on projected population estimates and local topography. Initial inputs include:

- Local population demographics
- Local topography
- Local meteorological conditions

The final parameters of the siren system are based on a detailed sound engineering study of the plume exposure pathway emergency planning zone (EPZ). Siren locations are based on the sound engineering study, necessary rights-of-way, and electrical power availability.

2.1.2 Assumptions

This design is based on technology currently used for promptly alerting the public at existing nuclear power stations (i.e., fixed sirens) and current guidance from the NRC and Federal Emergency Management Agency (FEMA).

Emergency Planning Zone (EPZ): The Plume Exposure Pathway EPZ is defined in Section I of this plan.

Population Demographics: NUREG-0654/FEMA-REP-1 provides specific guidance for sound coverage in areas with population densities greater than 2000 persons/mi² within the EPZ. No areas meeting this criterion have been identified in the Bellefonte Plume Exposure Pathway EPZ; therefore, this guidance does not apply to the Bellefonte public alert and notification system.

Capability beyond fixed sirens: Alternate alert equipment such as mobile sirens may be used in thinly populated areas if cost effective. Alternate methods for alerting and notifying institutional facilities are provided, as needed.

2.1.3 Criteria

Alerting criteria are delineated in NUREG-0654/FEMA-REP-1 (App 3) which also references Civil Preparedness Guide 1-17 (CPG 1-17). Additional guidance is provided in FEMA-REP-10. The following performance criteria are used to consider the system functional:

Reliability: The system is designed to allow activation by at least two separate (redundant) methods and will be available 24 hours per day. Backup power supplies are provided for the activation system. Fixed siren design is sufficient to withstand the environmental conditions expected at the emplacement (e.g., wind loading, precipitation).

Signal Parameters: The siren signal is a 3 to 5 minute steady signal capable of repetition. The strength of the signal is at least 10 db above average ambient noise level but not more than 123 db at the receptor.

Coverage: The siren system alerts the population on an area-wide basis within the Plume Exposure Pathway EPZ within 15 minutes. The system provides direct coverage of essentially 100% of the population within 5 miles of the site. Alternative methods, such as mobile sirens, may be employed outside the inner 5 mile radius if needed to assure coverage of the plume exposure pathway EPZ.

2.2 Methodology

A detailed sound engineering study, including acoustic surveys, is used to determine optimum siren site locations. Site selection is also based on population density, ambient noise levels, topography, electric power availability, and existing/interfaced siren locations. Siren site selection is subject to obtaining necessary rights of way.

Alternate means of alerting the population may be used for areas that are not suitable for fixed siren emplacement. These include the use of mobile sirens in areas beyond 5 miles from the site to alert the public in sparsely populated areas.

Public information is provided to transient populations within the EPZ to advise them on actions to be taken if the sirens are sounded.

3.0 System Description

The siren system consists of redundantly power supplied sirens that are activated by Jackson County emergency response officials (coordinated with DeKalb County emergency response officials). A redundant activation method is available. A method to activate individual sirens for maintenance and testing is provided.

3.1 System Components

The fixed sirens/controllers are an integrated package from a single vendor to promote reliability of system operations and component compatibility.

3.2 System Operation

Procedures based on vendor-supplied operating manuals are provided. Jackson County produces and approves specific operating procedures to be used to operate the system. Training on procedures and protocols to be used to operate the system is provided.

3.3 System Maintenance

The vendor provides procedures and recommendations for preventative maintenance, inspections, and testing which are used to produce maintenance and test procedures. An adequate supply of parts and components is maintained to facilitate corrective and preventative maintenance.

3.3.1 Tests

Tests are performed as indicated in NUREG-0654/FEMA-REP-1, App 3 as follows:

- Silent Test - every 2 weeks
- Growl Test (or equivalent) – Quarterly and when preventative maintenance is performed
- Complete Cycle Test – Annually, and as required for formal exercises

3.3.2 Inspections

An annual inspection is performed for each siren and control point. The sirens' electronics, batteries and transmitters/antennas are tested to vendor specifications. In addition, visual inspections of fixed siren connections and installation are performed annually.

3.4 Detailed Design Requirements

This layout is based on sirens that provide a sound level of at least 70 dB at a distance of 6,000 ft from the siren. A detailed acoustical/sound engineering study identifying optimal placement of sirens provides information for final placement of sirens. Availability of power and the ability to obtain necessary rights of way also affect actual siren placement. Unusual topography as well as adjacent river areas are considered in this study.

4.0 Results and Conclusions

The siren system and administrative controls meet current applicable regulations and guidance and address applicable regional considerations (e.g., demographics and topography). The system provides flexibility to add additional capabilities as future conditions/regulations dictate.

5.0 References

1. NUREG-0654/FEMA-REP-1 (Addenda 2002) “Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,” 1980.

2. Civil Preparedness Guide 1-17 (CPG 1-17), “Outdoor Warning Systems Guide,” 1980.

3. FEMA REP 10, “Guide For The Evaluation Of Alert & Notification Systems For Power Plants,” 1985.

Appendix 4 - Evacuation Time Estimate

The Bellefonte ETE report, published separately, describes the analyses undertaken and the results obtained by a study to develop Evacuation Time Estimates (ETE) for the proposed Bellefonte Nuclear Plant located in Jackson County, Alabama. Evacuation time estimates provide State and local governments with site-specific information needed for Protective Action decision-making.

In the performance of the ETE, guidance was provided by documents published by Federal Government agencies. 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.

- State of the Art in Evacuation Time Estimate Studies for Nuclear Power Plants, NUREG/CR-4831, March 1992.

- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/ CR-6863, January 2005.

Planning Basis and Assumptions

The ETE project began in August 2006 and extended over a period of eight months. The major activities performed are briefly described below in chronological sequence:

- Attended “kick-off” meetings with Tennessee Valley Authority personnel, Enercon Services and emergency management personnel representing state and local governments.

- Accessed U.S. Census Bureau data files for the year 2000. Studied Geographical Information Systems (GIS) maps of the area in the vicinity of BLN, 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 EPZ, extending 15 miles radially from the plant.

- Designed and sponsored a telephone survey of residents within the EPZ to gather focused data needs 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 rate of evacuating vehicles were estimated from the gathered data. The trip generation rate reflected the estimated mobilization time (i.e., the time required by evacuees to prepare for the evacuation trip) that was computed using the results of the telephone survey of EPZ residents.

- Following Federal guidelines, the EPZ is subdivided into 13 Emergency Response Planning Areas (ERPA). These ERPA are then grouped within circular areas or "keyhole" configurations (circles plus radial sectors) that define a total of 22 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, Ice). One special scenario involving construction of a second unit at the BLN site, following completion and initiation of operations of the first unit, was considered.

- The Planning Basis for the calculation of ETE is:

    - A rapidly escalating accident at BLN 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 yields ETEs, 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 including the prospect of a terrorist attack.

- If the emergency occurs while schools are in session, the ETE study assumes that the children are evacuated by bus directly to reception centers 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 either ride-share with relatives, friends or neighbors, or are evacuated by buses provided as specified in the county evacuation plans. Those in special facilities likewise are 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 264 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 22 Evacuation Regions to completely evacuate from that Region, under the circumstances defined for one of

the 12 Evacuation Scenarios (22 x 12 = 264). 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 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, elect to "voluntarily" evacuate. These voluntary evacuees could impede those others 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 BLN), 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

The study includes the development of a comprehensive traffic management plan designed to expedite the evacuation of people from within an impacted region. This plan is also designed to control access into the EPZ after returning commuters have rejoined their families.

The plan takes the form of detailed schematics specifying: (1) the directions of evacuation travel to be facilitated, and other traffic movements to be discouraged; (2) the 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.

This plan was reviewed with State and local law enforcement personnel.

Results

A compilation of selected information is presented in the figures and tables provided in the body of the report. The ETE indicates that the estimated evacuation time for the non-transit dependent population of the entire Plume Exposure Pathway EPZ, under adverse weather conditions, is four and one half hours. The corresponding ETE for the transit dependent population is approximately five and one half hours. The ETE did not identify any impediments to the development of emergency plans for the Bellefonte site.

Tables A4-1 through A4-3 provide summaries of the estimated evacuation times for the general population, schools, and transit-dependent populations, respectively.

Table A4-1 - Time to Evacuate the Area of 100% 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 Wind Toward:	Midday		Midday		Evening	**Region Wind Toward:**	Midday			Midday	Evening		**Region Wind Toward:**	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Ice	Good Weather	Rain	Good Weather		New Plant Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01 2-mile ring	4:00	4:00	4:00	4:00	4:00	R01 2-mile ring	4:00	4:00	4:00	4:00	4:00	4:00	R01 2-mile ring	4:00
R02 5-mile ring	4:05	4:05	4:05	4:05	4:05	R02 5-mile ring	4:05	4:05	4:05	4:05	4:05	4:05	R02 5-mile ring	4:05
R03 Entire EPZ	4:10	4:10	4:10	4:10	4:10	R03 Entire EPZ	4:10	4:10	4:30	4:10	4:10	4:10	R03 Entire EPZ	4:30
2-Mile Ring and Downwind to 5 Miles														
R04 N, NNE, NNW	4:05	4:05	4:05	4:05	4:05	R04 N, NNE, NNW	4:05	4:05	4:05	4:05	4:05	4:05	R04 N, NNE, NNW	4:05
R05 NE	4:05	4:05	4:05	4:05	4:05	R05 NE	4:05	4:05	4:05	4:05	4:05	4:05	R05 NE	4:05
R06 ENE	4:05	4:05	4:05	4:05	4:05	R06 ENE	4:05	4:05	4:05	4:05	4:05	4:05	R06 ENE	4:05
R07 E, ESE	4:05	4:05	4:05	4:05	4:05	R07 E, ESE	4:05	4:05	4:05	4:05	4:05	4:05	R07 E, ESE	4:05
R08 SE, SSE	4:05	4:05	4:05	4:05	4:05	R08 SE, SSE	4:05	4:05	4:05	4:05	4:05	4:05	R08 SE, SSE	4:05
R09 S, SSW, SW	4:05	4:05	4:05	4:05	4:05	R09 S, SSW, SW	4:05	4:05	4:05	4:05	4:05	4:05	R09 S, SSW, SW	4:05
R10 WSW, W, WNW	4:05	4:05	4:05	4:05	4:05	R10 WSW, W, WNW	4:05	4:05	4:05	4:05	4:05	4:05	R10 WSW, W, WNW	4:05
R11 NW	4:05	4:05	4:05	4:05	4:05	R11 NW	4:05	4:05	4:05	4:05	4:05	4:05	R11 NW	4:05
5-Mile Ring and Downwind to EPZ Boundary														
R12 N, NNW	4:10	4:10	4:10	4:10	4:10	R12 N, NNW	4:10	4:10	4:10	4:10	4:10	4:10	R12 N, NNW	4:10
R13 NNE	4:10	4:10	4:10	4:10	4:10	R13 NNE	4:10	4:10	4:10	4:10	4:10	4:10	R13 NNE	4:10
R14 NE	4:10	4:10	4:10	4:10	4:10	R14 NE	4:10	4:10	4:10	4:10	4:10	4:10	R14 NE	4:10
R15 ENE	4:10	4:10	4:10	4:10	4:10	R15 ENE	4:10	4:10	4:10	4:10	4:10	4:10	R15 ENE	4:10
R16 E	4:10	4:10	4:10	4:10	4:10	R16 E	4:10	4:10	4:10	4:10	4:10	4:10	R16 E	4:10
R17 ESE	4:10	4:10	4:10	4:10	4:10	R17 ESE	4:10	4:10	4:10	4:10	4:10	4:10	R17 ESE	4:10
R18 SE, SSE	4:10	4:10	4:10	4:10	4:10	R18 SE, SSE	4:10	4:10	4:10	4:10	4:10	4:10	R18 SE, SSE	4:10
R19 S	4:10	4:10	4:10	4:10	4:10	R19 S	4:10	4:10	4:10	4:10	4:10	4:10	R19 S	4:10
R20 SSW, SW	4:10	4:10	4:10	4:10	4:10	R20 SSW, SW	4:10	4:10	4:30	4:10	4:10	4:10	R20 SSW, SW	4:30
R21 WSW, W, WNW	4:10	4:10	4:10	4:10	4:10	R21 WSW, W, WNW	4:10	4:10	4:30	4:10	4:10	4:10	R21 WSW, W, WNW	4:30
R22 NW	4:10	4:10	4:10	4:10	4:10	R22 NW	4:10	4:10	4:10	4:10	4:10	4:10	R22 NW	4:10

Table A4-2 - Estimated Evacuation Times for EPZ Schools

School	Driver Mobilization Time(min)	Travel Time from Depot (min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)		Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bndry to R.C. (mi.)		Travel Time EPZ Bdry to RC (min)	ETE to R.C. (hr:min)
				Major Road	Local Road			Major Road	Local Road		
Jackson County Schools											
Brownwood Elementary School	90	30	5	6.5	0.2	9	2:15	36	0.3	44	**3:00**
Caldwell Elementary School	90	30	5	5.8	0.1	8	2:15	36	0.3	44	**3:00**
Collins Elementary School	90	30	5	4.9	0	6	2:15	36	0.3	44	**2:55**
Dutton Elementary School	90	30	5	5.9	0.9	9	2:15	15.2	1.7	22	**2:40**
Epruett Center of Technology	90	30	5	11.5	0.1	14	2:20	36	0.3	44	**3:05**
Hollywood Elementary School	90	30	5	11.5	0.4	15	2:20	36	0.3	44	**3:05**
Jackson County Alternative School	90	30	5	11.5	1.5	17	2:25	36	0.3	44	**3:10**
Pisgah High School	90	30	5	14.4	1.9	22	2:30	7.1	1.7	12	**2:40**
Rosalie Elementary School	90	30	5	2.3	0.1	3	2:10	30.3	0.1	37	**2:45**
Scottsboro High School	90	30	5	7.4	0	9	2:15	36	0.3	44	**3:00**
Scottsboro Junior High School	90	30	5	4.9	0.6	8	2:15	36	0.3	44	**3:00**
Section High School	90	30	5	2.7	0	4	2:10	15.2	1.7	22	**2:35**
Thurston T Nelson Elementary School	90	30	5	4	0.1	5	2:10	36	0.3	44	**2:55**
DeKalb County Schools											
Henagar Junior High School	90	30	5	3.8	0.1	5	2:10	7.1	1.7	12	**2:25**
						Revision 1Average for EPZ:	2:16		**Average:**	36	**2:52**

