BASIS: ESBWR COLA
(Entirety)

Dominion®

North Anna 3 Combined License Application

Part 5: Emergency Plan

Revision 5

December 2013

Explanatory Notes Regarding the Emergency Plan and Supplemental Information

The North Anna Power Station Unit 3 Combined License Emergency Plan consists of a basic plan and eight appendices. The basic plan follows the format of NUREG-0654 and provides detailed information regarding each of the sixteen Planning Standards and associated Evaluation Criteria. The eight appendices that follow provide additional detailed information on various aspects of the Emergency Plan. Supplemental information includes the detailed evacuation time estimate report and current state and local emergency planning documents. Emergency Planning Inspections, Test, Analyses, and Acceptance Criteria (ITAAC) are included in Part 10 of the COLA.

Emergency Plan	
Basic Plan	North Anna Power Station Unit 3 Combined License Application Emergency Plan
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Appendix 2	Assessment and Monitoring for Actual or Potential Off-site Consequences of a Radiological Emergency
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Supplemental Information	
Evacuation Time Estimate Report	
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Caroline County Radiological Emergency Response Plan	
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Maryland Radiological Event Plan (formerly known as Annex Q)	

REVISION SUMMARY

Revision 5

Section	Changes	Reason for Change
II.A.1.b	Revised to clarify the Emergency Coordinator Function	EF3 RAI 13.03-74
II.H.2	Added a pointer to Section II.N.2	EF3 RAI 13.03-72
II.N.2	Added text to clarify drill and exercise schedules	EF3 RAI 13.03-72
Appendix 8	Revised to clarify the Emergency Coordinator Function	EF3 RAI 13.03-78

Revision 4

Section	Changes	Reason for Change
Expanatory Notes, I.B, II.A.1.b, II.D, II.D.1, II.D.2, II.I.1, II.P.7, III.A.13, Appendix 1, Appendix 8	RAI 13.03-3- Revised, Emergency Action Levels	
II.A.1.b, II.A.3	Revised to reflect consolidation of certification letters and title change to National Response Framework	Consistency with Rev. 3 (based on US-APWR COLA)
II.B.9	Added reference to supporting offsite response organizations	Revision to 10 CFR 50, Appendix E, Section IV.A.7 (consistency with Rev. 3)
	Revised to reflect consolidation of certification letters	Consistency with Rev. 3
II.C.1.a	Deleted option for contacting FRMAC directly	Reflect NRC-preferred method of requesting Federal assistance (consistency with Rev. 3)
II.C.4	Revised to reflect consolidation of certification letters	Consistency with Rev. 3
II.C.5, II.C.6	Added	Address NSIR/DPR-ISG-01 Section IV.K
II.D.2	Added information about evaluating and declaring events	Address revision to 10 CFR 50, Appendix E, Section IV.C.2
II.E.1	Added information about notifying state and local officials within 15 minutes of emergency declaration	Consistency with North Anna Units 1 & 2 Emergency Plans

Revision 4 *(continued)*

Section	Changes	Reason for Change
II.E.6	Added information about route alerting	Addresses revision to 10 CFR 50, Appendix E, Section IV.D.4
II.F.1	Added reference to FSAR for communication links information	EF3 RAI 13.03-12
II.H	Revised reference to SSAR	Editorial
II.H.1, II.H.2	RAI 13.03-4, Clarify Change to HSI Function From SPDS Function	
II.H.2	RAI 13.03-5, Clarify New EOF	
	Clarified the location of the local EOF	Addresses SER OI 13.03-5
II.H.4	Added information about staging areas for staff augmentation for hostile actions	Addresses revision to 10 CFR 50, Appendix E, Section IV.E.8
II.H.5	Changed “Sections” to “Section”	Editorial; consistency with Rev. 3
II.H.8	Added reference to met system description	Consistency with Rev. 3
II.H.9	Clarified the location of the OSC	Addresses SER OI 13.03-8
II.J.7	Added information to address evacuations and protective actions	Addresses EF3 RAIs 13.03-14 and 13.03-61
II.J.8	Revised to address the updated ETE report	2012 ETE Report, and addresses revision to 10 CFR 50, Appendix E, Section IV.4
II.J.10	Changed “Figures 10-1 through 10-4” to “Figure 10-1 and Figure 10-2”	Addresses 2012 ETE Report
Figure II-4	Updated map to North Anna remote assembly areas	Consistency with Rev. 3
II.L.1	Revised to reflect consolidation of certification letters	Consistency with Rev. 3
II.N.1-2	Clarified periodic drills and exercises	Addresses revision to 10 CFR 50, Appendix E IV.F.2 and NSIR/DPR-ISG-01, Section IV.g
II.P.4	Clarified ETE review and updates	Addresses revision to 10 CFR 50, Appendix E, Section IV.5 and IV.6

Revision 4 *(continued)*

Section	Changes	Reason for Change
II.N.4, II.P.1, II.P.3, II.P.4, II.P.10	Changed "Emergency Planning Coordinator" to "Manager Emergency Preparedness"	Consistency with Rev. 3
III.A	Updated references 12 and 18; added references 20 and 21	Documents revised and new documents
III.B	Added NSIR/DPR-ISG-01	New reference
III.C	Revised to reflect consolidation of certification letters	Consistency with Rev. 3
Appendix 2–1.0	Changed reference from "Section II.I" to "SSAR Section 2.3"	Correction
Appendix 2–2.3	Changed reference from "Section II.F of this emergency plan" to "SSAR Section 2.3"	Correction
Appendix 2–3.0	Deleted reference to SSAR Section 2.3.3; in last three bullets, changed "Section xxx of the NAESP application" to "SSAR Section xxx"; changed references to Generic ITAAC to COLA Part 10	Corrections
Appendix 4	Replaced with Executive Summary from updated ETE report	Evacuation Time Estimate Report was updated in 2012
Appendix 7	Replaced individual certification letters with consolidated certification letter	Consistency with Rev. 3
Appendix 8 (Note)	Revised to reflect consolidation of certification letters	Consistency with Rev. 3
	Added evaluation criteria C.5 and C.6	Address NSIR/DPR-ISG-01, Section IV.K
	Added evaluation criterion N.1.c	Address NSIR/DPR-ISG-01, Section IV.G
Supplement	Replaced with 2012 ETE report	Evacuation Time Estimate Report was updated in 2012

Revision 1

Section	Changes
I, I.C.2, I.C.3, II.A, II.B, II.C, II.D, II.D.2, II.E, II.E.2, II.E.6, II.E.7, II.F, II.G, II.H, II.H.4, II.I, II.I.7, II.J, II.J.8, II.K, II.L, II.O, II.P, III.A.19, Appendix 1–Executive Summary, Appendix 1–1.0, Appendix 1–3.0	RAI 13.03-2.2, IBR is SSAR in ESPA versus ESP
I.A, I.B, I.C.3, II.A.1.b, II.B.1, II.H.2, II.H.5.a, II.H.5.b, II.H.5.c, II.H.5.d, II.K.2, II.L.1, II.N.2.b, II.P.9, III.A.9, III.A.10, III.A.19, IC HU4, Appendix 2–1.0, Appendix 2–2.1, Appendix 2–2.2, Appendix 8	Made references to Unit 3. Editorial changes. Corrected references. Added reference to MD plan (Appendix 8). Updated Appendix 4 with ETE R1 executive summary.
II.B.8, II.C.3	RAI 13.03-2.3, Vendor Support During Emergency Events
II.E.1, II.F.1.d	Added locations of ENS access and description of communication capabilities between the Control Room/TSC and radiological field personnel.
II.G.4.a, II.G.4.c	RAI 13.03-2-8, Classification of Titles in Public Information Structure
II.H.1, II.H.2	Corrected description of technical data display in TSC.
Table II-2	RAI 13.03-2.9, Required Minimum Staffing Times
II.J.10.a, Figure II-5	RAI ETE-4, Evacuation Routes, Monitoring Points, and Shelter Locations
II.P.4	Changed FSRC to proper noun.
Appendix 1–Executive Summary	Deleted incorrect reference.
Appendix 8	Editorial corrections.

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Acronyms and Abbreviations

AED	Automatic External Defibrillator
ALARA	As Low As Reasonably Achievable
CDE	Committed Dose Equivalent
CFR	Code of Federal Regulations
COL	Combined License
COVRERP	Commonwealth of Virginia Radiological Emergency Response Plan
CPR	Cardio-Pulmonary Resuscitation
CR	Control Room
DCD	Design Control Document
DEQ	Department of Environmental Quality
DHS	(U.S.) Department of Homeland Security
DOE	(U.S.) Department of Energy
EAL	Emergency Action Level
EAS	Emergency Alert System
EDE	Effective Dose Equivalent
ENS	Emergency Notification System
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
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
ESP	Early Site Permit
ETE	Evacuation Time Estimate
FEMA	Federal Emergency Management Agency
FRMAC	Federal Radiological Monitoring and Assessment Center
FRMAP	Federal Radiological Monitoring Assessment Plan
FSAR	Final Safety Analysis Report
GUI	Graphic User Interface
HEAR	Hospital Emergency Alerting Radio
HPN	Health Physics Network
INPO	Institute of Nuclear Power Operations
ITAAC	Inspections, Tests, Analyses and Acceptance Criteria
JIC	Joint Information Center
LAN	Local Area Network
LCO	Limiting Condition of Operation

MIDAS	Meteorological Information and Dose Assessment System
MIDAS-NU	MIDAS-Nuclear
NAEP	North Anna Emergency Plan
NAPS	North Anna Power Station
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
ODCM	Offsite Dose Calculation Manual
ORO	Offsite Response Organization
OSC	Operational Support Center
PAG	Protective Action Guide
PAR	Protective Action Recommendation
PMCL	Protective Measures Counterpart Link
POI	Point of Interest
QA	Quality Assurance
RERP	Radiological Emergency Response Plan
RM/F	Radiation Monitors and Flow
RPP	Radiation Protection Program
RSCL	Reactor Safety Counterpart Link
SOSC	State On Scene Coordinator
SPDS	Safety Parameter Display System
Sv	Sievert
REAC/TS	Radiation Emergency Assistance Center / Training Site
SPDS	Safety Parameter Display System
TEDE	Total Effective Dose Equivalent
TSC	Technical Support Center
UHF	Ultra High Frequency
VCUMC	Virginia Commonwealth University Medical Center
VDEM	Virginia Department of Emergency Management
VDH	Virginia Department of Health
WAN	Wide Area Network

I. Introduction

This emergency plan describes the plans established by Dominion for responding to a radiological emergency at North Anna Power Station (NAPS) Unit 3. Portions of this plan incorporate content by reference from Part 2, Site Safety Analysis Report, of the North Anna ESPA (Reference 19). This plan uses the format "SSAR Section x.y.z" to identify content incorporated from Part 2 of the ESPA.

A. Purpose

This Emergency Plan describes the pre-planned facilities, equipment, response organizations, assessment and protective actions, and cooperative agreements established by Dominion to provide for adequate protection of life and property in the event of a radiological emergency at Unit 3. In this context, protection of life and property includes:

- Notifying and mobilizing affected members of the licensee staff, Federal, Commonwealth of Virginia, risk jurisdiction, and commercial response organizations, and the public;
- Limiting the radiological impact of the emergency on plant employees and affected members of the public; and
- 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.

B. Scope

This emergency plan applies to planning for and response to any radiological emergency condition at Unit 3. Section II.D describes the emergency classification system. Implementing procedures identify radiological emergency conditions, 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 listed in Section II.A. Ongoing coordination with affected risk jurisdiction, Commonwealth of Virginia, 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

This plan has been developed to meet the requirements of 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses For Nuclear Power Plants," (Reference 1). Consistent with those requirements, this plan is based on the requirements of 10 CFR Part 50, "Domestic Licensing Of Production And Utilization

Facilities," (Reference 2) primarily Section 50.47, "Emergency Plans," (Reference 3) and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities" (Reference 4). This plan is also based on the guidance provided in NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (Reference 5).

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. When recommending the size of these EPZs in 1978, the NRC/EPA Task Force on Emergency Planning considered the 1975 Reactor Safety Study (WASH-1400) (Reference 6). The NRC/EPA Task Force on Emergency Planning determined that this study was the best available source of information on the relative likelihood of large accidental releases of radioactivity, given a core melt event (Reference 7). Since that time, significant advances have been made in understanding the timing, magnitude, and chemical form of fission product releases from severe nuclear power plant accidents (Reference 8). The plan recognizes that the size of these areas is subject to change if later analyses, design-specific factors, and legislative or regulatory initiatives warrant.

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. The description of the plume exposure pathway EPZ in SSAR Section 13.3.2.2.1 is incorporated by reference. Collectively, the affected counties are referred to as the risk jurisdictions.

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 aquatic 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. The description of the Ingestion Exposure Pathway EPZ in SSAR Section 13.3.2.2.1 is incorporated by reference.

3. Site and Area Description

Unit 3 consists of a General Electric - Hitachi (GEH) ESBWR as described in the ESBWR Design Control Document (DCD) (Reference 9) and the associated Final Safety Analysis Report (FSAR) (Reference 10).

The site and area descriptions in SSAR Section 13.3.2.1.1 are incorporated by reference.

Figure I-1 North Anna Site Plume Exposure Pathway EPZ

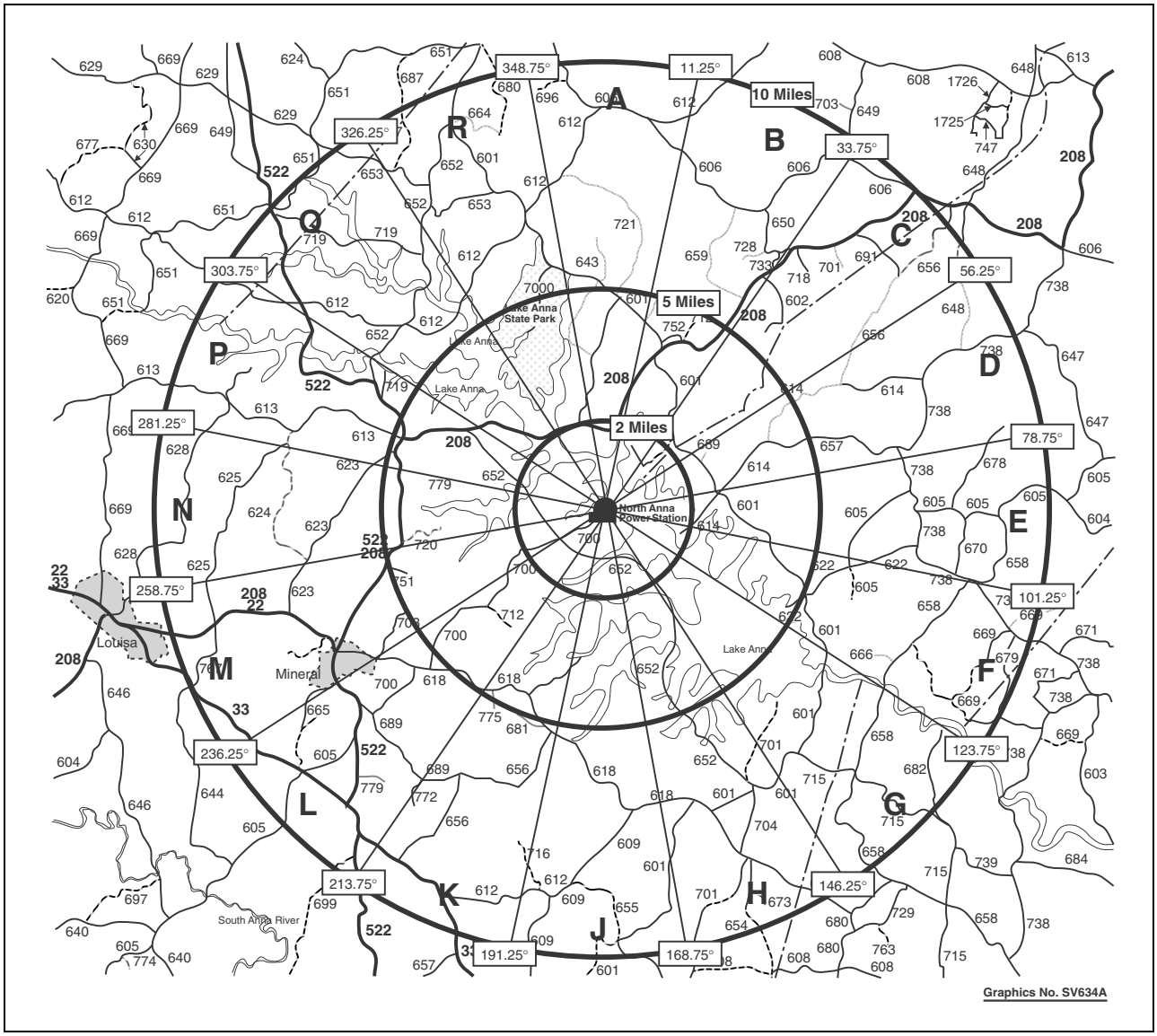
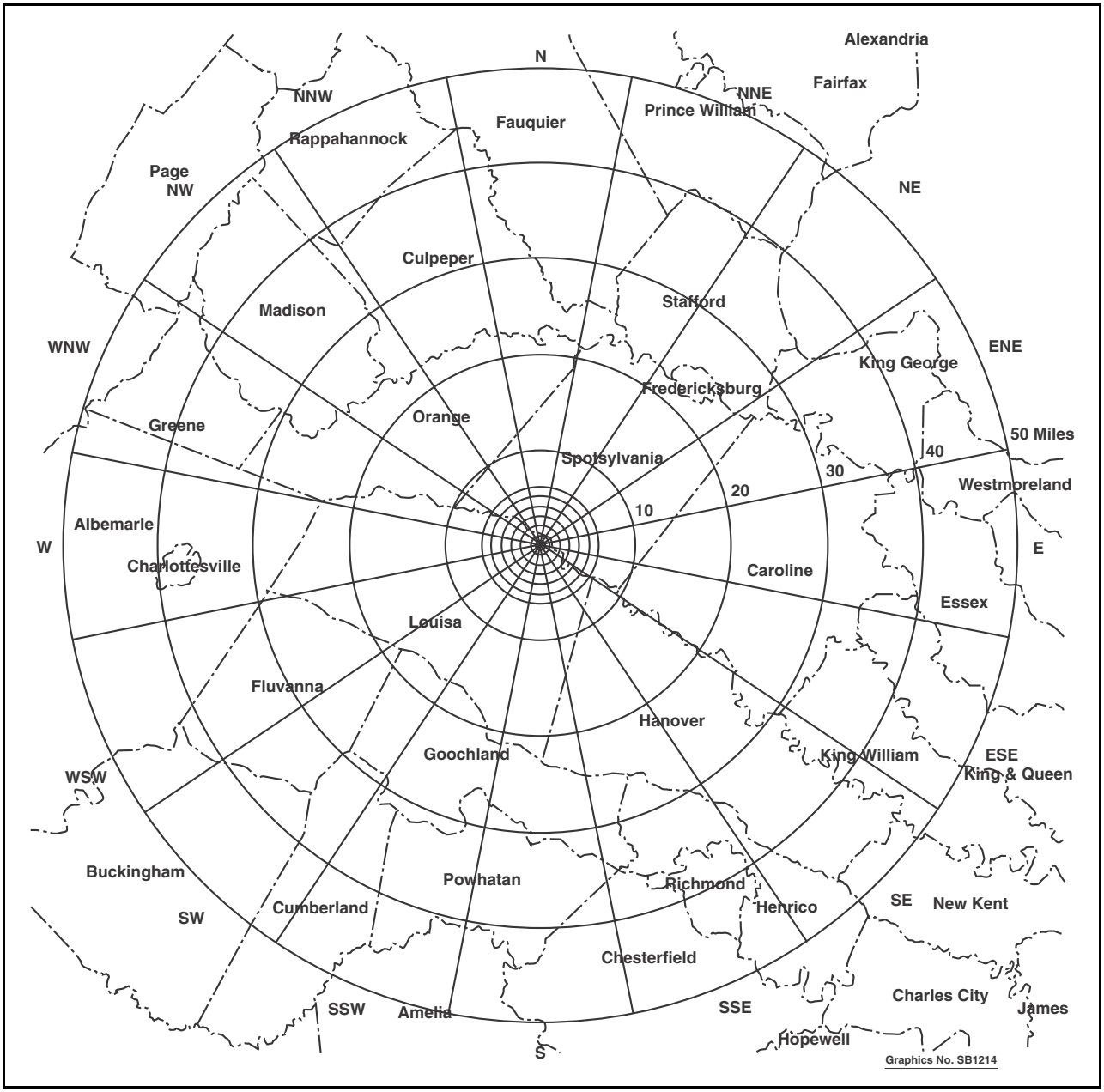