Table A4-3 - Estimated Evacuation Times for the Transit- Dependent Population

Route Number	Single Wave						Second Wave						
	Mobilization (min)	Travel time to EPZ (min)	Route Length (mi.)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)	Arrive at RC (min)	Unload (min)	Driver Rest (min)	Return to EPZ (min)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)
1	150	30	24.9	50	15	**4:05**	172	5	15	36	50	15	**4:55**
2	150	30	11.7	23	15	**3:40**	172	5	15	36	23	15	**4:30**
3	150	30	17.3	35	15	**3:50**	172	5	15	36	35	15	**4:40**
4	150	30	25.9	52	15	**4:10**	172	5	15	36	52	15	**4:55**
5	150	30	17.9	36	15	**3:55**	172	5	15	36	36	15	**4:40**
Average for EPZ:						**3:56**	**Average for EPZ:**						**4:44**

The following figures illustrate selected information from the ETE:

- Figure A4-1 – illustrates the Plume Exposure Pathway EPZ, including the permanent resident population of each emergency response planning area
- Figure A4-2 – illustrates the permanent resident population of the Plume Exposure Pathway EPZ in a sector format
- Figure A4-3 – illustrates the locations of reception centers assumed for conduct of the ETE
- Figure A4-4 through A4-7 – illustrate the evacuation routes for the Plume Exposure Pathway EPZ population

Figure A4-1 - Plume Exposure Pathway EPZ and Permanent Resident Population by Emergency Response Planning Area

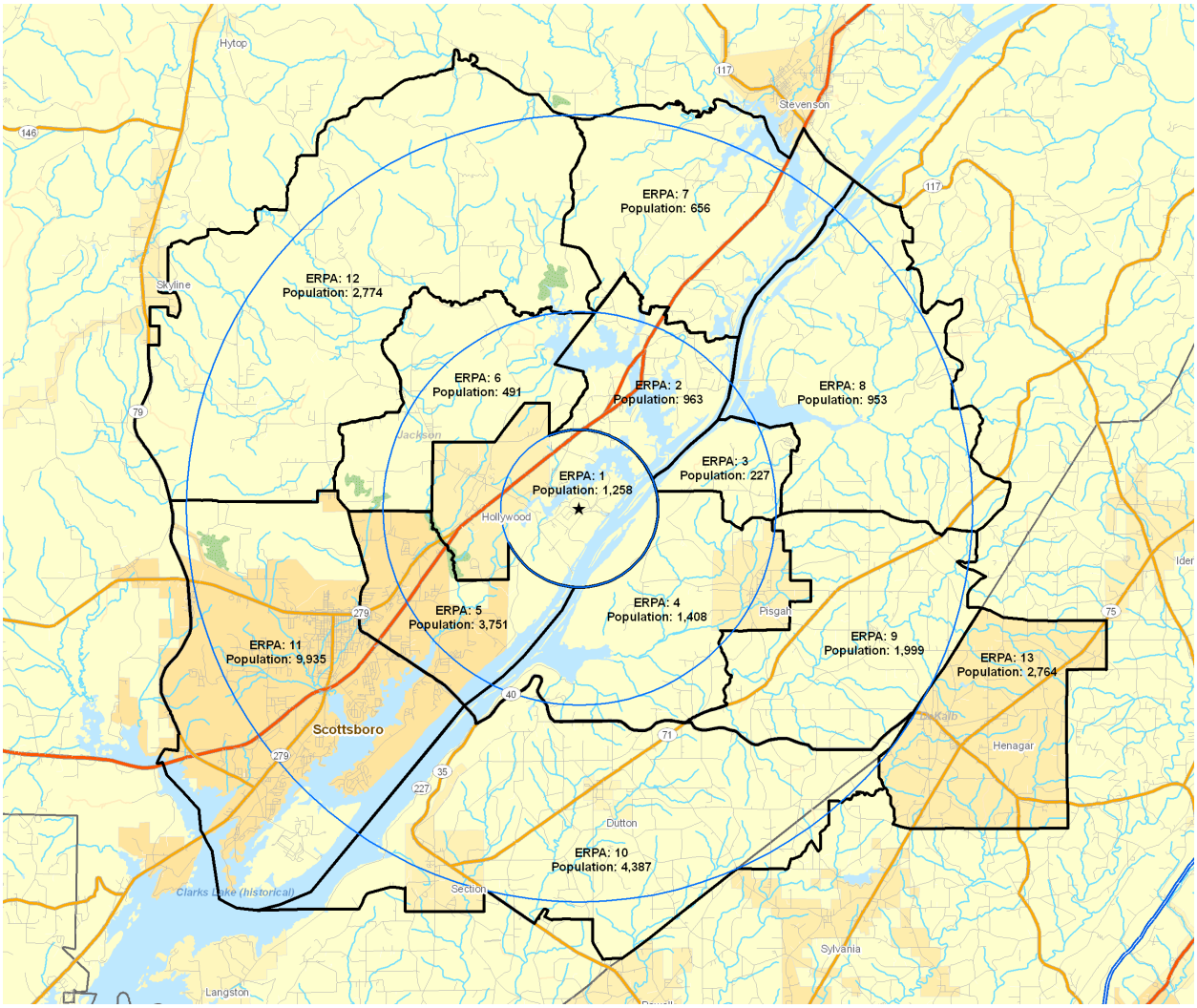
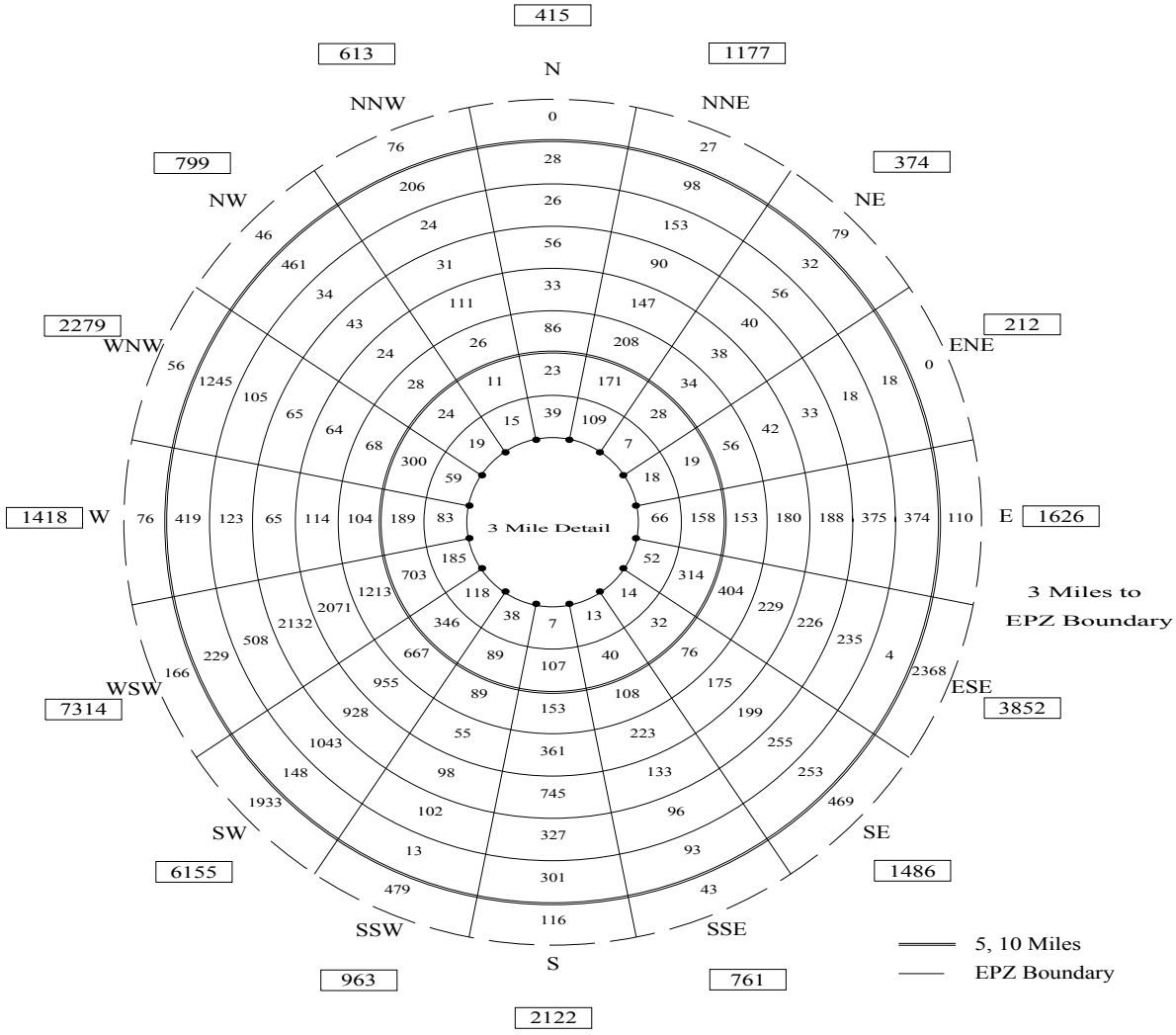


Figure A4-2 - Plume Exposure Pathway EPZ Permanent Resident Population by Sector



Resident Population			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	47	0-1	47
1-2	320	0-2	367
2-3	990	0-3	1357
3-4	842	0-4	2199
4-5	2554	0-5	4753
5-6	3473	0-6	8226
6-7	4822	0-7	13048
7-8	5072	0-8	18120
8-9	3480	0-9	21600
9-10	3922	0-10	25522
10-EPZ	6044	0-EPZ	31566