Figure I-2 North Anna Site Ingestion Exposure Pathway EPZ



II. Emergency Plan

A. Assignment of Responsibility (Organization Control)

The description of participating organizations in SSAR Section 13.3.2.2.2.a is incorporated by reference.

1. Emergency Organization

a. Participating Organizations

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Concept of Operations

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

- Assess plant conditions
- Classify emergency conditions
- Notify affected agencies of emergency conditions
- Provide technical expertise to affected agencies
- Provide support for offsite assessment and protective activities
- 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 Unit 3 are conducted under the authority of the Shift Manager and directed from the Unit 3 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 operating procedures, including the EALs provided in implementing procedures, 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 *Emergency Coordinator*[1], makes or directs initial notifications to affected plant staff

1. Throughout this plan, certain position titles, such as *Emergency Coordinator* and *EOF Director*, are used consistent with the provisions of existing regulations, guidance, and Dominion documents. The position titles are provided in italics to denote their generic application. The actual position titles to be used in the execution of this plan will be established in emergency plan implementing procedures or other facility documentation.

and Commonwealth of Virginia, risk jurisdiction, and Federal authorities, and determines if activation of the Dominion emergency response facilities (ERFs) is desirable or required.

The Unit 3 Control Room is the initial center for coordination of emergency response affecting the unit. For emergencies classified as Alert, Site Area Emergency and General Emergency, the *Emergency Coordinator* directs the activation of the emergency response organization (ERO)[2,3,4]. The *Emergency Coordinator* may direct the activation of all or part of the ERO for a Notification of Unusual Event, based on an assessment of plant conditions and support needs.

The Unit 3 Technical Support Center (TSC) acts in support of the command and control function of the Unit 3 Control Room. The TSC provides an area for station personnel who have expertise in diverse areas of plant operation to support the emergency response. This facility is equipped with communication equipment, computer terminals, 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 accident condition and make recommendations to the Control Room, the Emergency Operations Facility (EOF) and off-site agencies as necessary to provide for the safety of plant personnel and members of the general public. After the EOF is operational and activated, the EOF assumes many of the functions of the TSC and relies on the TSC as a vital link to the station. The TSC provides the EOF with up-to-date plant parameters, which allows the EOF staff to perform its assigned tasks.

Following activation of the ERFs and receipt of an adequate turnover, the *Site Vice President* or other designated member of the station management staff relieves the Shift Manager of *Emergency Coordinator* responsibilities and directs the activities of the on-site emergency response organization from the TSC. If the EOF is activated, the *EOF Director* assumes responsibility for the licensee's offsite emergency response efforts, coordinates the availability and utilization of corporate and external resources, and manages recovery efforts.

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

The Operational 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 *Emergency Coordinator*, providing operational information, radiological assessment, and manpower for in-plant functions.

Table II-1, Responsibility for Emergency Response Functions, summarizes the responsibilities and activities of the ERFs under the various emergency classifications.

Coordination with NAPS Units 1&2

Dominion has identified the need to coordinate emergency response actions taken at Unit 3 with Units 1&2. As noted previously in this section the *Emergency Coordinator* is responsible for making notifications to affected plant staff, which may include the Unit 1&2 Control Room. This notification and subsequent communications are important to apprise the Unit 1&2 staffs of any actions they may be required to take.

Additionally, in the unlikely event that emergencies are declared at Unit 3 simultaneously with Unit 1 or 2, the Unit 3 Shift Manager fulfills the *Emergency Coordinator* function until relieved as previously noted in this section. The *Emergency Coordinator* discharges those duties described in this Emergency Plan, as well as those described in the Unit 1&2 Emergency Plan and provides for coordination of activities between the on-site ERFs.

Coordination with Other Reactor Sites Serviced by Central Emergency Operations Facility

In the unlikely event that the Central Emergency Operations Facility described in Section II.H.2 is activated for emergencies that are declared at Unit 3 simultaneously with another reactor site it services, the EOF Director discharges those duties described in this Emergency Plan, as well as those described in the other affected site's Emergency Plan.

Commonwealth of Virginia Government Response

The Commonwealth of Virginia organization for response to radiological emergencies is based on normal governmental structures and channels of communication. The Governor directs the emergency response through the State Coordinator of the Virginia Department of Emergency Management (VDEM). The State Coordinator of the VDEM coordinates the overall response, and the Virginia Department of Health (VDH) provides technical advice and assistance on radiological accident assessment, protective action, radiological control, and radiological monitoring.

When notification is received, the COVRERP is implemented and the VDH initiates action to assess and evaluate the radiological situation in order to provide guidance and assistance to risk jurisdiction governments. After the initial immediate actions, subsequent protective actions are implemented based on the results of the Commonwealth of Virginia evaluation of the radiological situation and the company's recommendations. Commonwealth of Virginia and Federal agencies provide assistance as required. Response operations at the state level are coordinated by the VDEM.

The Commonwealth of Virginia also provides police support during activation of this plan. The first response is likely to be from police units normally based in the local area. These resources can be supplemented as needed by additional units dispatched from other parts of the state. The Virginia State Police also provides traffic control and additional security.

The State Coordinator of the VDEM coordinates the overall response operations at the state level and performs specific duties as defined in the Virginia Emergency Operations Plan, Radiological Emergency Response Basic Plan. The Virginia Emergency Operations Center (EOC) is located at 7700 Midlothian Turnpike, Richmond, Virginia. There are local EOCs in the risk jurisdictions. The VDH sends appropriate liaison personnel to the EOF upon activation.

VDH personnel provide technical advice and assistance on radiological accident assessment, protective actions, radiological exposure control, and radiological monitoring. Virginia EOC staffing is augmented when notification is received of a radiological emergency classified as an Alert or above. Included in the planned response is a team sent to the EOF, which provides direct interface between the VDH and the company's radiological assessment personnel.

Additional Commonwealth of Virginia organizations having possible responsibilities in a radiological emergency are listed in the COVRERP. Requests for support services from these organizations are coordinated through the VDEM.

Figure II-1, Emergency Response Organization Interrelationships, depicts the interrelationships among the various Commonwealth of Virginia and Federal organizations that may respond to an emergency at the facility.

Risk Jurisdiction Government Emergency Response

Responsibility for 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. An Insta-phone with

backup by commercial telephone, having extensions available in the Control Room, TSC and EOF, is used for normal transmission of emergency notifications to these authorities. Receipt of message by Insta-phone constitutes verification. If the message was received by means other than by Insta-phone, procedures for authentication of an emergency, via the use of call-back numbers, are maintained in the COVRERP and risk jurisdiction RERPs. Risk jurisdiction law enforcement personnel also respond to these Plans. They can perform essentially the same functions as the Virginia State Police and coordinate their efforts with that organization.

In the event of an emergency, the Station is in communication with the risk jurisdiction Emergency Services Directors, who have the capability of activating their EOCs. The Station relies upon the risk jurisdictions to provide assistance in the event an evacuation from the site requires a remote assembly point or for any services the risk jurisdictions are capable of providing to mitigate the results of the emergency.

The risk jurisdiction health department is the primary health response agency, with the Virginia Health Department providing assistance to them as required, with emphasis on the special requirements for those individuals who are contaminated with radioactivity. Accident assessment personnel operate from the Virginia EOC.

In the event of an emergency, notification and coordination with the risk jurisdictions within the ingestion exposure pathway EPZ are the responsibility of the VDEM and VDH in cooperation with the Virginia Department of Agriculture and Consumer Services and the Virginia Department of Environmental Quality (DEQ), Water Division.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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 11) provides for the coordinated management of Federal technical response activities related to a radiological emergency. Its primary goals include:

- Assisting the Commonwealth of Virginia and Federal Coordinating Agency with personnel, equipment, and technical resources, as needed;
- Collecting offsite environmental radiological data; and,
- Providing the data and related assessments to involved State agencies and to the Federal Coordinating Agency.

The Department of Energy (DOE), because of its history and capabilities in radiological monitoring and assessment, was assigned the 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.

Appendix 7 provides a copy of the certification letter established between Dominion and the supporting Commonwealth of Virginia and risk jurisdiction agencies and private sector organizations supporting this plan. The responsibilities of many Federal agencies are established in the National Response Framework (Reference 12) and therefore no agreement letters are required for these agencies.

c. Organizational Interrelationships

The interfaces between and among the onsite and offsite functional areas of emergency response described in SSAR Section 13.3.2.2.2.b.1 are incorporated by reference. Figure II-1 illustrates these interrelationships.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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, classifies the emergency. Upon declaration of an emergency, the Shift Manager or Unit Supervisor assumes the role of the *Emergency Coordinator* and is in charge of the emergency response for the facility.

If required by the emergency classification, or if deemed appropriate by the *Emergency Coordinator*, emergency response personnel are notified and instructed to report to their emergency response locations[5]. The Shift Manager is relieved as *Emergency Coordinator* when the designated management representative reports to

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

the station and is updated as to the status of the unit, the emergency actions taken, and the current status of the emergency. Following this relief, the *Emergency Coordinator* may relocate to the TSC.

The EOF may be activated concurrent with the TSC and always is activated upon declaration of a Site Area Emergency or General Emergency. The EOF is staffed by Dominion personnel, including the *EOF Director*, who directs the activities of this facility. The senior Dominion representative is responsible for ensuring the EOF communicates emergency status to the Commonwealth of Virginia and risk jurisdiction governments, directs the efforts of the offsite monitoring teams, makes radiological assessments, recommends offsite protective measures to the Commonwealth of Virginia, and arranges through the company for dispatch of any special assistance or services requested by the station.

The Director Nuclear Protection Services and Emergency Preparedness reports to Dominion's senior nuclear executive who is responsible for the total execution of the radiological emergency response effort at Dominion's fleet of nuclear power plants.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

e. 24 Hour Emergency Response Capability

Dominion maintains capability for 24 hour response, including staffing of communications links, through training of multiple responders for key emergency response positions, consistent with the staffing requirements of Section II.B.5 and the training requirements of Section II.O.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Functions, Responsibilities, and Legal Basis

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

3. Written Agreements

Appendix 7 provides a copy of the certification letter established between Dominion and the Commonwealth of Virginia and risk jurisdiction government agencies and private sector organizations committed to supporting further development and implementation of this plan.

The responsibilities of many Federal agencies are established in the National Response Framework; therefore, no certification letters are required for these agencies.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

4. Continuous Operations

Dominion 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. The *Emergency Coordinator* bears responsibility for ensuring continuity of technical, administrative, and material resources during emergency operations.

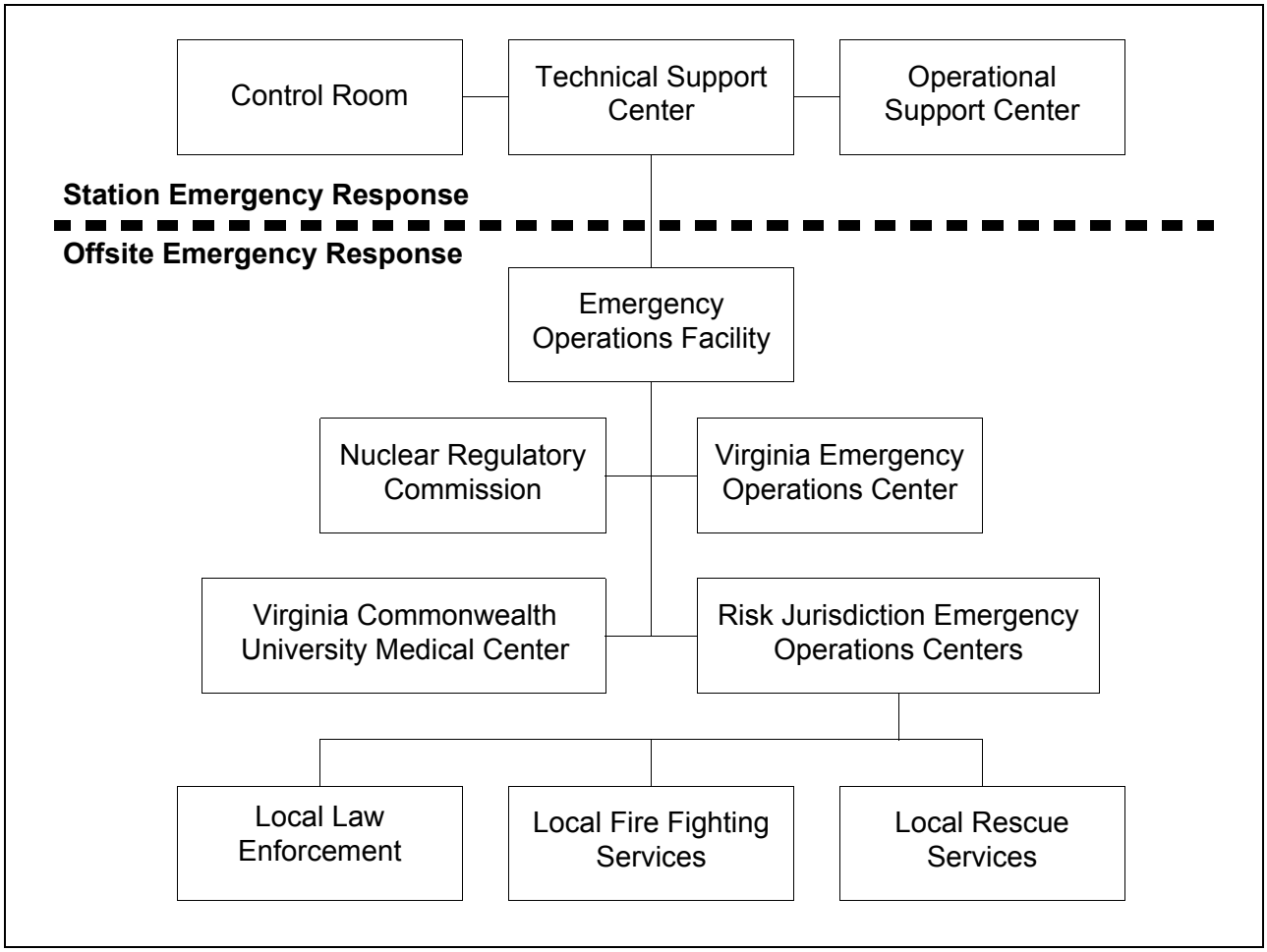
Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

Table II-1 Responsibility for Emergency Response Functions

Function	Emergency Classification			
	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) (EOF)	TSC (EOF)	EOF	EOF
Monitoring of radioactive effluents and the environs; dose assessment and projection	CR (TSC) (EOF)	TSC (EOF)	EOF	EOF
Provision of information to Commonwealth of Virginia and risk jurisdiction emergency response organizations, including Protective Action Recommendations	CR (TSC) (EOF)	TSC (EOF)	EOF	EOF
Management of recovery operations	CR (TSC) (EOF)	TSC (EOF)	TSC/EOF	TSC/EOF
Technical support for recovery operations	CR (TSC) (EOF)	TSC (EOF)	TSC/EOF	TSC/EOF

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. Onsite Emergency Organization

1. Onsite Emergency Organization

The description of the Onsite Emergency Organization in SSAR Section 13.3.2.2.2.b is incorporated by reference.

Figure II-2 illustrates the onsite 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 this plan. Staffing is described in FSAR Section 13.1. 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. Emergency Coordinator

The Shift Manager/Unit Supervisor position is continuously staffed consistent with 10 CFR 50.54(m). Upon recognition of an emergency condition, the individual filling this position assumes the duties of the *Emergency Coordinator* until relieved by a qualified member of the management staff consistent with Section II.B.3 or until termination of the emergency condition, whichever comes first.

The individual filling the *Emergency Coordinator* role has the responsibility and authority to initiate any required emergency response actions, including notification of affected Federal, Commonwealth of Virginia, and risk jurisdiction authorities and provision of Protective Action Recommendations to offsite authorities. Upon staffing of the ERO, the *EOF Director* relieves the *Emergency Coordinator* of responsibility for notification of and coordination with offsite authorities.

3. Emergency Coordinator Line of Succession

If the Shift Manager is rendered unable to fulfill the duties and responsibilities of the *Emergency Coordinator* position (such as due to personal illness or injury) the Unit Supervisor or, in the absence of a Unit Supervisor (i.e., as may be permitted in cold shutdown or refueling modes), a Reactor Operator present on shift (a position that also will be continuously staffed) assumes the *Emergency Coordinator* position until relieved by a qualified member of the management staff as outlined below.

A trained, higher level member of the licensee's management staff may assume *Emergency Coordinator* 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. Emergency Coordinator Responsibilities

The *Emergency Coordinator* 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 Commonwealth of Virginia and risk jurisdiction agencies. The non-delegable responsibilities of the *Emergency Coordinator* include:

- Classifying the emergency
- Authorizing notification to the NRC, Commonwealth of Virginia and risk jurisdiction agencies of the emergency status
- Recommending protective measures

- Authorizing emergency exposure limits

Other responsibilities of the *Emergency Coordinator* include:

- Activating emergency personnel and facilities
- Reducing power or shutting down the reactor
- Committing company funds as necessary
- Acquiring emergency equipment or supplies
- Ordering site evacuation
- Restricting access to the site
- Notifying company management
- Implementing work schedules
- Directing onsite emergency activities

As indicated in Table II-1, the EOF may assume responsibility for:

- Management of corporate emergency response resources
- Monitoring of radioactive effluents and the environs
- Dose assessment and dose projections, including recommending protective measures
- Provision of information regarding emergency status to offsite emergency response support organizations, including notification to the NRC, the Commonwealth of Virginia, and the risk jurisdiction agencies

5. Plant Emergency Response Staff

Dominion will establish minimum emergency response staffing consistent with Table II-2, which has been based on the guidance provided in Table B-1 of NUREG-0654. Figure II-2 illustrates the plant staff emergency organization.