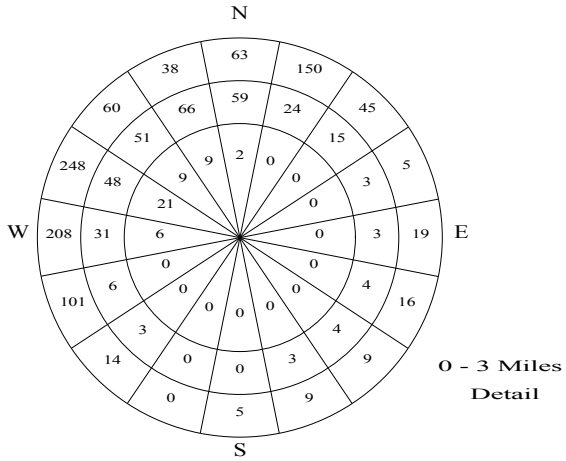


Figure A4-3 - Assumed Locations of Reception Centers

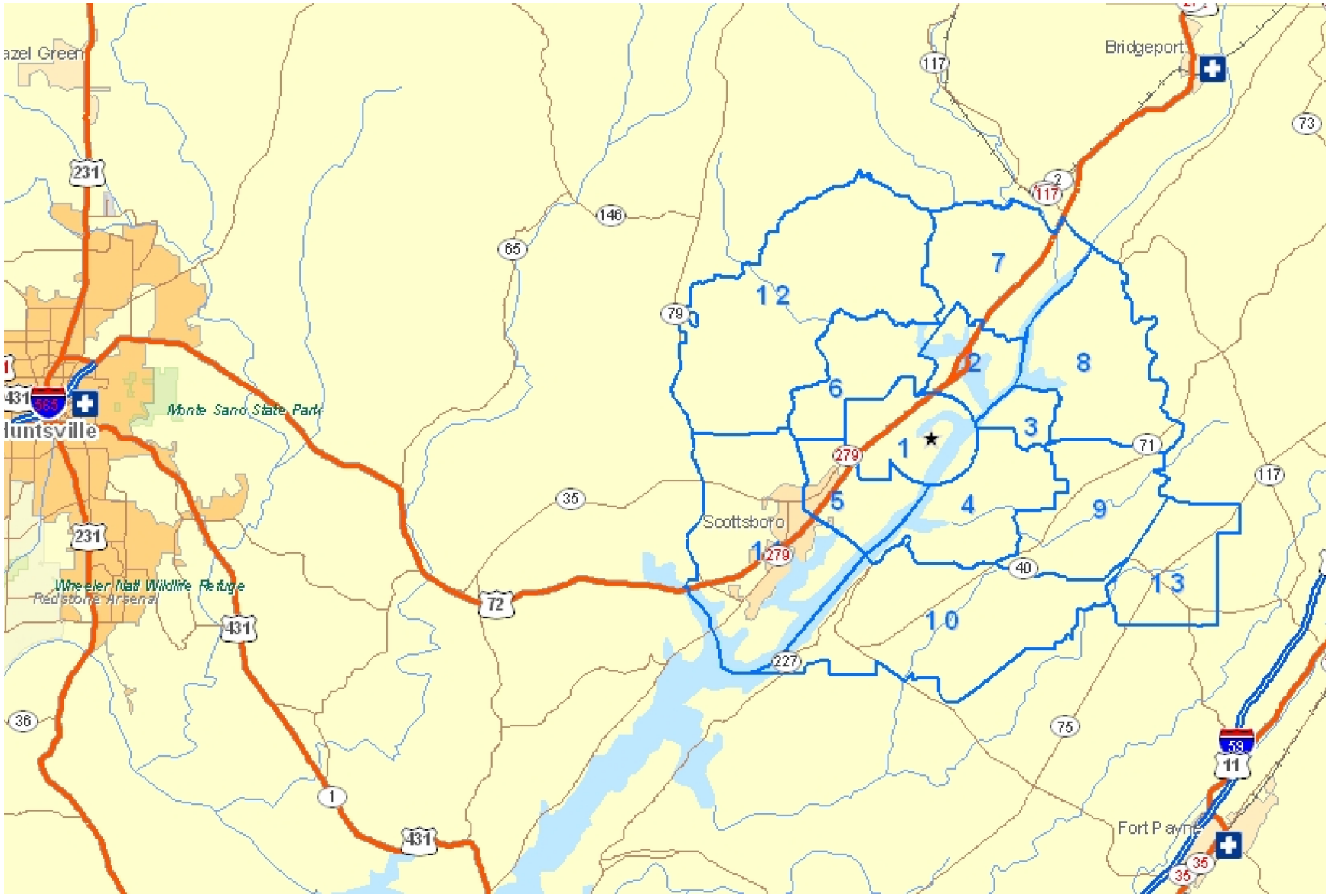


Figure A4-4 - Plume Exposure Pathway EPZ Evacuation Routes

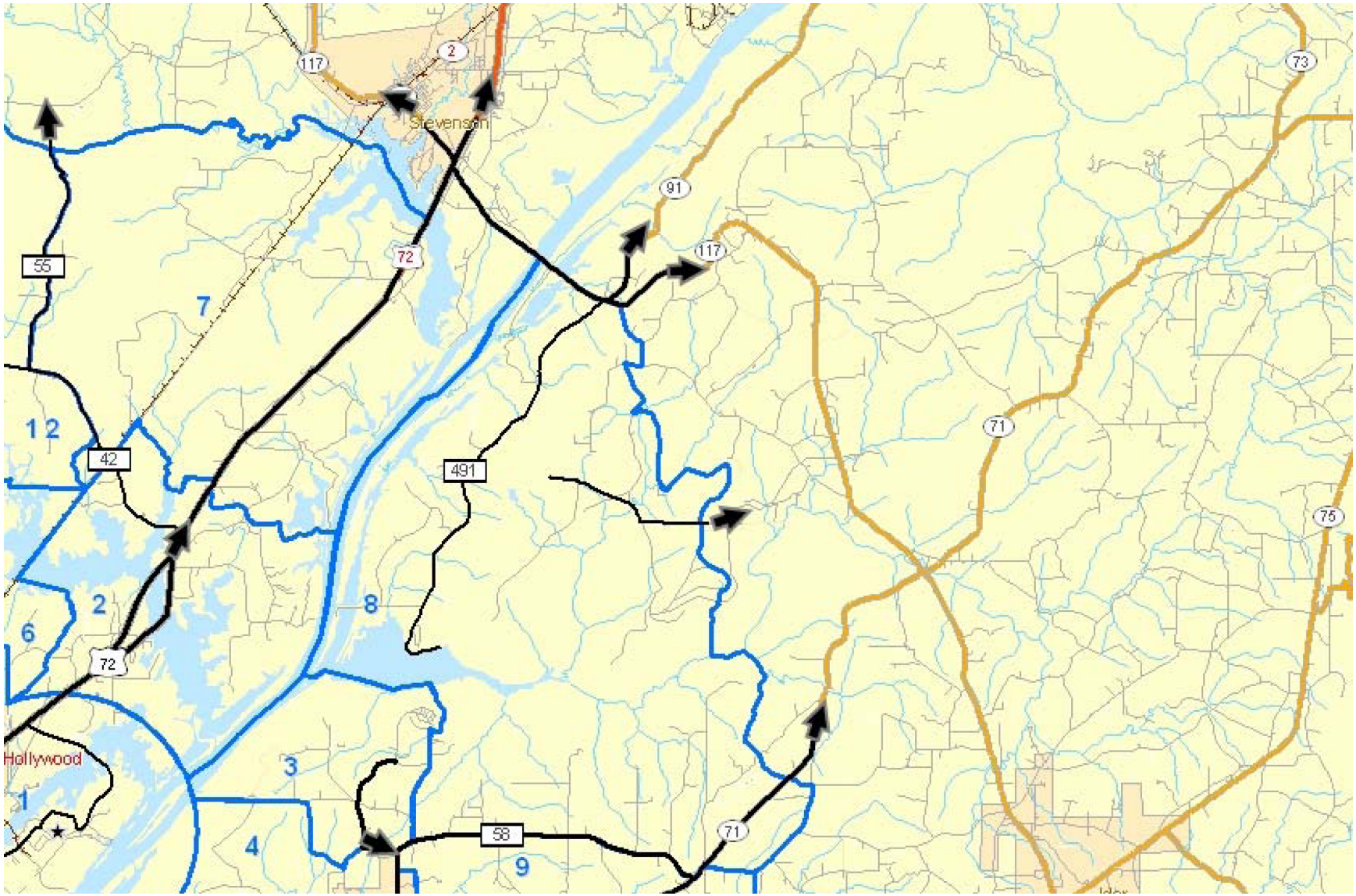


Figure A4-5 - Plume Exposure Pathway EPZ Evacuation Routes

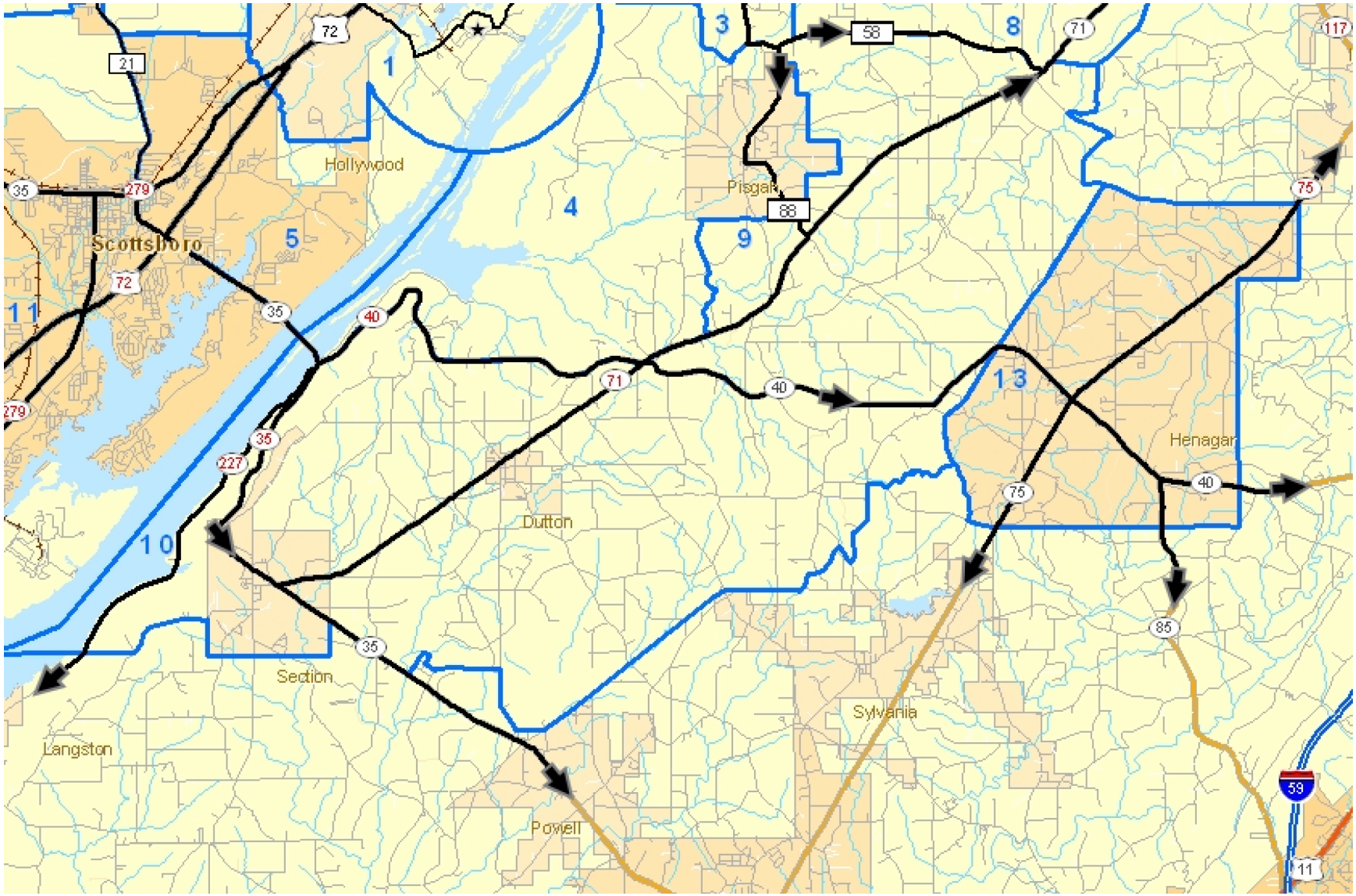


Figure A4-6 - Plume Exposure Pathway EPZ Evacuation Routes

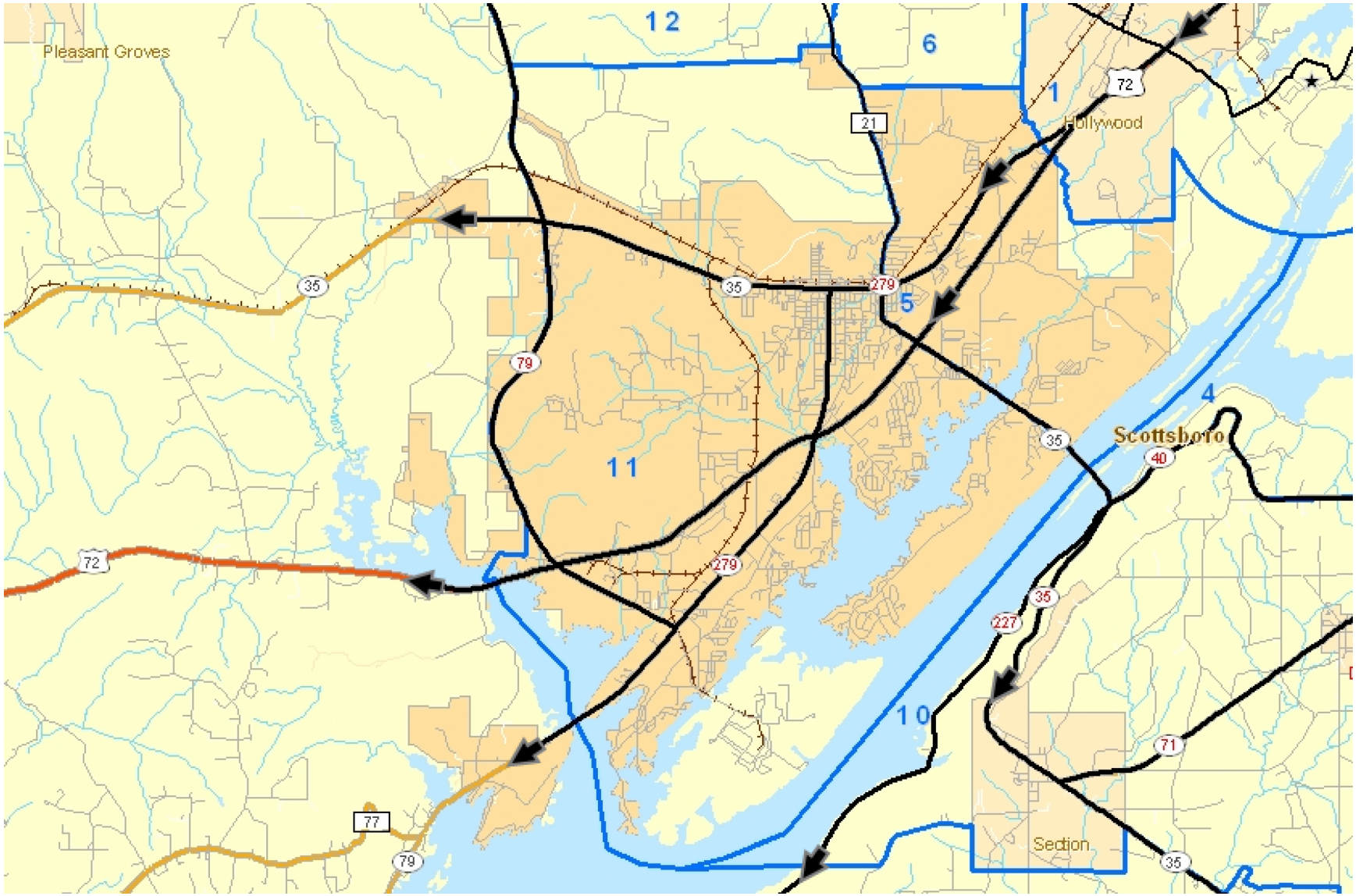
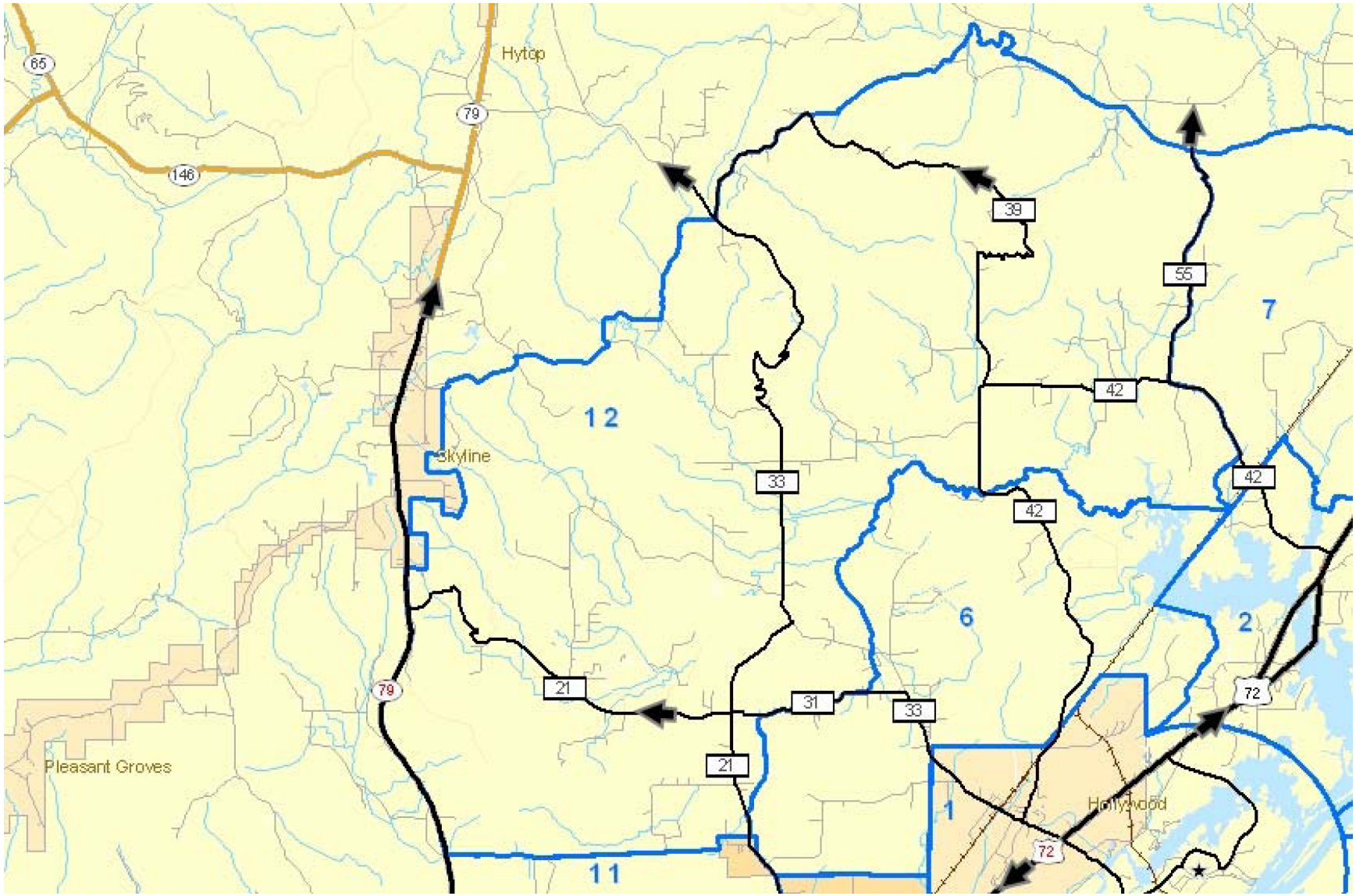


Figure A4-7 - Plume Exposure Pathway EPZ Evacuation Routes



Appendix 5 - Emergency Plan Implementing Procedures – Topical List

Emergency Plan Implementing Procedures (EPIPs) address a range of actions needed to implement the contents of this emergency plan. The EPIPs address, at a minimum, the following topics, including parenthetical references to the affected sections of this plan:

- Emergency Classification (II.D)
- Notifications Associated with Emergency Conditions (II.E, II.L.1)
- Emergency Communications (II.F)
- Protective Action Recommendations (II.J.7, II.J.10)
- Activation of the Emergency Response Organization (II.B)
- Site Assembly, Accountability, and Evacuation (II.J.4, II.J.5)
- Core Damage Assessment (II.I)
- Radiation Protection Under Emergency Conditions (II.K)
- Plume Tracking and Assessment of Off-site Radiological Conditions (II.I)
- Respiratory Protection and Distribution of Radioprotective Drugs (II.J.6)
- Personnel Monitoring (II.K.2, II.K.3)
- Decontamination (II.K.5, II.K.7)
- Obtaining and Analyzing High Activity Samples Under Emergency Conditions (II.I)
- Emergency Media Relations (II.G)
- Recovery and Reentry (II.M)

Additional plant procedures address various activities that are required to support the ongoing maintenance of emergency preparedness. These supporting procedures are not included within the body of the emergency plan implementing procedures. These supporting procedures address, at a minimum, the following topics, including parenthetical references to the affected sections of this plan:

- Emergency Equipment Inventory and Operational Tests (II.H.10)
- Conduct of Emergency Drills and Exercises (II.N)
- Testing of Emergency Communications Systems (II.N, II.F)
- Emergency Plan Training (II.G.5, II.O, II.P.1)

- Maintaining Emergency Preparedness (II.P)

Appendix 6 - Emergency Equipment and Supplies

TVA establishes and maintains inventories of emergency equipment and supplies for use by emergency response personnel in the ERFs and by TVA's off-site field monitoring teams. The actual inventories are based on the activities that occur in, or are dispatched from, each individual facility. Actual inventories are established in inventory lists in accordance with implementing procedures. Emergency kit inventories typically include the following:

- Radiation survey instrument(s)
- Surface contamination control and survey supplies
- Air sampling equipment and sampling media
- Scaler(s) or other appropriate radio-analytical counting instrument(s)
- Protective clothing
- Contamination control and decontamination supplies
- Respiratory protection equipment
- Radiological control posting and warning supplies
- Personnel monitoring equipment (record and instantaneous reading dosimeters)
- Radioiodine blocking agent
- Emergency lighting equipment
- Appropriate maps
- Computer equipment
- Administrative and recordkeeping supplies
- Plans, procedures, and drawings
- Communications equipment
- Batteries and other expendable supplies
- First aid supplies (e.g., bandages, stretchers, splints, topical ointments)

Appendix 7 - Certification Letters

A Letter of Agreement with the Institute of Nuclear Power Operations (INPO) will be included in this Appendix prior to receipt of nuclear fuel at the site.

A Letter of Agreement with the Westinghouse Electric Company (WEC) will be included in this Appendix prior to receipt of nuclear fuel at the site.

A Letter of Agreement with the Radiation Emergency Assistance Center/Training Site (REAC/TS) will be included in this Appendix prior to receipt of nuclear fuel at the site.

A Letter of Agreement with each medical support provider will be included in this Appendix prior to receipt of nuclear fuel at the site.

(Insert copies of certification letters here)

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

September 21, 2007

Mr. James Tidmore, Chairman
Jackson County Commission
Courthouse Suite 47
Scottsboro, Alabama 35768

Dear Mr. Tidmore:

As previously indicated in public announcements and meetings, the Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC (NuStart), is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR Part 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama (the Site). The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the Site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These proposed plans have been developed using, to the extent practical, federal, state, and local plans already in place for other nuclear generating units in Alabama. With the cooperation of affected state and local agencies, TVA and NuStart have developed Part 5 of the COL application, the "Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan," Revision E (The COL Emergency Plan). The emergency plan includes the emergency classification system required by NRC regulations. TVA and NuStart have worked with other knowledgeable representatives from the nuclear industry to develop a set of initiating conditions and emergency action levels consistent with this emergency classification system and appropriate to the proposed nuclear plant design.

In addition to the COL Emergency Plan, initial evacuation time estimates have been developed with input from various state and local government agencies in Alabama. The initial evacuation time estimate report is included in the COL application.

Emergency planning provisions of 10 CFR Part 52 and the COL application process require that TVA and NuStart "make good faith efforts to obtain certifications from the local and State governmental agencies with emergency planning responsibilities." At this time, we are asking the Jackson County Commission to certify that:

- The proposed emergency plans are practicable;
- The Commission is committed to participating in any further development of the plans, including any required field demonstrations; and
- The Commission is committed to executing its responsibilities under the plans in the event of an emergency.

Your signature on the enclosed certification also indicates that you concur with the emergency classification system, initiating conditions and emergency action levels and have reviewed the initial evacuation time estimates proposed in the Bellefonte Nuclear Plant Emergency Plan.

The actual emergency planning arrangements would be finalized in a letter of agreement at a later stage in the licensing process.

Jackson County's participation in these emergency planning efforts is greatly appreciated. I am happy to answer any questions you may have and would appreciate your signature if these terms are acceptable.

Please return signed Certification to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

Sincerely,

Jack A. Bailey

Jack A. Bailey
Vice President, Nuclear Generation Development

Enclosure
cc: See Page 3.

Mr. Victor Manning, Director
Jackson County Emergency Management Agency
102 East Laurel Street
Scottsboro, Alabama 35768

Mr. John D. James, CEM, Acting Director
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

CERTIFICATION

The Jackson County has reviewed the following emergency plans (Proposed Emergency Plans) supporting the Combined License Application:

Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan	Rev. E
Alabama Emergency Operations Plan	April 20, 2006
Alabama Emergency Operations Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan	Rev. 14, July 17, 2006
Alabama Radiological Emergency Preparedness Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Section X.G	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Appendix 3, Jackson and DeKalb County Responsibilities, Bellefonte Nuclear	September 2007
Proposed Jackson County Radiological Emergency Plan for Bellefonte Nuclear Plant	September 2007

Jackson County certifies that:

- Jackson County's actions under the Proposed Emergency Plans are practicable, as of the date of this Certification;
- Jackson County is committed to participating in further development of the Proposed Emergency Plans, including any required field demonstrations; provided, however, that TVA agrees to provide funding for the Jackson County's participation in any further development of the Proposed Emergency Plans or field demonstrations; and
- Jackson County is committed to executing their responsibilities under the Proposed Emergency Plans in the event of an emergency.

Furthermore, Jackson County concurs with the proposed emergency classification system, initiating conditions, and emergency action levels described in the Combined License Application Emergency Plan and has reviewed the initial evacuation time estimates contained in "Bellefonte Nuclear Plant Evacuation Time Estimates, Final Report, September 2007."

It is my understanding that the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit will be clearly established in a properly executed and binding letter of agreement that will be included in the Bellefonte Site Emergency Plan if and when TVA proceeds with construction and operation of this nuclear facility.

James Tidmore
Print Name

James Tidmore
Signature

9-25-07
Date

Chairman
Title

Victor Manning
Print Name

Victor Manning
Signature

09-25-2007
Date

EMA Director
Title

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

September 21, 2007

Mr. John D. James, CEM, Acting Director
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

Dear Mr. James:

As previously indicated in public announcements and meetings, the Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC (NuStart), is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR Part 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama (the Site). The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the Site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These proposed plans have been developed using, to the extent practical, federal, state, and local plans already in place for other nuclear generating units in Alabama. With the cooperation of affected state and local agencies, TVA and NuStart have developed Part 5 of the COL application, the "Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan," Revision E (The COL Emergency Plan). The emergency plan includes the emergency classification system required by NRC regulations. TVA and NuStart have worked with other knowledgeable representatives from the nuclear industry to develop a set of initiating conditions and emergency action levels consistent with this emergency classification system and appropriate to the proposed nuclear plant design.

In addition to the COL Emergency Plan, initial evacuation time estimates have been developed with input from various state and local government agencies in Alabama. The initial evacuation time estimate report is included in the COL application.

Emergency planning provisions of 10 CFR Part 52 and the COL application process require that TVA and NuStart "make good faith efforts to obtain certifications from the local and State governmental agencies with emergency planning responsibilities." At this time, we are asking the Alabama Emergency Management Agency to certify that:

- The proposed emergency plans are practicable;
- The agency is committed to participating in any further development of the plans, including any required field demonstrations; and
- The agency is committed to executing its responsibilities under the plans in the event of an emergency.

Your signature on the enclosed certification also indicates that you concur with the emergency classification system, initiating conditions and emergency action levels and have reviewed the initial evacuation time estimates proposed in the Bellefonte Nuclear Plant Emergency Plan.

The actual emergency planning arrangements would be finalized in a letter of agreement at a later stage in the licensing process.

Alabama Emergency Management Agency's participation in these emergency planning efforts is greatly appreciated. I am happy to answer any questions you may have and would appreciate your signature if these terms are acceptable.

Please return signed Certification to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

Sincerely,

Jack A. Bailey

Jack A. Bailey
Vice President, Nuclear Generation Development

Enclosure
cc: See Page 3.

Ms. La Tonya Stephens
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

Mr. Frank Price
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

Mr. Bryan Prescott, Esq.
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

CERTIFICATION

The Alabama Emergency Management Agency has reviewed the following emergency plans (Proposed Emergency Plans) supporting the Combined License Application:

Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan	Rev. E
Alabama Emergency Operations Plan	April 20, 2006
Alabama Emergency Operations Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan	Rev. 14, July 17, 2006
Alabama Radiological Emergency Preparedness Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Section X.G	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Appendix 3, Jackson and DeKalb County Responsibilities, Bellefonte Nuclear	September 2007

The Alabama Emergency Management Agency certifies that:

- The Alabama Emergency Management Agency's actions under the Proposed Emergency Plans are practicable, as of the date of this Certification;
- The Alabama Emergency Management Agency is committed to participating in further development of the Proposed Emergency Plans, including any required field demonstrations; provided, however, that TVA agrees to provide funding for the Alabama Emergency Management Agency's participation in any further development of the Proposed Emergency Plans or field demonstrations; and
- The Alabama Emergency Management Agency is committed to executing their responsibilities under the Proposed Emergency Plans in the event of an emergency.