Upon declaration of an emergency, members of the plant staff assume positions in the emergency response organization consistent with their training and management assignments. Figure II-3 provides an illustration of the augmented plant staff emergency response organization.

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

The onsite emergency organization provides for the key functions of accident assessment, radiological monitoring and analysis, security, fire-fighting, first aid and rescue, and communications.

6. Interfaces Between Functional Areas

Figure II-1 illustrates the interfaces between and among the site functional areas of emergency response activity, Dominion EOF support, the affected Commonwealth of Virginia and risk jurisdiction government response organizations, the NRC, and other offsite organizations.

7. Corporate Support for the Plant Staff

Upon declaration of an Alert, Site Area Emergency, or General Emergency, the *Emergency Coordinator* directs the activation and notification of the onsite and offsite ERFs. Dominion management, technical, and administrative personnel staff the EOF and provide (or coordinate) augmented support for the plant staff.

The Dominion corporate 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 offsite authorities and release of information to the media. In addition to the activities discussed in Table II-2, activities of the Dominion corporate staff include:

- Logistical support for plant personnel
- Technical support for planning and recovery/re-entry operations
- Management-level interface with governmental authorities
- Coordination with, and release of information to, the news media

8. Support from Contractor and Private Organizations

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 will report to the *EOF Director* and assist in coordinating INPO's response to the emergency.

Dominion may request that the reactor vendor, GEH, provide technical support for emergency response activities. GEH will operate primarily from its corporate offices, with a small contingent at the plant if requested.

If required at the time of the event, additional resources can be obtained through purchase agreements with the supporting institutions. These agreements would be negotiated on an as-needed basis.

9. Risk Jurisdiction Emergency Response Support

Dominion has established and will maintain agreements for risk jurisdiction emergency response support services, including fire fighting, rescue squad, medical and hospital services. Section II.L of this plan provides a description of the arrangements for medical support services, including hospital and ambulance support. Appendix 7 provides the certification letter for organizations providing these services.

Figure II-2 North Anna Unit 3 Emergency Response Organization – On-Site

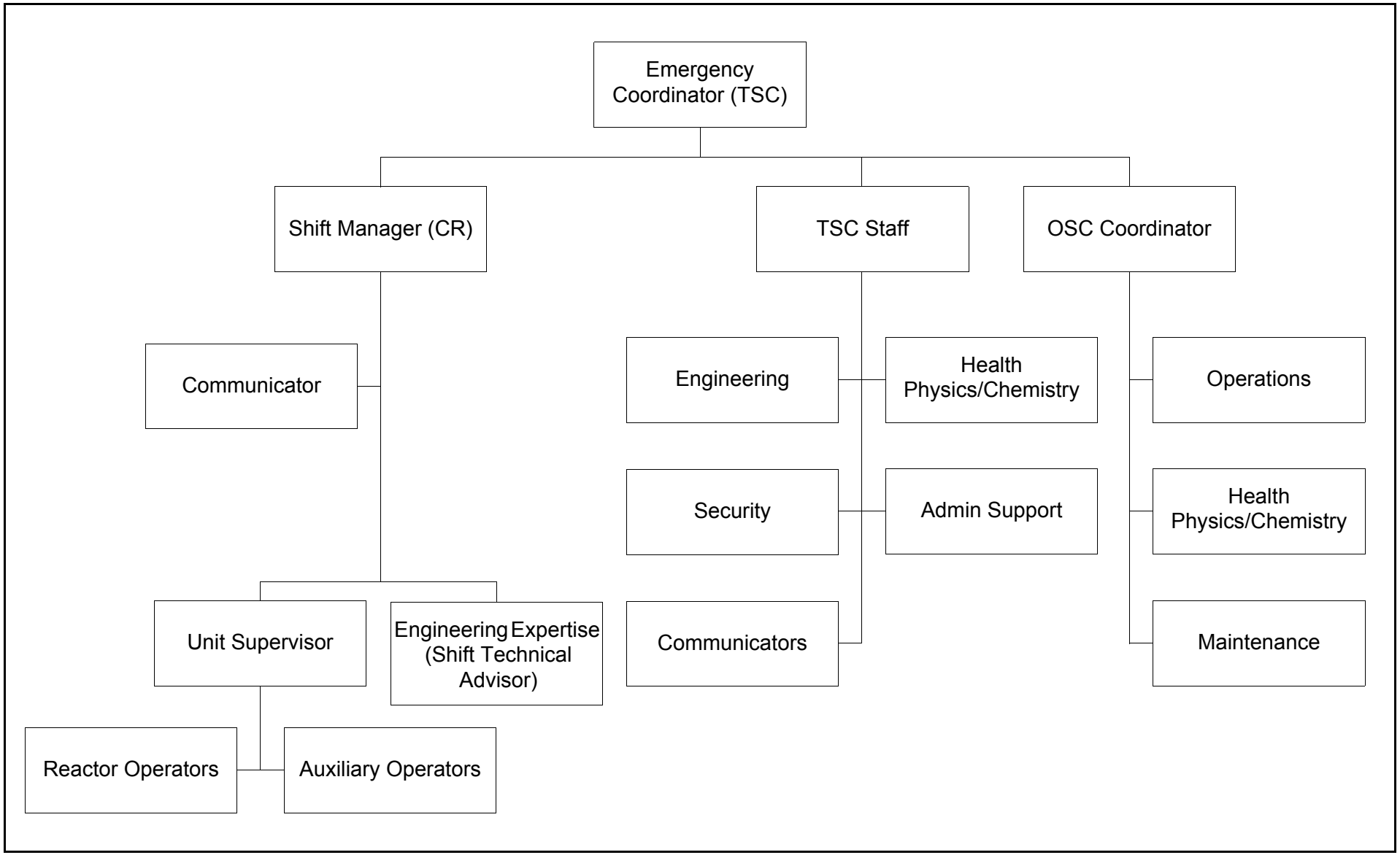


Figure II-3 North Anna Unit 3 Augmented Emergency Response Organization

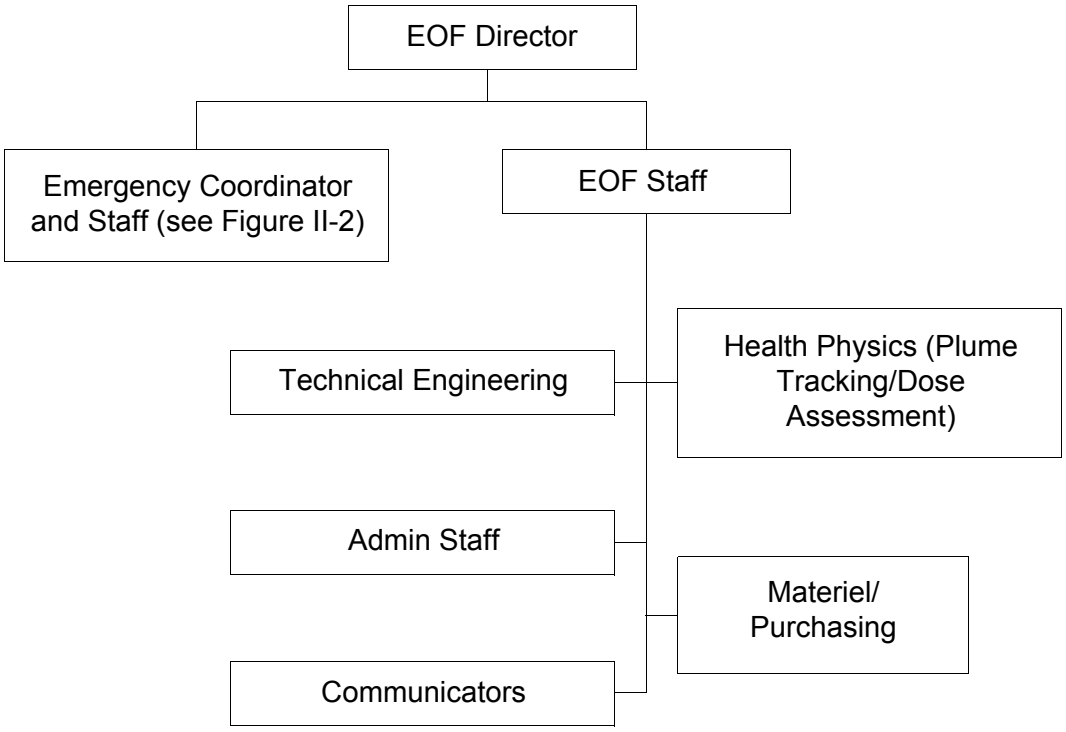


Table II-2 Plant Staff Emergency Functions

Major Functional Area	Major Tasks	Position, Title, or Expertise	On Shift[2,3]	Capability for Additions	
				Approx 45 min	Approx 60 min
Plant Operations and Assessment of Operational Aspects	Supervision of Station Operations and Assessment of Operational Aspects of Plant Operations	Shift Manager-(SRO)	1		
		Unit Supervisor (SRO)	1		
		Control Room Operator (RO)	2		
		Non-Licensed Operator	2		
Emergency Direction and Control (*Emergency Coordinator*)	Direction and Control of On-Site Emergency Activities	Shift Manager	1[1]		
Notification and Communication	Notify licensee, Commonwealth of Virginia, risk jurisdiction, and Federal personnel and maintain communication	Emergency Communicator	1[4]	1[4]	2[4]
Radiological Accident Assessment and Support of Operational Accident Assessment	EOF Director	Senior Manager			1
	Dose Assessment	Radiological Assessment Coordinator		1	
	Off-site surveys	HP Technicians		2[4]	2[4]
	On-site (out of plant)			1[4]	1[4]
	In-plant surveys		1	1	1
	Chemistry/Radiochemistry	Chemistry	1		1