Furthermore, the Alabama Emergency Management Agency concurs with the proposed emergency classification system, initiating conditions, and emergency action levels described in the Combined License Application Emergency Plan and has reviewed the initial evacuation time estimates contained in "Bellefonte Nuclear Plant Evacuation Time Estimates, Final Report, September 2007."

It is my understanding that the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit will be clearly established in a properly executed and binding letter of agreement that will be included in the Bellefonte Site Emergency Plan if and when TVA proceeds with construction and operation of this nuclear facility.

JOHN D. JAMES
Print Name

John D. James
Signature

09-24-07
Date

ACTING DIRECTOR
Title

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

October 9, 2007

Mr. Kim Bryant
Chief Executive Officer
Highlands Medical Center
380 Woods Cove Road
Scottsboro, Alabama 35768

Subject: Bellefonte Nuclear Plant
Emergency Support Letter of Intent

Dear Mr. Bryant:

As previously indicated in public announcements and meetings, the Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC, is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama. The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These plans will take credit, to the extent practical, for the site, federal, state, and local plans already in place for other nuclear generating units in Alabama.

The purpose of this letter is to certify that Highlands Medical Center Emergency Medical Services (HMC) will work with TVA to develop a formal letter of agreement, once construction begins at the Bellefonte Nuclear Plant, confirming that HMC will respond to a request by TVA for ambulance and/or rescue service for any emergency medical situations at the proposed Bellefonte Nuclear Plant, including situations that may involve radioactive materials. The following provisions will be included in the formal letter of agreement:

1. HMC will provide emergency ambulance service for the transportation of injured and contaminated individuals to Huntsville Hospital or other medical facility named by TVA. In the event the contaminated individual is transported by HMC vehicle, a member of the Bellefonte Nuclear Plant Radiation Protection organization may accompany the patient to the medical facility.

2. TVA will be responsible for contamination control and decontamination of the HMC vehicles and equipment if contamination occurs as a result of transporting a contaminated individual.

3. HMC personnel will participate in annual training that will include topics in radiation safety and care of contaminated/irradiated patients. This training will be provided by TVA personnel or a TVA contractor.

4. HMC personnel will participate, upon request, in medical drills or full exercises that will be conducted at the Bellefonte Nuclear Plant.

This letter of intent shall remain in effect until superseded by a formal letter of agreement and may not be terminated by either party without 90 days' written notice.

I am happy to answer any questions you may have and would appreciate your signature below if these terms are acceptable. Please return the signed letter to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

ACCEPTED BY:

Jack A. Bailey — 10/9/2007
Jack A. Bailey — Date
Vice President, Nuclear Generation Development

C.O.O — 10/9/07
Kim Bryant — Date
Chief Executive Officer
Highlands Medical Center

Mr. Victor Manning, Director
Jackson County Emergency Management Agency
102 East Laurel Street
Scottsboro, Alabama 35768

Mr. Ron Bray, Director, EMS
Highlands Medical Center
380 Woods Cove Road
Scottsboro, Alabama 35768

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

September 21, 2007

Dr. Donald E Williamson
State Health Officer
Alabama Department of Public Health
P.O. Box 303017
Montgomery, Alabama 36130-3017

Dear Dr. Williamson:

As previously indicated in public announcements and meetings, the Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC (NuStart), is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR Part 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama (the Site). The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the Site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These proposed plans have been developed using, to the extent practical, federal, state, and local plans already in place for other nuclear generating units in Alabama. With the cooperation of affected state and local agencies, TVA and NuStart have developed Part 5 of the COL application, the "Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan," Revision E (The COL Emergency Plan). The emergency plan includes the emergency classification system required by NRC regulations. TVA and NuStart have worked with other knowledgeable representatives from the nuclear industry to develop a set of initiating conditions and emergency action levels consistent with this emergency classification system and appropriate to the proposed nuclear plant design.

In addition to the COL Emergency Plan, initial evacuation time estimates have been developed with input from various state and local government agencies in Alabama. The initial evacuation time estimate report is included in the COL application.

Emergency planning provisions of 10 CFR Part 52 and the COL application process require that TVA and NuStart "make good faith efforts to obtain certifications from the local and State governmental agencies with emergency planning responsibilities." At this time, we are asking the Alabama Department of Public Health to certify that:

- The proposed emergency plans are practicable;
- The Department is committed to participating in any further development of the plans, including any required field demonstrations; and
- The Department is committed to executing its responsibilities under the plans in the event of an emergency.

Your signature on the enclosed certification also indicates that you concur with the emergency classification system, initiating conditions and emergency action levels and have reviewed the initial evacuation time estimates proposed in the Bellefonte Nuclear Plant Emergency Plan.

The actual emergency planning arrangements would be finalized in a letter of agreement at a later stage in the licensing process.

Alabama Department of Public Health's participation in these emergency planning efforts is greatly appreciated. I am happy to answer any questions you may have and would appreciate your signature if these terms are acceptable.

Please return signed Certification to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

Sincerely,

Jack A. Bailey
Vice President, Nuclear Generation Development

Enclosure
cc: See Page 3.

Mr. John D. James, CEM, Acting Director
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

Ms. Tonya Appleyard
Alabama Department of Public Health
P.O. Box 303017
Montgomery, Alabama 36130-3017

CERTIFICATION

The Alabama Department of Public Health has reviewed the following emergency plans (Proposed Emergency Plans) supporting the Combined License Application:

Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan	Rev. E
Alabama Emergency Operations Plan	April 20, 2006
Alabama Emergency Operations Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan	Rev. 14, July 17, 2006
Alabama Radiological Emergency Preparedness Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Section X.G	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Appendix 3, Jackson and DeKalb County Responsibilities, Bellefonte Nuclear	September 2007

The Alabama Department of Public Health certifies that:

- The Alabama Department of Public Health's actions under the Proposed Emergency Plans are practicable, as of the date of this Certification;
- The Alabama Department of Public Health is committed to participating in further development of the Proposed Emergency Plans, including any required field demonstrations; provided, however, that TVA agrees to provide funding for the Alabama Department of Public Health's participation in any further development of the Proposed Emergency Plans or field demonstrations; and
- The Alabama Department of Public Health is committed to executing their responsibilities under the Proposed Emergency Plans in the event of an emergency.

Furthermore, the Alabama Department of Public Health concurs with the proposed emergency classification system, initiating conditions, and emergency action levels described in the Combined License Application Emergency Plan and has reviewed the initial evacuation time estimates contained in "Bellefonte Nuclear Plant Evacuation Time Estimates, Final Report, September 2007."

It is my understanding that the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit will be clearly established in a properly executed and binding letter of agreement that will be included in the Bellefonte Site Emergency Plan if and when TVA proceeds with construction and operation of this nuclear facility.

Donald E. Williamson, M.D.

Print Name

Signature

October 1, 2007

Date

State Health Officer

Title

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

September 21, 2007

Mr. Sid Holcomb, President
DeKalb County Commission
111 Grand Avenue, SW, Suite 200
Ft. Payne, Alabama 35967

Dear Mr. Holcomb:

As previously indicated in public announcements and meetings, the Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC (NuStart), is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR Part 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama (the Site). The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the Site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These proposed plans have been developed using, to the extent practical, federal, state, and local plans already in place for other nuclear generating units in Alabama. With the cooperation of affected state and local agencies, TVA and NuStart have developed Part 5 of the COL application, the "Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan," Revision E (The COL Emergency Plan). The emergency plan includes the emergency classification system required by NRC regulations. TVA and NuStart have worked with other knowledgeable representatives from the nuclear industry to develop a set of initiating conditions and emergency action levels consistent with this emergency classification system and appropriate to the proposed nuclear plant design.

In addition to the COL Emergency Plan, initial evacuation time estimates have been developed with input from various state and local government agencies in Alabama. The initial evacuation time estimate report is included in the COL application.

Emergency planning provisions of 10 CFR Part 52 and the COL application process require that TVA and NuStart "make good faith efforts to obtain certifications from the local and State governmental agencies with emergency planning responsibilities." At this time, we are asking the DeKalb County Commission to certify that:

- The proposed emergency plans are practicable;
- The Commission is committed to participating in any further development of the plans, including any required field demonstrations; and
- The Commission is committed to executing its responsibilities under the plans in the event of an emergency.

Your signature on the enclosed certification also indicates that you concur with the emergency classification system, initiating conditions and emergency action levels and have reviewed the initial evacuation time estimates proposed in the Bellefonte Nuclear Plant Emergency Plan.

The actual emergency planning arrangements would be finalized in a letter of agreement at a later stage in the licensing process.

DeKalb County's participation in these emergency planning efforts is greatly appreciated. I am happy to answer any questions you may have and would appreciate your signature if these terms are acceptable.

Please return signed Certification to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

Sincerely,

Jack A. Bailey
Vice President, Nuclear Generation Development

Enclosure
cc: See Page 3.

Ms. Susan Battles, Director
DeKalb County Emergency Management Agency
111 Grand Avenue Southwest
Fort Payne, Alabama 35967

Mr. John D. James, Acting Director
Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, Alabama 35046-2160

CERTIFICATION

The DeKalb County has reviewed the following emergency plans (Proposed Emergency Plans) supporting the Combined License Application:

Bellefonte Nuclear Plant Units 3 and 4 Combined License Application Emergency Plan	Rev. E
Alabama Emergency Operations Plan	April 20, 2006
Alabama Emergency Operations Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan	Rev. 14, July 17, 2006
Alabama Radiological Emergency Preparedness Plan, Table of Proposed Changes	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Section X.G	September 2007
Alabama Radiological Emergency Preparedness Plan, Proposed Appendix 3, Jackson and DeKalb County Responsibilities, Bellefonte Nuclear	September 2007
Proposed DeKalb County Radiological Emergency Plan for Bellefonte Nuclear Plant	September 2007

DeKalb County certifies that:

- DeKalb County's actions under the Proposed Emergency Plans are practicable, as of the date of this Certification;
- DeKalb County is committed to participating in further development of the Proposed Emergency Plans, including any required field demonstrations; provided, however, that TVA agrees to provide funding for the DeKalb County's participation in any further development of the Proposed Emergency Plans or field demonstrations; and
- DeKalb County is committed to executing their responsibilities under the Proposed Emergency Plans in the event of an emergency.

Furthermore, DeKalb County concurs with the proposed emergency classification system, initiating conditions, and emergency action levels described in the Combined License Application Emergency Plan and has reviewed the initial evacuation time estimates contained in "Bellefonte Nuclear Plant Evacuation Time Estimates, Final Report, September 2007."

It is my understanding that the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit will be clearly established in a properly executed and binding letter of agreement that will be included in the Bellefonte Site Emergency Plan if and when TVA proceeds with construction and operation of this nuclear facility.

SID HOLCOMB

Print Name

Sid Holcomb

Signature

9-25-07

Date

PRESIDENT

Title

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

September 21, 2007

Mr. Will Tate, Acting Chief
Hollywood Volunteer Fire Department
29164 US Highway 72
Hollywood, Alabama 35752

Subject: Bellefonte Nuclear Plant
Emergency Support Letter of Intent

Dear Chief Tate:

As previously indicated in public announcements and meetings, Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC, is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama. The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These plans will take credit, to the extent practical, for the site, federal, state, and local plans already in place for other nuclear generating units in Alabama.

The purpose of this letter is to certify that: (1) Hollywood Volunteer Fire Department will respond to requests for aid in firefighting and initial emergency medical response resulting from emergency situations at the Bellefonte Nuclear Plant and (2) Hollywood Volunteer Fire Department will participate in future periodic drills and training as required by the Bellefonte Nuclear Plant Emergency Plan.

This letter of intent shall remain in effect until superseded by a formal letter of agreement and may not be terminated by either party without 90 days' written notice.

I am happy to answer any questions you may have and would appreciate your signature below if these terms are acceptable. Please return signed letter to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

ACCEPTED BY:

Jack A. Bailey — 9/21/2007

Jack A. Bailey
Vice President, Nuclear Generation Development

William Tate acting Chief — 9-24-2007

Will Tate, Acting Chief
Hollywood Volunteer Fire Department

cc: Mr. Victor Manning, Director
Jackson County Emergency Management Agency
102 East Laurel Street
Scottsboro, Alabama 35768

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

October 9, 2007

Mr. David G. Spillers, Chief Executive Officer
Huntsville Hospital
101 Sivley Road
Huntsville, Alabama 35801

Subject: Bellefonte Nuclear Plant
Emergency Support Letter of Intent

Dear Mr. Spillers:

As previously indicated in public announcements and meetings, the Tennessee Valley Authority (TVA), in cooperation with NuStart Energy Development, LLC, is developing a Combined License (COL) application for submission to the U.S. Nuclear Regulatory Commission (NRC), consistent with the requirements of 10 CFR 52, for the Bellefonte Nuclear Plant near Hollywood, Alabama. The purpose of this initiative is to develop a COL application for NRC's approval to be used should TVA decide to construct and operate two advanced design commercial nuclear generating units at the site.

A key part of this COL application is the development of emergency plans which provide information sufficient to demonstrate compliance with pertinent regulatory requirements. These plans will take credit, to the extent practical, for the site, federal, state, and local plans already in place for other nuclear generating units in Alabama.

These plans include extending TVA's existing agreement with Huntsville Hospital for the Browns Ferry Nuclear Plant to include the proposed Bellefonte Nuclear Plant. TVA intends to execute a formal letter of agreement with Huntsville Hospital governing support for radiological emergencies at Bellefonte Nuclear Plant. Terms that will be addressed include the following:

1. Huntsville Hospital, as the proposed primary medical facility, would provide emergency medical services to Bellefonte Nuclear Plant personnel in the event of an accident at Bellefonte Nuclear Plant (this specifically includes radiological contamination) including:

a. Emergency care for one or more contaminated injured individuals.

b. Establishment of radiological contamination control measures at Huntsville Hospital. TVA may provide assistance in establishing these measures as requested by Huntsville Hospital.

c. Hospital care at Huntsville Hospital.

2. Huntsville Hospital would participate in sufficient practice drills and an annual emergency exercise to ensure emergency preparedness and would make Huntsville Hospital personnel available for questions from the NRC and/or the Federal Emergency Management Agency.

3. A Huntsville Hospital Emergency Medicine physician would be the primary physician for medical treatment of radiologically contaminated areas once the patient is admitted.

4. Huntsville Hospital Emergency Department and management personnel would be available on an annual basis for training session(s) provided by TVA to ensure emergency preparedness.

5. Huntsville Hospital would provide storage space near the Emergency Room for an emergency supply kit (to be provided by TVA) and allow for quarterly inventory of the kit by TVA personnel.

6. TVA would be responsible for decontamination of Huntsville Hospital facilities and would replace equipment that is not suitable for decontamination.

7. TVA would be responsible for reimbursement of Huntsville Hospital for any supplies, procedures, and treatment given in the Emergency Room or as in-patient in the hospital.

This letter of intent shall remain in effect until superseded by a formal letter of agreement and may not be terminated by either party without 90 days' written notice.

I am happy to answer any questions you may have and would appreciate your signature below if these terms are acceptable. Please return the signed letter to me at the address below.

Tennessee Valley Authority
1101 Market Street, LP 5A
Chattanooga, Tennessee 37402
(423) 751-3922

ACCEPTED BY:

Jack A. Bailey
Vice President, Nuclear Generation Development

10/9/2007
Date

David S. Spillers
Huntsville Hospital

10/10/2007
Date

TENNESSEE EMERGENCY MANAGEMENT AGENCY
CERTIFICATION

The Tennessee Emergency Management Agency certifies that:

- The Agency's actions under the proposed emergency plans are practicable;
- The Agency is committed to participating in further development of the emergency plans, including any required field demonstrations; and
- The Agency is committed to executing their responsibilities under the plans in the event of an emergency.

James H. Bassham
Print Name

Signature

12/17/07
Date

Director
Title
Tennessee Emergency Management Agency

GEORGIA EMERGENCY MANAGEMENT AGENCY
CERTIFICATION

The Georgia Emergency Management Agency certifies that:

- The Agency's actions under the proposed emergency plans are practicable;
- The Agency is committed to participating in further development of the emergency plans, including any required field demonstrations; and
- The Agency is committed to executing their responsibilities under the plans in the event of an emergency.

Charles A. Dawson
Print Name

Signature

12/17/07
Date

Director of Operations
Title
Georgia Emergency Management Agency

Appendix 8 - Cross-References to Regulations, Guidance, and State and Local Plans

Note: To a limited extent, certain details of the State and local plans may not yet reflect the addition of BLN Units 3 and 4. Such details are to be developed at a later date consistent with the commitments outlined in the certification letters provided in Appendix 7 of this plan.

Requirement	Corresponding COL Emergency Plan Provision
10 CFR 50.47(b)(1)	II.A, II.B, II.C
10 CFR 50.47(b)(2)	II.A, II.B, II.C, II.E, II.F
10 CFR 50.47(b)(3)	II.A, II.B, II.C, II.H
10 CFR 50.47(b)(4)	II.D, App. 1
10 CFR 50.47(b)(5)	II.E, I.F, II.J
10 CFR 50.47(b)(6)	II.E, I.F, II.J
10 CFR 50.47(b)(7)	II.G
10 CFR 50.47(b)(8)	II.H
10 CFR 50.47(b)(9)	I.H, II.I
10 CFR 50.47(b)(10)	II.J, II.K
10 CFR 50.47(b)(11)	II.J, II.K
10 CFR 50.47(b)(12)	II.L
10 CFR 50.47(b)(13)	II.M
10 CFR 50.47(b)(14)	II.N
10 CFR 50.47(b)(15)	II.O
10 CFR 50.47(b)(16)	II.P
10 CFR 50.72(a)(3)	II.E.1
10 CFR 50.72(a)(4)	II.F.I.g
10 CFR 50.72(c)(3)	II.E.4
10 CFR 50 App E.IV	COL Emergency Plan, including App. 4 and Evacuation Time Estimate
10 CFR 50 App E.IV.A	II.A, II.B, II.C, II.E, II.F, II.J, II.K, II.L
10 CFR 50 App E.IV.B	II.D, II.H, II.I, App. 1
10 CFR 50 App E.IV.C	II.A, II.D, II.E. II.F, App. 1
10 CFR 50 App E.IV.D	II.A, II.E, II.F, II.G, App. 3
10 CFR 50 App E.IV.E	II.B, II.F, II.H, II.I, II.L, II.N, App. 2, App. 6
10 CFR 50 App E.IV.F	II.N, II.O
10 CFR 50 App E.IV.G	II.P
10 CFR 50 App E.IV.H	II.M

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
A.1.a	Plan § II.A.1.a	Plan § IV.E, Plan § V.B, App. 3 § I	State Plan App. 3 § I, Plan § IV	State Plan App. 3 § I, Plan § IV
A.1.b	Plan § II.A.1.b	Plan § IX.B, Plan § X.G, Plan § XII, App. 3 Att. 1 § I, ESF-2 § VI.A, ESF-2 § VII.A	Plan § IV.A, State Plan § X.G, State Plan App. 3 Att. 1 § I	Plan § IV.A, State Plan § X.G, State Plan App. 3 Att. 1 § I
A.1.c	Plan § II.A.1.c	Plan § X.G, ESF-2 § VII.D	State Plan § X.G, Plan App. 1	State Plan § X.G, Plan App. 1
A.1.d	Plan § II.A.1.d	Plan § III.C, Plan § IV.E, Plan § V, App. 3 § I	Plan § IV.A.1	Plan § IV.A.1
A.1.e	Plan § II.A.1.e	Plan § X.B & G, App. 3 § I.B, ESF-2 § III, ESF-2 § VII.D	State Plan § X.G, Plan § IV.A.1, Plan § IV.A.5	State Plan § X.G, Plan § IV.A.1, Plan IV.A.5
A.2.a		Plan § IX.B, Plan § X.C & G, Plan § XIV, App. 3 Att. 1 § I, App. 3 Att. 5, ESF-2 § V.A, ESF-2 § VI-C, ESF-2 § VII.B	State Plan § X.G, State Plan App. 3 Att. 1 § I, State Plan App. 3 Att. 5, Plan § V	State Plan § X.G, State Plan App. 3 Att. 1 § I, State Plan App. 3 Att. 5, Plan § V
A.2.b		Plan p. 1	State Plan App. 3 § I.A, DeKalb EOP § IV.C.1, DeKalb EOP § VII.B, DeKalb EOP § X	State Plan App. 3 § I.A, Jackson EOP § I.A, Jackson EOP § IV.G.3
A.3	Plan § II.A.3	Plan § XIII.C	State Plan § III.C; DeKalb EOP § VII.E, DeKalb EOP § IX.D	State Plan § III.C, State App. 3 Att. 4 § III
A.4	Plan § II.A.4	Plan § IX.C, App. 3	Plan § IV.A.1	Plan § IV.A.1
B.1	Plan § II.B.1			

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
B.2	Plan § II.B.2			
B.3	Plan § II.B.3			
B.4	Plan § II.B.4			
B.5	Plan § II.B.5			
B.6	Plan § II.B.6			
B.7	Plan § II.B.7			
B.7.a	Plan § II.B.7.a			
B.7.b	Plan § II.B.7.b			
B.7.c	Plan § II.B.7.c			
B.7.d	Plan § II.B.7.d			
B.8	Plan § II.B.8			
B.9	Plan § II.B.9			
C.1.a	Plan § II.C.1.a	Plan § XII.B&C		
C.1.b	Plan § II.C.1.b	ESF-8 Tab 8		
C.1.c	Plan § II.C.1.c	Plan § IX	State Plan § IX	State Plan § IX
C.2.a		Plan § XIII.C	State Plan § XIII	State Plan § XIII
C.2.b	Plan § II.C.2.b			
C.3	Plan § II.C.3	ESF-8 § IV.C		

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
C.4.	Plan § II.C.4, App. 7	Plan § IV.E	DeKalb EOP § VII.B, State Plan App. 3, Letters of Agreement (Additional Detailed Planning Required)	Jackson EOP § VIII.A, State Plan App. 3, Letters of Agreement (Additional Detailed Planning Required)
D.1	Plan § II.D.1, App. 1			
D.2	Plan § II.D.2, App. 1			
D.3		Plan § III, Plan § VIII	Plan § III.B	Plan § III.B
D.4		Plan § XIII.A & C, App. 3 Att. 4	State Plan App. 3 Att. 4, Plan § III.B	State Plan App. 3 Att. 4, Plan § III.B
E.1	Plan § II.E.1	App. 3 Att. 4	Plan § III.B.1, State Plan App. 3 Att. 4	Plan § III.B.1, State Plan App. 3 Att. 4
E.2	Plan § II.E.2	Plan § X.C, Plan § XIII.A, App. 3 Att. 4, ESF-2 § V.A	Plan § IV.A.5, Plan App. 1, Plan Annex A – Additional Detailed Planning Required	Plan § IV.A.5, Plan App. 1, Plan Annex A – Additional Detailed Planning Required
E.3	Plan § II.E.3			
E.4	Plan § II.E.4			
E.4.a	Plan § II.E.4.a			
E.4.b	Plan § II.E.4.b			
E.4.c	Plan § II.E.4.c			
E.4.d	Plan § II.E.4.d			
E.4.e	Plan § II.E.4.e			
E.4.f	Plan § II.E.4.f			

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
E.4.g	Plan § II.E.4.g			
E.4.h	Plan § II.E.4.h			
E.4.i	Plan § II.E.4.i			
E.4.j	Plan § II.E.4.j			
E.4.k	Plan § II.E.4.k			
E.4.l	Plan § II.E.4.l			
E.4.m	Plan § II.E.4.m			
E.4.n	Plan § II.E.4.n			
E.5		Plan § X.C & G, ESF-2 § VII.D, ESF-15	State Plan § X.G, Plan Annex C & E & Q	State Plan § X.G, Plan Annex C & E & Q
E.6	Plan § II.E.6	Plan § X.B & G, ESF-2 § VI.A, ESF-2 § VII.A	Plan App. 1, Plan Annex E § III.C, State Plan § X.G	Plan App. 1, Plan Annex E § III.C, State Plan § X.G
E.7	Plan § II.E.7	ESF-15 § VI.D	Annex C & E & Q	Annex C & E & Q
F.1.a	Plan § II.F.1.a	Plan § X.G, ESF-2 § VI.A	Plan § IV.A.1 & .5, Plan App. 1, Plan Annex Q § II	Plan § IV.A.1 & .5, Plan App. 1, Plan Annex Q § II
F.1.b	Plan § II.F.1.b	Plan § X.G, ESF-2 § VI.A, ESF-2 § VII.A	State Plan § X.B & G, State Plan App. 3 Att. 1 § III, DeKalb EOP § VII.I, DeKalb EOP ESF #2	State Plan § X.B & G, State App. 3 Att. 1 § III, Jackson EOP § VII.A, Jackson EOP ESF #2
F.1.c	Plan § II.F.1.c	Plan § X.C & G, ESF-2 § VII.D	State Plan § X.G	State Plan § X.G
F.1.d	Plan § II.F.1.d	Plan § X.C	Plan § IV.C, Plan Annex D, State Plan § X	Plan § IV.C, Plan Annex D, State Plan § X

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
F.1.e	Plan § II.F.1.e	Plan § X.C	Plan Annex A (Ops Officer); DeKalb EOP Tab D	Plan Annex A (Ops Officer), Jackson County EOP-ESF #2
F.1.f	Plan § II.F.1.f			
F.2	Plan § II.F.2	ESF-8 Tab 5 § III.D	State Plan § X.C	State Plan § X.C, Jackson County EOP ESF #8 § III
F.3	Plan § II.F.3	ESF-2 § VI.B, ESF-2 § VII.A	State Plan § X.A & C & G	State Plan § X.A & C & G
G.1	Plan § II.G.1	ESF-15	State Plan ESF-15 § III.D	State Plan ESF-15 § III.D
G.2	Plan § II.G.2	ESF-15	State Plan ESF-15	State Plan ESF-15
G.3.a	Plan § II.G.3.a	ESF-15	Annex C App. 1, State ESF-15 § II.A	Annex C App. 1, State ESF-15 § II.A
G.3.b	Plan § II.G.3.b			
G.4.a	Plan § II.G.4.a	ESF-15	Annex C App. 1, State ESF-15 § II.A	Annex C App. 1, State ESF-15 § II.A
G.4.b	Plan § II.G.4.b	ESF-15	State ESF-15 § II.A	State ESF-15 § II.A
G.4.c	Plan § II.G.4.c	ESF-15	State ESF-15 § II.B	State ESF-15 § II.B
G.5	Plan § II.G.5	ESF-15	State ESF-15 § II.B	State ESF-15 § II.B
H.1	Plan § II.H.1			
H.2	Plan § II.H.2			
H.3		Plan § IX.C, App. 3 Att. 1 § II.B	State Plan App. 3 Att. 1 § II.B	State Plan App. 3 Att. 1 § II.B