Table II-2 Plant Staff Emergency Functions

Major Functional Area	Major Tasks	Position, Title, or Expertise	On Shift[2,3]	Capability for Additions	
				Approx 45 min	Approx 60 min
Plant System Engineering, Repair and Corrective Actions	Technical Support	Shift Technical Advisor function[5]	1		
		Technical Support Team Member (Core and Thermal Hydraulics)			1[6]
		Technical Support Team Member (Electrical)			1
		Technical Support Team Member (Mechanical)			1
	Repair and Corrective Actions	Damage Control Team Member (Mechanical Maintenance)	1[1]		2
		Damage Control Team Member (Electrical Maintenance)	1[1]	1	1
		Damage Control Team Member (Instrumentation and Control)		1	
Protective Actions (In-Plant)	Radiation Protection a. Access Control b. HP Coverage for repair, corrective actions, search and rescue, first aid, and firefighting c. Personnel monitoring d. Dosimetry	HP Technicians	2[1]	2[4]	2[4]
Firefighting	Firefighting	Fire Team Members	Per FSAR	Local Support	
Rescue Operations and First Aid	First Aid	First Aid Team Member	2[1, 4]	Local Support	

Table II-2 Plant Staff Emergency Functions

Major Functional Area	Major Tasks	Position, Title, or Expertise	On Shift[2,3]	Capability for Additions	
				Approx 45 min	Approx 60 min
Site Access Control and Personnel Accountability	Security, firefighting, communications, personnel accountability	Security Team Members	Staffing levels for the on-shift, initial additions and supplemental additions are provided in the Security Plan.		
		Security Team Leader			
Totals			**16**	**10**	**16**

1. This coverage is initially provided by personnel assigned other functions.
2. The minimum shift crew will be as defined in 10 CFR 50.54(m)(2)(i) and the Technical Specifications.
3. On-shift positions may be vacant for up to two hours due to unforeseen circumstances, such as sudden illness.
4. These resources are common between North Anna Units 1&2 and Unit 3 and may be shared.
5. These duties may be performed by an appropriately qualified SRO.
6. The Shift Technical Advisor function provides core thermal/hydraulics expertise prior to supplemental staff addition.

C. Emergency Response Support and Resources

The arrangements for emergency response support and resources described in SSAR Section 13.3.2.2.2.c are incorporated by reference.

1. Federal Response Capability

a. Under some complex circumstances it may be necessary to obtain offsite radiological monitoring support from Federal government agencies. The *Emergency Coordinator/EOF Director* may request FRMAC assistance through the NRC.

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). Dominion estimates that a FRMAC Advance Party could be expected at the site within 6 to 14 hours following the order to deploy, based on the availability of airports near the site.

   Dominion expects that NRC assistance from NRC's offices in Atlanta, GA, will arrive in the site vicinity within 7-8 hours following notification.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

c. Dominion provides facilities and resources needed to support the Federal response through the EOF. Available resources include office space and telephone and radio communications circuits. Dominion also provides limited office space and telephone communications facilities for NRC personnel in the TSC.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Offsite Organization Representation in the EOF

a. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Dominion does not expect risk jurisdiction representatives to be present at the EOF. A VDEM State On-Scene Coordinator (SOSC) serves as the Commonwealth's representative to provide interface between the utility and Commonwealth of Virginia and risk jurisdiction governments.

3. Radiological Laboratories

Radiological laboratories available to support emergency response efforts are available through the Commonwealth of Virginia to respond to an emergency at the NAPS site. These resources include those facilities listed below. Estimated travel times to the NAPS site are provided parenthetically.

- University of Virginia, Charlottesville, Virginia (45 minutes)
- Virginia Commonwealth Laboratories, Richmond, Virginia (75 minutes)
- Virginia Commonwealth University Medical Center, Richmond, Virginia (75 minutes)
- Newport News Shipbuilding & Drydock, Newport News, Virginia (3 1/2 hours)
- VDH Radiological Health Program Mobile Laboratory (1 hour)

North Anna maintains fixed laboratory equipment to support sampling analysis and monitoring. The equipment includes multichannel analyzers, proportional counters, a tritium analyzer, and whole body counters; arrangements are maintained for reading thermoluminescent dosimeters (TLDs).

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

4. Other Supporting Organizations

Dominion has made arrangements to obtain additional emergency response support from the INPO Fixed Nuclear Facility Voluntary Assistance Agreement signatories and the Radiation Emergency Assistance Center/Training Site (REAC/TS). A certification letter in Appendix 7 outlines the scope of the expected support.

5. Not Used

6. Support During a Hostile Action Based Incident

Reserved for a future revision per schedule for implementing provisions of 10 CFR 50 Appendix E, Section IV.A.7.

D. Emergency Classification System

Dominion uses a standard emergency classification scheme, based on system and effluent parameters, which allows affected Commonwealth of Virginia and risk jurisdiction response organizations to determine initial offsite response measures.

The description of the emergency classification system in SSAR Section 13.3.2.2.2.d is incorporated by reference.

1. Classification System

10 CFR 50, Appendix E identifies four distinct classes of emergencies:

- 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.

  Potential degradation of the level of safety of the plant is indicated primarily by exceeding plant technical specification Limiting Condition of Operation (LCO) allowable action statement time for achieving required mode change. Precursors of more serious events should also be included because precursors do represent a potential degradation in the level of safety of the plant. Minor releases of radioactive materials are included. In this emergency class, however, releases do not require monitoring or offsite response.

  Actions undertaken at the NOUE emergency class include promptly informing State and local offsite authorities of the event, augmenting on-shift resources as needed, assessment and response, and escalation to a more severe class, if appropriate. If the emergency class is not escalated to a more severe class, then State and local offsite authorities will be notified of event termination in accordance with implementing procedures.

- 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.

  Rather than discussing the distinguishing features of “potential degradation” and “potential substantial degradation,” a comparative approach would be to determine whether increased monitoring of plant functions is warranted at the Alert level as a result of safety system degradation. This addresses the operations staff's need for help, independent of whether an actual decrease in plant safety is determined. This increased monitoring can then be used to better determine the actual plant safety state, whether escalation to a higher emergency class is warranted, or whether de-escalation or termination of the emergency class declaration is warranted. Dose consequences from these events are small fractions of the EPA PAG plume exposure levels.

  Actions undertaken at the Alert emergency class include those described for the NOUE emergency class and activation of the Technical Support Center and

Operational Support Center. In addition, Emergency Operations Facility and other key emergency personnel are alerted, on-site monitoring teams are dispatched, periodic plant status updates and meteorological assessments are provided to offsite authorities, as are dose estimates, if any event related releases are occurring.

- 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 Protective Action Guideline exposure levels beyond the site boundary.

  The discriminator (threshold) between Site Area Emergency and General Emergency is whether or not the EPA PAG plume exposure levels are expected to be exceeded outside the site boundary. This threshold, in addition to dynamic dose assessment considerations discussed in the EAL guidelines, clearly addresses NRC and offsite emergency response agency concerns as to timely declaration of a General Emergency.

  Actions undertaken at the Site Area Emergency emergency class include those described for the Alert emergency class and activation of the Emergency Operations Facility. In addition, an individual is dedicated to provide plant status updates to offsite authorities and periodic media briefings (jointly with offsite authorities when practicable), senior technical and management staff are made available for consultation with NRC and the Commonwealth of Virginia on a periodic basis, and release and dose projections based on available plant condition information and foreseeable contingencies are provided.

- 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 or hostile action that results in an actual los of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

  The bottom line for the General Emergency is whether evacuation or sheltering of the general public is indicated based on EPA PAGs, and therefore should be interpreted to include radionuclide release regardless of cause. In addition, it should address concerns as to uncertainties in systems or structures (e.g., containment) response, and also events such as waste gas tank releases and severe spent fuel pool events that may affect the public. To better assure timely notification, EALs in this category must primarily be expressed in terms of plant function status, with secondary reliance

on dose projection. In terms of fission product barriers, loss of two barriers with loss or potential loss of the third barrier constitutes a General Emergency.

Actions undertaken at the General Emergency emergency class are identical to those described for the Site Area Emergency emergency class except there is no more severe emergency class.

Implementing procedures provide recognition categories, the associated initiating condition matrices, and the EALs.

2. **Emergency Action Levels**

   The description of emergency action levels provided in SSAR Section 13.3.2.2.2.c is incorporated by reference. The following information supplements that description.

   Implementing procedures provide the parameter values and equipment status that are indicative of each emergency class. Once indications are available to plant operators that an emergency action level has been exceeded, the event is promptly assessed and classified, and the corresponding emergency classification level is declared. This declaration occurs as soon as possible and within 15 minutes of when these indications become available.

3. **Commonwealth/Risk Jurisdiction EAL Scheme**

   This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

4. **Commonwealth/Risk Jurisdiction Emergency Action Procedures**

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

E. Notification Methods and Procedures

Dominion maintains procedures for notification of Commonwealth of Virginia and risk jurisdiction response organizations and licensee emergency responders. These procedures include, or make reference to, the pre-planned content of messages to Commonwealth of Virginia and risk jurisdiction organizations. Dominion also makes arrangements to provide prompt notification to members of the public within the plume exposure pathway EPZ.

The descriptions of notification methods and procedures provided in SSAR Section 13.3.2.2.2.e are incorporated by reference.

1. **Notification of Commonwealth and Risk Jurisdiction Authorities**

   Dominion maintains systems and procedures needed to provide prompt notification of affected Commonwealth of Virginia, risk jurisdiction, and Federal authorities following the

declaration of any emergency condition, consistent with the emergency classification and action level scheme described in implementing procedures. The *Emergency Coordinator* initiates notification of affected Commonwealth of Virginia and risk jurisdiction authorities, including escalation or de-escalation of any emergency condition. State and local community officials will be notified within 15 minutes after declaration of an emergency (meaning the emergency classification level has been provided to the Virginia and risk-jurisdiction Emergency Operations Centers (EOCs)). The affected authorities include the Commonwealth of Virginia and the following risk jurisdictions:

- Caroline County
- Hanover County
- Louisa County
- Orange County
- Spotsylvania County

The primary notification method to be used is the Insta-phone system, which is accessible from the Control Room, TSC, and EOF. Back-up notification capability is maintained through the use of commercial telephone systems. Message content and verification methods are established in implementing procedures.

Dominion maintains systems and procedures needed to provide prompt notification of the USNRC Operations Center following the declaration of any emergency condition. The USNRC will be notified as soon as is practical following the notification of the Commonwealth of Virginia and risk jurisdiction authorities and within one (1) hour of the emergency declaration, including escalation or de-escalation of any emergency declaration. The primary notification method to be used is the Emergency Notification System, which is accessible from the Control Room, TSC, and EOF. Back-up notification capability is maintained through the use of commercial telephone systems.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Notification and Mobilization of Licensee Response Organizations

The description of the methods and procedures used for notifying and mobilizing the Dominion ERO provided in SSAR Section 13.3.2.2.2.e is incorporated by reference. The following information supplements that description.

The *Emergency Coordinator* directs the notification and mobilization of the licensee emergency response organization following the declaration of an Alert or higher level emergency. Although Dominion does not expect that the augmented resources of the emergency response organization would 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 *Emergency Coordinator*.

When staffing of the ERO is required, or desired by the *Emergency Coordinator*, affected personnel may be notified by a multifaceted process, including alarms, announcements, pagers, telephones, on-line messages, etc. Notification and mobilization of the emergency response organization is initiated in accordance with implementing procedures.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

3. Message Content

The content of initial emergency notification messages from the plant to affected Commonwealth of Virginia and risk jurisdiction authorities includes information addressing the class of emergency, status of any radioactive releases, the locations of any potentially-affected populations, and recommendations regarding public protective actions.

The COVRERP provides the notification form used for notification of Commonwealth and risk jurisdiction authorities. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

4. Follow-up Messages to Offsite Authorities

Follow-up messages from the plant to affected Commonwealth of Virginia and risk jurisdiction authorities include the following information, to the extent the information is available and appropriate, as mutually agreed upon between Dominion and VDEM:

- Incident date, time, and location;
- Name of and contact information for caller;
- Emergency classification;
- 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, and estimates of total and relative quantities and concentrations of noble gases, iodines, and particulates;
- Meteorological conditions, including wind speed and direction, stability class, and precipitation;
- Actual or projected exposure rates and projected integrated dose at the site boundary;
- Projected exposure rates and integrated doses at the projected peak location and at 2, 5, and 10 miles, including affected sectors;

- Estimates of surface contamination levels in the plant, onsite, and offsite;
- Emergency response actions underway;
- Recommended emergency actions, including protective action recommendations;
- Requests for any onsite support by offsite organizations (e.g., firefighting or medical transportation support); and
- Prognosis for changes in event classification or other conditions based on current assessments of plant conditions.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

6. Instructions to the Public in the Plume Exposure EPZ

The description of the methods and procedures used for providing instructions to members of the public provided in SSAR Section 13.3.2.2.2.e is incorporated by reference. The following information supplements that description.

The primary method of alerting the public is by sounding the Alert and Notification System sirens. Other alerting methods may include telephone communications, television and radio communications via the Emergency Alert System (EAS) stations, public address systems, bull horns from patrol cars, and personal contact.

The Commonwealth of Virginia and risk jurisdiction governments have ultimate responsibility for warning the public. Should it be necessary, Commonwealth of Virginia and risk jurisdiction authorities will alert the public within the plume exposure pathway EPZ using alternative methods described in the Virginia Emergency Operations Plan, Radiological Emergency Response Basic Plan and the risk jurisdiction Radiological Emergency Response Plans. Route alerting provides backup alert and notification capability (reference to 10 CFR 50, Appendix E, paragraph IV.D.4). Details of alternate methods are located in the same section of the respective plans as the primary methods. Members of the public within the plume exposure pathway EPZ shall be informed of what actions to take following activation of the Alert and Notification System. Upon hearing the alert, they are instructed to turn on their radios or television sets to the EAS to receive further instructions. The affected risk jurisdictions and the Commonwealth of Virginia have a 24 hour per day capability to activate the system. If the Commonwealth of Virginia cannot be contacted, the risk jurisdictions can contact the EAS control station directly in accordance with their respective plans.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

7. Written Messages to the Public

The description of the processes used for providing written messages to the public provided in SSAR Section 13.3.2.2.2.g is incorporated by reference. The following information supplements that description.

Affected Commonwealth of Virginia and risk jurisdiction officials bear responsibility for providing written emergency messages intended for the public, in particular providing instructions regarding specific protective actions. Dominion supports development of these messages by providing supporting information.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

F. Emergency Communications

Dominion maintains systems and procedures that provide for prompt communications between its ERFs and between the site and offsite ERFs. The descriptions of plans for implementing emergency communications provided in SSAR Section 13.3.2.2.2.f are incorporated by reference.

1. Description of Communication Links

Dominion maintains reliable communications links both within the plant and between the plant and external emergency response organizations. FSAR Section 9.5.2.2 and Section 9.5.2 of the ESBWR DCD provide a description of communications systems.

a. Dominion maintains capabilities for 24 hour per day emergency notification to the Commonwealth of Virginia and risk jurisdiction emergency response network. Commonwealth of Virginia/risk jurisdiction warning points are manned 24 hours per day. This communications link consists of an Insta-phone loop with links to risk jurisdictions and the Commonwealth of Virginia. If the Insta-phone is out of service, regular commercial telephone will be used to make the notifications and the above localities have a system to call back to the power station and verify the message.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Provisions for communicating with Commonwealth of Virginia and risk jurisdiction governments include an Insta-Phone loop that has been installed to permit simultaneous telephone-speaker communications from the Station to the risk jurisdictions and the Virginia EOC on a 24-hour per day basis. This loop can be activated from the Control Room, TSC, or EOF.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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

- Emergency Notification System (ENS): Provide for initial notifications, as well as ongoing information about plant systems, status and parameters, will be provided to the NRC. ENS lines are located in the Control Room, TSC and EOF.
- Management Counterpart Link (MCL): Provides 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 EOF.
- Health Physics Network (HPN): Provide for communications regarding radiological and meteorological conditions, assessments, trends, and protective measures. HPN lines are located in the TSC and EOF.
- Reactor Safety Counterpart Link (RSCL): Allows for internal NRC discussions regarding plant and equipment conditions. RSCL lines are located in the TSC and EOF.
- 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 EOF.
- Local Area Network (LAN) Access: Provides access to the NRC local area network. Jacks are provided in the TSC and EOF.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

d. Dominion provides capability for communications between the Control Room or TSC and the EOF, risk jurisdiction and Virginia EOCs via the Insta-Phone loop as described in Section II.F.1.b. Communications capabilities between the Control Room or TSC and radiological field personnel are also provided.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

f. Dominion provides for communications between Control Room/TSC/EOF and the NRC Operations Center via dedicated telephone lines.

g. Dominion will activate the Emergency Response Data System (ERDS) within one hour of the declaration of an Alert or higher emergency classification in accordance with the applicable facility procedure(s).

2. Communication with Fixed and Mobile Medical Support Facilities

Dominion 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 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

3. Communication System Tests

Dominion conducts tests of its emergency communications system as follows:

- Communications with the facility and EOF and the Commonwealth of Virginia/risk jurisdiction warning points are tested monthly.
- Communications between the Virginia/risk jurisdiction EOCs and field assessment teams are tested annually.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

G. Public Education and Information

Dominion maintains a coordinated program to educate affected members of the public regarding emergency notification methods and actions. The descriptions of plans for implementing a public information program provided in SSAR Section 13.3.2.2.2.g are incorporated by reference.

1. Public Information Program

Dominion coordinates with affected Commonwealth of Virginia and risk jurisdiction authorities to disseminate pertinent emergency response information to members of the public in the plume exposure pathway EPZ on a yearly basis. Information may be 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:

- Educational information on radiation;
- Information regarding notification methods and immediate actions;
- Protective measures, such as information addressing evacuation routes, relocation centers, sheltering, respiratory protection, and radioprotective drugs;
- Information addressing special needs of the handicapped; and
- Point of contact for additional information.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Distribution and Maintenance of Public Information

Dominion coordinates with affected Commonwealth of Virginia and risk jurisdiction authorities to disseminate pertinent emergency response information to members of the public in the plume exposure pathway EPZ on a yearly basis. Written information applicable to permanent residences is provided in a form that is likely to be maintained in the residence (e.g., calendars, brochures) so it will be 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 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

3. News Media Coordination

a. The outlet for emergency information is the Joint Information Center. Dominion's *Chief Technical Spokesperson* will serve as the primary licensee spokesperson and media contact in the Joint Information Center. The *Chief Technical Spokesperson* gathers information from the ERO for dissemination to the news media and updates the news media on a periodic basis throughout any emergency situation during which the members of the media respond to the JIC.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Dominion provides a designated space for limited numbers of news media personnel within the EOF.