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
H.4	Plan § II.H.4	Plan § IX.C, App. 3 Att. 1 § I & II.B	State Plan App. 3 Att. 1 § II.B	State Plan App. 3 Att. 1 § II.B
H.5	Plan § II.H.5			
H.5.a	Plan § II.H.5.a			
H.5.b	Plan § II.H.5.b			
H.5.c	Plan § II.H.5.c			
H.5.d	Plan § II.H.5.d			
H.6.a	Plan § II.H.6.a			
H.6.b	Plan § II.H.6.b			
H.6.c	Plan § II.H.6.c			
H.7	Plan § II.H.7, App. 6	ESF-8 § IV.B	State Plan App. 3 § I.B	State Plan App. 3 § I.B
H.8	Plan § II.H.8, App. 2			
H.9	Plan § II.H.9, App. 2			
H.10	Plan § II.H.10, App. 6	App. 3 Att. 4 § II.A & III.B & IV.A, ESF-8	State Plan App. 3 § II.B	State Plan App. 3 § II.B
H.11	Plan § II.H.11, App. 6	ESF-8 (partial)	State Plan App. 3 § IV.A	State Plan App. 3 § IV.A
H.12	Plan § II.H.12	ESF-8 § IV.C	State Plan App. 3 § I.B, State ESF-8 § IV.C	State Plan App. 3 § I.B, State ESF-8 § IV.C
I.1	Plan § II.I.1			
I.2	Plan § II.I.2			
I.3.a	Plan § II.I.3.a			

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
I.3.b	Plan § II.I.3.b			
I.4	Plan § II.I.4			
I.5	Plan § II.I.5			
I.6	Plan § II.I.6			
I.7	Plan § II.I.7, App. 6	ESF-8 Tab 7 § I	State Plan ESF-8 Tab 7 § I	State Plan ESF-8 Tab 7 § I
I.8	Plan § II.I.8	ESF-8 Tab 7	State Plan ESF-8 Tab 7	State Plan ESF-8 Tab 7
I.9	Plan § II.I.9	ESF-8 Tab 7 § III.B		
I.10	Plan § II.I.10, App. 2	ESF-8 Tab 7 § V.A		
I.11		ESF-8		
J.1.a	Plan § II.J.1.a			
J.1.b	Plan § II.J.1.b			
J.1.c	Plan § II.J.1.c			
J.1.d	Plan § II.J.1.d			
J.2	Plan § II.J.2	Additional Detailed Planning Required	Plan Annex K § VI	Plan Annex K § VI
J.3	Plan § II.J.3			
J.4	Plan § II.J.4			
J.5	Plan § II.J.5			
J.6.a	Plan § II.J.6.a			
J.6.b	Plan § II.J.6.b			

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
J.6.c	Plan § II.J.6.c			
J.7	Plan § II.J.7, App. 2			
J.8	Plan § II.J.8, App. 4			
J.9		ESF-8 Tab 4	State Plan ESF-8 Tab 4, Plan Annex N App. 5	State Plan ESF-8 Tab 4, Plan Annex N App. 5
J.10.a	Plan § II.J.10.a	Additional Detailed Planning Required	State Plan App. 3 Att. 4 § VI.A; Plan Annex K; Additional Detailed Planning Required	State Plan App. 3 Att. 4 § VI.A; Plan Annex K; Additional Detailed Planning Required
J.10.b	Plan § II.J.10.b	Additional Detailed Planning Required	Plan Annex K App. 1 & 2	Plan Annex K App. 1 & 2
J.10.c	Plan § II.J.10.c, App. 3	Plan § X.G, ESF-2 § VII.A	State Plan § J.10.c	State Plan § J.10.c
J.10.d		ESF-8 Tab 4 § VII	Plan Annex J	Plan Annex J
J.10.e		ESF-8 Tab 4 § V	Plan Annex O	Plan Annex O
J.10.f		ESF-8 Tab 4 § V	Plan Annex O § V & VI	Plan Annex O § V & VI
J.10.g		App. 3 Att. 1 § II.B	Plan Annex I § III.A, Plan Annex M App. 2	Plan Annex I § III.A, Plan Annex M App. 2
J.10.h		ESF-8 § VI.C & D, ESF-8 Tab 13	Annex M App. 2	Annex M App. 2
J.10.i		Additional Detailed Planning Required	Annex K § VIII	Annex K § VIII
J.10.j		ESF-13 § III.A	Annex G § III.D & E, Annex K § VII	Annex G § III.D & E, Annex K § VII
J.10.k		Plan § XIII.G	Annex K § VII	Annex K § VII

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
J.10.l		Additional Detailed Planning Required	Annex K § V	Annex K § V
J.10.m	Plan § II.J.10.m	ESF-8 Tab 4 § III.A		
J.11		ESF-8 Tab 4 § VI.A		
J.12		ESF-8 Tab 11	Annex M, Annex N	Annex M, Annex N
K.1.a	Plan § II.K.1.a			
K.1.b	Plan § II.K.1.b			
K.1.c	Plan § II.K.1.c			
K.1.d	Plan § II.K.1.d			
K.1.e	Plan § II.K.1.e			
K.1.f	Plan § II.K.1.f			
K.1.g	Plan § II.K.1.g			
K.2	Plan § II.K.2			
K.3.a	Plan § II.K.3.a	ESF-8 Tab 5	State ESF-8 Tab 5	State ESF-8 Tab 5
K.3.b	Plan § II.K.3.b	ESF-8 Tab 5 § I.A	State ESF-8 Tab 5 § I.A, Plan Annex F App. 1-4	State ESF-8 Tab 5 § I.A, Plan Annex F App. 1-4
K.4		ESF-8 Tab 5 § IV	State ESF-8 Tab 5 § IV, Plan Annex G App. 1	State ESF-8 Tab 5 § IV, Plan Annex G App. 1
K.5.a	Plan § II.K.5.a	ESF-8 Tab 5 § II	Plan Annex N App. 9	Plan Annex N App. 9
K.5.b	Plan § II.K.5.b	ESF-8 Tab 5 § III-A	State ESF-8 Tab 5 § III-A, Plan Annex N App. 9	State ESF-8 Tab 5 § III-A, Plan Annex N App. 9
K.6.a	Plan § II.K.6.a			

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
K.6.b	Plan § II.K.6.b			
K.6.c	Plan § II.K.6.c			
K.7	Plan § II.K.7			
L.1	Plan § II.L.1	ESF-8 Tab 5 § III.D	Plan § IV.A.2	Plan § IV.A.2
L.2	Plan § II.L.2			
L.3		ESF-8 Tab 5 § III.F		
L.4	Plan § II.L.4	ESF-8 Tab 5 § III.D	Plan § IV.A.2, Annex L § III.D	Plan § IV.A.2, Annex L § III.D
M.1	Plan § II.M.1	App. 3 Att. 4	State Plan § V.B, XIII.B, State ESF-8 Tab 7 § V, State Plan App. 3 Att. 4	State Plan § V.B, XIII.B, State ESF-8 Tab 7 § V, State Plan App. 3 Att. 4
M.2	Plan § II.M.2			
M.3	Plan § II.M.3	App. 3 Att. 4		
M.4	Plan § II.M.4	ESF-8 Tab 4 § II		
N.1.a	Plan § II.N.1.a	App. 4 § III.C	State App. 4 § III.C	State App. 4 § III.C
N.1.b	Plan § II.N.1.b	App. 4 § III.C	State App. 4 § III.C	State App. 4 § III.C
N.2.a	Plan § II.N.2.a	App. 4 § III.C	State Plan § X.G, State Plan App. 4 § III.C	State Plan § X.G, State Plan App. 4 § III.C
N.2.b	Plan § II.N.2.b			
N.2.c	Plan § II.N.2.c	App. 4 § III.C	Plan § IV.A.2, State Plan App. 4 § III.C	Plan § IV.A.2, State Plan App. 4 § III.C
N.2.d	Plan § II.N.2.d	App. 4 § III.C	State Plan App. 4 § III.C	State Plan App. 4 § III.C

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
N.2.e(1)	Plan § II.N.2.e.1	App. 4 § III.C		
N.2.e(2)	Plan § II.N.2.e.2			
N.3.a	Plan § II.N.3.a	App. 4 § III.A, App. 4 § IV.A & B	State App. 4 § III.A, State App. 4 Att. 1 § I.A & B	State App. 4 § III.A, State App. 4 Att. 1 § I.A & B
N.3.b	Plan § II.N.3.b	App. 4 § IV.A & B	State App. 4 Att. 1 § I & B	State App. 4 Att. 1 § I & B
N.3.c	Plan § II.N.3.c	App. 4 § III.A, App. 4 § IV.A & B	State App. 4 § III.A, State App. 4 Att. 1 § I.B	State App. 4 § III.A, State App. 4 Att. 1 § I.B
N.3.d	Plan § II.N.3.d	App. 4 § III.A & C, App. 4 § IV.A & B	State App. 4 § III.A & C, State App. 4 Att. 1 § I.B	State App. 4 § III.A & C, State App. 4 Att. 1 § I.B
N.3.e	Plan § II.N.3.e	App. 4 § III.C, App. 4 § IV.A & B	State App. 4 § III.C, State App. 4 § IV.A & B	State App. 4 § III.C, State App. 4 § IV.A & B
N.3.f	Plan § II.N.3.f	App. 4 § IV.B	State App. 4 § IV.B	State App. 4 § IV.B
N.4	Plan § II.N.4	App. 4 § IV.B	State App. 4 § IV.B, State App. 4 Att. 1 § I.C	State App. 4 § IV.B, State App. 4 Att. 1 § I.C
N.5	Plan § II.N.5	App. 4 § IV.A	State App. 4 § IV.B, State App. 4 Att. 1 § I.C	State App. 3 § IV.B, State App. 4 Att. 1 § I.C
O.1	Plan § II.O.1	Plan § XII	Plan § IV.A, VI.D, State Plan XII.B, State App. 3 § I.B	Plan § IV.A, VI.D, State Plan XII.B, State App. 3 § I.B
O.1.a	Plan § II.O.1.a			
O.1.b		Plan § XII	State Plan § XII.B, State App. 3 § II.D, Plan § VI.D	State Plan § XII.B, State App. 3 § II.D, Plan § VI.D
O.2	Plan § II.O.2			

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
O.3	Plan § II.O.3			
O.4.a	Plan § II.O.4.a	Plan § IX.E	State Plan § XII.B, State App. 3 § II.A	State Plan § XII.B, State App. 3 § II.A
O.4.b	Plan § II.O.4.b	ESF-8	State ESF-8	State ESF-8
O.4.c	Plan § II.O.4.c	ESF-8	State Plan § XII.B	State Plan § XII.B
O.4.d	Plan § II.O.4.d	*	State Plan § XII.B	State Plan § XII.B
O.4.e	Plan § II.O.4.e			
O.4.f	Plan § II.O.4.f	*	State Plan § XII.B	State Plan § XII.B
O.4.g	Plan § II.O.4.g		State Plan § XII.B	State Plan § XII.B
O.4.h	Plan § II.O.4.h	ESF-8 Tab 5 § III.D	State Plan § XII.B	State Plan § XII.B
O.4.i	Plan § II.O.4.i			
O.4.j	Plan § II.O.4.j	Plan § X.C	State Plan § XII.B	State Plan § XII.B
O.5	Plan § II.O.5	Plan § XII	State Plan § XII.A, State App. 3 § II.D	State Plan § XII.A, State App. 3 § II.D
P.1	Plan § II.P.1	Plan § VI	State Plan § XII.B	State Plan § XII.B
P.2	Plan § II.P.2	Plan § VI.A	Plan § IV	Plan § IV
P.3	Plan § II.P.3	Plan § VI.A	Plan § VI.A	Plan § VI.A
P.4	Plan § II.P.4	Plan § VI.A	Plan § VI.B	Plan § VI.B
P.5	Plan § II.P.5	Plan page xv	Plan § VI.A	Plan § VI.A
P.6	Plan § II.P.6	Plan § XV	State Plan § XV, DeKalb EOP ESFs (by function)	State Plan § XV, Jackson EOP ESFs (by function)

NUREG-0654 Eval. Criterion	COL EPlan	State of Alabama	DeKalb County	Jackson County
P.7	Plan § II.P.7, App. 5	Plan page iii	Additional Detailed Planning Required	Additional Detailed Planning Required
P.8	Plan § II.P.8, App. 8	Plan page i	Plan Index; Additional Detailed Planning Required	Plan Index; Additional Detailed Planning Required
P.9	Plan § II.P.9			
P.10	Plan § II.P.10	Plan § V.B, Plan § VI.A	State Plan App. 3 § II.E, Plan § VI.E	State Plan App. 3 § II.E, Plan § VI.E

App. ~ Appendix
Att. ~ Attachments
BFNPP ~ Browns Ferry Nuclear Power Plant
ESF ~ Emergency Support Function
FNPP ~ Farley Nuclear Power Plant
SOG ~ Standard Operating Guide
* ~ “NRC and FEMA encourage State and local governments which have these capabilities to continue to include them in their training programs”

Appendix 9 - Justification for CECC

Under 10 CFR Part 50, Appendix E, Section III.E.8, Tennessee Valley Authority (TVA) is required to provide a licensee near-site Emergency Operations Facility (EOF) from which effective direction can be given and effective control can be exercised during an emergency. The U.S. Nuclear Regulatory Commission provides guidance for design and location of the EOF in NUREG-0696. Since the early 1980's, TVA has used a centralized concept for providing the EOF function. Consistent with this approach, the Bellefonte Nuclear Plant Combined Operating License Application Emergency Plan relies on the use of the Central Emergency Control Center as the EOF for the Bellefonte Nuclear Plant. The Central Emergency Control Center (CECC) serves as the EOF for TVA's Browns Ferry Nuclear Plant (BFN), Sequoyah Nuclear Plant (SQN), and Watts Bar Nuclear Plant (WBN). The CECC is located at TVA's Chattanooga Office Complex in Chattanooga, Tennessee, approximately 44 air miles from the BLN site and approximately 140 air miles from the BFN site. The CECC is further than 20 miles from the BLN Technical Support Center (TSC), as is the case for BFN, SQN, and WBN, but does not alter the functions of the EOF as described in NUREG-0696.

The use of the CECC as the EOF for BLN allows TVA to continue to operate a standardized program for corporate management and response to radiological emergencies at TVA nuclear facilities. The effectiveness of the CECC's operation has been demonstrated during numerous drills and exercises. Communications systems, data links, and staffing have been incorporated and tested. Using the CECC for BLN allows TVA to apply its corporate emergency response structure and experience to the Bellefonte Nuclear Plant emergency plan.

TVA has discussed this concept with the Alabama (AL) Emergency Management Agency (AEMA), Alabama Department of Public Health (ADPH), Jackson County AL Emergency Management, and DeKalb County AL Emergency Management. The Alabama State agencies are familiar with the CECC because the facility is used for responding to a radiological emergency at the Browns Ferry Nuclear Plant. Through their certification letters provided in Appendix 7 of the Bellefonte Nuclear Plant Combined License Application Emergency Plan, AEMA, ADPH, Jackson County EMA, and DeKalb County EMA confirm their support of the TVA emergency response program, included the use of the CECC in Chattanooga.

Access to the station by the NRC site team is accommodated. The CECC includes space for Alabama liaisons reporting to the CECC in Chattanooga. Proposed changes to the existing State Plans for BLN Plant events in Alabama (Alabama Radiological Emergency Preparedness Program Plan) designate TVA liaisons to respond to the State Radiological Monitoring Assessment Center (SRMAC) in Decatur, AL and a Joint Information Center (JIC). The proposed location for the BLN JIC is Chattanooga, TN. These liaisons will interact with the ADPH Office of Radiation Control, who is responsible for offsite monitoring, dose assessment, and determining protective actions. These liaisons are able to quickly respond to the SRMAC and the CECC. These liaisons are already familiar with the CECC and SRMAC and providing liaison support between the SRMAC and CECC is consistent with their emergency response for the other TVA nuclear stations.

The State also dispatches it's Public Information Teams to the JIC. State and utility staff at the JIC are responsible for providing timely and accurate information concerning an emergency to the media. County plans allow dispatch of a County Public Information Officer to the JIC, but there is no liaison to the CECC.

The following discussion provides an evaluation of the CECC against criteria in NUREG-0696.

Evaluation Against NUREG-0696

The CECC is designed to provide for the effective and timely performance of the following functions:

- Management of overall licensee emergency response;
- Coordination of radiological and environmental assessment;
- Determination of recommended public protective actions; and
- Coordination of emergency response activities with Federal, State, and local agencies.

The primary role of the CECC is to relieve the plant staff of the functions of keeping the Federal, State and county emergency response organizations informed, for directing dose assessment and field monitoring, for managing the informational needs of the media, interested industry groups, and elected officials, and for supporting the accident assessment needs of the TSC staff. The NRC will have access to plant data through the CECC Computer System and the Emergency Response Data System (ERDS). NRC also has telephones on the Emergency Telecommunications System (ETS) in Chattanooga.

Equipment already exists in the CECC for the acquisition, display, and evaluation of radiological, meteorological, and plant system data used to determine off-site protective measures Actual release information is provided by the field monitoring teams and is used in determining appropriate protective action recommendations. Because a similar set of data currently used for BFN, SQN and WBN are required for the Bellefonte Nuclear Plant, the plant and effluent data would be provided on as timely a basis at the CECC in Chattanooga as it would be at a near-site location.

Normal industrial security is already provided for the CECC and processes are already established to upgrade security during an activation.

Location, Structure, and Habitability

The CECC is located in the Northeast corner of the sixth floor of Lookout Place in the TVA Chattanooga Office Complex in Chattanooga, Tennessee The CECC has proven to be an effective facility for implementation of the nuclear station emergency plans. The CECC is used for TVA's existing nuclear plants at the BFN, SQN, and WBN sites. The facility is more than ten miles from any of the TVA nuclear stations; therefore, there are no specific habitability criteria.

Staffing and Training

Incorporation of Bellefonte Nuclear Plant emergency response functions into the CECC will not adversely affect TVA's ability to staff the CECC in a timely manner. The CECC is staffed with experienced personnel from the TVA Chattanooga Office Complex and personnel from one or

more TVA nuclear plants. The CECC staff has demonstrated their ability to staff the CECC within 60 minutes of emergency declaration during previous augmentation drills. The CECC staff includes personnel to manage overall licensee emergency response, coordinate radiological and environmental assessment, determine recommended public protective actions, and interface with offsite officials.

Size

The CECC size has proven to be adequate during drills and exercises for TVA's nuclear facilities.

In addition, the NRC has workspace co-located with the decision makers, radiological assessment, and accident assessment personnel.

Radiological Monitoring

The CECC is beyond 10 miles from any nuclear stations, and therefore does not require radiological monitoring equipment.

Communications

The communications systems available in the CECC are:

- Central Office Trunks
- Tie-lines
- Digital Services
- Privately-owned/maintained microwave systems
- Privately-owned fiber-optic systems
- NRC Emergency Telecommunications System phones
- Emergency Preparedness Radio System

The emergency communications systems at the CECC are designed to provide a reliable, timely flow of information between the parties having an emergency response role. The single facility results in commonality of communications and interface with offsite officials and liaisons. The Emergency Preparedness Telephone System continues to be the primary means of communicating changes in event classification and protective action recommendations to the States and counties. This system operates on a combination of the TVA telecommunications network and leased circuits.

The offsite communications network is used to communicate with Federal, State, and other supporting agencies. Access to these agencies is provided through several redundant, diverse routes. This diversity provides offsite routing through more than one type of facility. These facilities include, but are not limited to, commercial facilities such as central office trunks, tie-lines

and digital services, plus privately owned and maintained microwave and fiber-optic systems. The offsite telecommunications network is designed to facilitate traffic in the most fail-safe manner to the emergency response organizations.

ENS and HPN (NRC FTS 2000 System) telephones provide communications from each site Technical Support Center, Control Room, and the CECC to the NRC Headquarters and regional offices. These telephones are tested on a periodic basis consistent with the BLN COLA Emergency Plan.

The Emergency Preparedness radio system is a VHF mobile radio system which provides redundant radio coverage of the 10-mile emergency zone. It provides radiological monitoring vans with mobile communications to other van(s) and to the following locations: Radiological Control, Technical Support Center, Control Room at each plant and the CECC.

Instrumentation, Data System Equipment, and Power Supplies

Various plant parameters are available to the CECC staff via a connection through TVA's CECC computer network. Data available at the CECC provides a snapshot of data from each unit's integrated set of plant data as described in Chapter 18 of the DCD. Plant data can be displayed at the CECC. These data are sufficient to perform accident assessment and evaluate the potential on-site and off-site environmental consequences of an emergency at the Bellefonte Nuclear Plant. Detailed discussion on specific plant parameters are described in the Emergency Plan. The computers in the Dose Assessment Area are capable of running the dose projection computer programs RED (Radiological Emergency Dose), FRED (Forecast Radiological Emergency Dose) and BRED (Back-calculation Radiological Emergency Dose) and accessing plant status data.

Hourly and 15-minute average meteorological data from the plant Environmental Data Station are available to the CECC, TSC, State, and LRC. The CECC computer system provides access of up to the most recent 168 hours of this data. A meteorologist in the CECC provides meteorological information to the CECC staff, in support of offsite dose projections.

The CECC draws its primary power from commercial power.

A loss of commercial power should not impact any of the voice or data communications equipment located in the CECC. Common TVA telecommunications infrastructure that supports CECC functions, including, but not limited to, fiber optic transmission equipment, telephone switching equipment and data network routers, is configured to operate from at least one and usually multiple backup power sources in the event of a loss of commercial power. These backup sources include generator, dc battery and uninterruptible power supply systems.

Technical Data and Data Systems

As discussed in the previous section, a variety of plant parameters are provided over the TVA communications network to the CECC.

Reports Availability and Management

Hard copies of key reference materials are maintained in the CECC. In addition, station design documentation, plant drawings, FSAR, procedures, etc. are available via Local Area Network connection from the Business Support Library.

The following information is available for the Bellefonte Nuclear Station at the EOF:

- Plant technical specifications,
- Plant operating procedures,
- Emergency operating procedures,
- Final Safety Analysis Report,
- Up-to-date licensee, State, and local emergency response plans,
- Off-site population distribution data,
- Evacuation plans

Local Recovery Center

(1) The Local Recovery Center is located at the Bellefonte Training Center and operational within two hours of being notified that the NRC Regional Administrator and site team are departing for the site.

(2) The same data available at the EOF is available at the Local Recovery Center.

(3) At least 1500 square feet is designated to accommodate the NRC site team and a FEMA liaison individual with an appropriate TVA complement. The space is configured to provide for: a work area for EOF personnel; EOF data system equipment needed to receive and transmit data from/to other locations; performing repair, maintenance, and service equipment, displays and instrumentation; ready access to communications equipment by the EOF personnel who need communications capabilities to perform their functions; and ready access to functional displays of EOF data and to displays of plant records and historical data

Conclusion

The CECC meets the functional and design criteria provided in NUREG-0696 for an Emergency Operations Facility with the exception that it is located more than 20 miles from the Bellefonte Nuclear Plant. This document describes TVA's approach to assuring that these functional and design criteria are met and maintained. The consolidation of TVA's corporate emergency response functions into a centralized facility provides a timely and effective response to a radiological emergency at the Bellefonte Nuclear Plant.

Appendix 10 - Technical Support Center Decription

Technical Support Center(TSC)

The TSC is part of the emergency response facilities provided for emergency response to accidents. The TSC is established consistent with NUREG 0696, as described below.

Function

The TSC provides plant management and technical support personnel (including the appropriate number of NRC personnel) with a facility from which they can assist plant operating personnel located in the control rooms during any emergency. The Site Emergency Director(SED) and the NRC representative are located in the same general area to promote proper communications.

Location

The TSC is located in the Maintenance Support Building sited in the Northeast corner of the site, just north of BLN Unit 3 within the BLN protected area.

The TSC may not be within a two minute walk of either units' control room as identified in NUREG-0696, section 2.2. The ability to retrieve plant data and displays available in the control room (CR) coupled with the sophisticated communications systems preclude the need for frequent face to face interchange between the TSC and control room personnel.

The TSC is common for both BLN units, which is a departure from the DCD, Tier 2, Section 18.8.3.5. The additional benefit of managing licensee emergency response from a single TSC is a major consideration for this departure from the DCD.

Staffing and Training

The level of staffing and training is described in the Emergency Plan. The TSC accommodates the required personnel to support an event affecting one or both units. The level of staffing may vary according to the severity of the emergency condition.

Size

The TSC provides working space, without crowding, for the personnel assigned to the TSC at the maximum level of occupancy. The working space is sized for a minimum of 25 persons. Minimum size of working space is approximately 75 ft^2 per person.

Structure

The TSC is designed in accordance with the Uniform Building Code (UBC) to withstand earthquakes and high winds. The layout of the TSC is shown in Figure A10-1

Habitability

The ventilation system is operated in accordance with approved procedures and is manually controlled from the TSC. In addition, portable radiation monitors are available to personnel in the

TSC. Equipment and supplies are provided in accordance with Appendix 6 of the Emergency Plan.

The ventilation system includes high efficiency particulate air (HEPA) filters and charcoal filters. The ventilation system is designed to maintain exposures at or below 0.05 Sv (5 rem) total effective dose equivalent (TEDE) as defined in 10 CFR 50.2 for the duration of an accident.

The TSC structure, shielding, and ventilation system are designed to protect the TSC personnel from radiological hazards.

Communications

The TSC has reliable voice communications to the control room, the OSC, the EOF, and the NRC. Provisions for communications with State and local operations centers are also provided in the TSC. The communications facilities include the means for reliable primary and backup communication.

Instrumentation, Data System Equipment, and Power Supplies

The TSC is provided with reliable power and backup power supplies. Lighting is powered by the normal and backup electrical supply system. An emergency battery operated lighting system is installed. Power for vital information systems is provided by reliable power supplies including a battery backed Uninterruptible Power Supply (UPS) system.

Technical Data and Data System

Technical and operational data and information is available for each BLN unit within the TSC. Support facilities are located within the TSC to support long term operation of the TSC.

The TSC is equipped with a computer system, which provides source term and meteorological data and technical data displays to allow TSC personnel to perform detailed analysis and diagnosis of abnormal plant conditions, including assessment of any significant release of radioactivity to the environment.

Human Factors Engineering (HFE) is incorporated into the design of the TSC related to the display and availability of plant data.

Records Availability and Management

The TSC has ready access to plant records. The documents maintained in the TSC include:

- Technical Specifications
- Plant Operating Procedures
- Emergency Operating Procedures
- Final Safety Analysis Reports

- System piping and ventilation diagrams and heating, ventilation, and air conditioning(HVAC) flow diagrams
- Piping area diagrams
- Records needed to perform the functions of the emergency operating facility(EOF) when it is not operational

In addition, copies of the above-listed documents and the following documents are available in BLN Document Control:

- Plant operating records
- Plant Review Board records and reports.

The above records are updated as necessary to maintain currency and completeness. Operations at this facility are directed by the TSC Manager/Site Emergency Director when the TSC is operational.

Figure A10-1 - BLN TSC Layout