4. Information Exchange

a. The Dominion public affairs liaison has access to required public information, primarily through communications with the *Chief Technical Spokesperson* and designated members of the EOF staff.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. The Dominion public affairs liaison coordinates continuity and consistency of information with designated members of the Commonwealth of Virginia and risk jurisdiction emergency response organizations on a periodic basis.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

c. Rumor control is accomplished through ongoing contact with the *Chief Technical Spokesperson* and by the activities of a Dominion public affairs liaison in the JIC, who monitors communications, identifies rumors, and makes appropriate contacts to obtain and disseminate accurate information through the representatives in the JIC. The rumor control number is announced by the VDEM Public Affairs Office at media briefings and in press releases.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

5. News Media Training

News media training is accomplished through briefings for the news media offered on a yearly basis. 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 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

H. Emergency Facilities and Equipment

The descriptions of ERFs in SSAR Section 13.3.2.2.2.h are incorporated by reference.

1. On-Site Emergency Response Facilities

The TSC and OSC are provided to support emergency operations consistent with the guidance provided in NUREG-0737, Supplement 1.

The function 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.

The TSC is located in the electrical building. The ESBWR Design Certification Document provides pertinent design information (instrumentation, data system equipment, and power supplies) for the TSC in Tier 2.

Section II.B.5 provides a description of the TSC staff. Section II.O.4 provides a description of emergency response organization training and qualification.

The size of the TSC is sufficient to support a staff of 26 people.

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 monitor personnel radiation exposure and to maintain personnel doses less than 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 main control room. However, in the event that off-site and on-site AC power were unavailable, the TSC could be evacuated and the TSC management function transferred to a location unaffected by the radiation release.

The TSC is provided with reliable voice and data communication with the main control room and EOF and reliable voice communications with the OSC, NRC Operations Center and Virginia and risk jurisdiction EOCs. Control room data communication of emergency response data system (ERDS) data with the NRC Operations Center is also provided as appropriate. Section II.F provides a description of the communications capabilities provided in the TSC.

Display capability of the technical data system in the TSC includes a workstation that, at minimum, is capable of displaying the parameters that are required of a Safety Parameter Display System (SPDS). The SPDS function is described in DCD Section 18.8 through its incorporated references.

Key reference materials are available to the TSC staff via Local Area Network connection from the Nuclear Electronic Document Library, including:

- Up-to-date, as-built drawings, schematics, and diagrams showing conditions and locations of plant structures and systems down to component level
- Plant technical specifications
- Plant operating procedures
- Emergency operating procedures
- Final Safety Analysis Report

- Up-to-date records related to licensee, State, and local emergency response plans
- Offsite population distribution data
- Evacuation plans

Section II.H.9 provides a description of the OSC.

2. Emergency Operations Facility

The function of the EOF is to provide a location for Dominion management to direct and coordinate emergency response activities, with emphases on providing support to the plant staff and coordinating emergency response activities with offsite response agencies.

The Local EOF and Central EOF are the same as those used for NAPS Units 1 and 2. The Local EOF is located within the owner-controlled area, adjacent to the NAPS Units 1 and 2 Training Facility, and the Central EOF at Dominion's Innsbrook Technical Center in Glen Allen, Virginia, approximately 30 miles from Unit 3. This configuration does not alter the functions of the EOF as described in NUREG-0696.

Provisions are made for staffing of the EOF by Dominion, Commonwealth of Virginia, and NRC personnel. Dominion also makes provisions for accommodating a limited number of media personnel in the EOF. Section II.B.5 provides a description of the Dominion EOF staff. Section II.N.2 provides a description of EOF drills. Section II.O.4 provides a description of emergency response organization training and qualification.

The size of the EOF is sufficient to support 35 people. The Local EOF was designed to provide a specified protection factor from gamma radiation. The Local EOF also has a specially designed ventilation system to limit the exposure of its occupants and further assure its availability during an emergency. Provisions exist for dedicated radiation monitoring equipment to measure airborne particulate and direct radiation. The location of the Central EOF precludes the necessity of providing radiation monitoring systems.

Section II.F provides a description of the communications capabilities provided in the EOF.

The Local EOF and Central EOF draw power from commercial power sources. There is electrical generator backup power to the Central EOF. A loss of commercial power should not impact any of the voice or data communications equipment located in the Central EOF. Common Dominion telecommunications infrastructure that supports EOF 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 UPS systems.

Display capability of the technical data system in the EOF includes a workstation that, at minimum, is capable of displaying the parameters that are required of an SPDS. The SPDS function is described in DCD Section 18.8 through its incorporated references.

Key reference materials will be available to the EOF staff via Local Area Network connection from the Nuclear Electronic Document Library, including:

- Plant technical specifications
- Plant operating procedures
- Emergency operating procedures
- Final Safety Analysis Report
- Up-to-date records related to licensee, State, and local emergency response plans
- Offset population distribution data
- Evacuation plans
- Up-to-date, as-built drawings, schematics, and diagrams showing conditions and locations of plant structures and systems down to component level

3. Commonwealth/Risk Jurisdiction Emergency Operations Centers

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

4. Activation and Staffing of Emergency Response Facilities

Dominion staffs and activates the designated ERFs as follows[6]:

- Notification of Unusual Event – ERF staffing not normally needed, but may be undertaken at the discretion of the *Emergency Coordinator*.
- Alert, Site Area Emergency and General Emergency – Staffing of the TSC and OSC required.
- Site Area Emergency and General Emergency – Staffing of the EOF required.

Following declaration of an emergency condition, the ERFs are staffed and activated in accordance with EPIPs. The descriptions of ERF notification and staffing provided in SSAR Sections 13.3.2.2.2.e.2 and 13.3.2.2.2.f.4 are incorporated by reference.

In the event the site is under threat of, or experiencing hostile action, the Louisa Fire Training Center functions as a staging area for augmentation of emergency response staff. This location has the capability to communicate with the EOF, control room, and plant security.

6. See Section II.A.1.a of this plan regarding situations under which staffing of the emergency response facilities may be deferred.

Commonwealth of Virginia and risk jurisdiction emergency response personnel also staff their ERFs consistent with the provisions of their respective plans.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

5. Onsite Monitoring Systems

Dominion maintains and operates onsite 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. Section 3.7.4 of the FSAR and the DCD provide a description of the seismic monitoring system.

b. Section 12.3 of the FSAR and the DCD provide a description of the installed radiological monitoring systems. In addition to the installed systems, Dominion maintains an adequate supply of portable radiation monitoring and sampling equipment, including dedicated emergency response equipment, consistent with Sections II.H.7, II.H.10, and II.H.11 and Appendix 6.

c. Section 11.5 of the FSAR and the DCD provide description of the plant process monitoring systems.

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

6. Access to Data from Monitoring Systems

a. Dominion 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 (National Earthquake Information Center) and the Virginia Polytechnic Institute and State University (Virginia Tech) Seismological Observatory. Streamflow data is available from the U.S. Geological Survey. Flooding data is available from NOAA's Hydro-Meteorological Reports. Other data sources, such as commercial media outlets, may also be used.

b. Offsite environmental radiological monitoring equipment includes a series of continuous air samplers and environmental monitoring dosimeters surrounding the facility. The facility's Offsite Dose Calculation Manual (ODCM) describes the monitoring systems. In addition to the monitoring systems, equipment, and radiological laboratory facilities provided at the plant, Dominion maintains arrangements to obtain back-up radiological monitoring and analysis support from

offsite organizations. Section II.A provides a description of these arrangements and the capabilities of the affected organizations and facilities. Appendix 7 provides pertinent certifications from these support organizations.

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

7. Offsite Radiological Monitoring Equipment

Dominion provides offsite radiological monitoring equipment suitable for assessment of the offsite radiological consequences of facility incidents, for use by its offsite monitoring field teams. Appendix 6 provides a description of the types of radiological monitoring equipment provided for field team use.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

8. Meteorological Instrumentation and Procedures

The station's Meteorological Monitoring System provides the capability for providing data that are used for predicting atmospheric effluent transport and diffusion. The system consists of a primary and a backup tower, the locations of which were chosen so as to be representative of regional conditions.

The parameters monitored by the site's primary meteorological tower are listed below.

10 Meter Elevation:

- Wind speed
- wind direction
- horizontal wind direction fluctuation
- temperature (used with 48.4 meter data for differential temperature)
- dew point temperature

48.4 Meter Elevation:

- Wind speed
- wind direction
- horizontal wind direction fluctuation
- temperature (used with 10 meter data for differential temperature)

Precipitation is monitored at the ground level.

The NAPS backup meteorological monitoring site consists of instrumentation on a freestanding 10 meter tower. This tower is located approximately 1300 feet northeast of the Unit 1 containment building and serves as the backup meteorological monitoring site.

A sensor at the top of the mast monitors wind speed, wind direction, and horizontal wind direction fluctuation. SSAR Section 2.3 provides a detailed description of the Meteorological Monitoring System.

9. **Operational Support Center**

   The function of the OSC is to provide a common area and the necessary supporting resources for the assembly of designated operations support personnel during emergency conditions. Designated plant support personnel, as indicated in Section II.B, assemble in the OSC to provide support to both the Control Room and TSC. Personnel reporting to the OSC can be assigned duties in support of emergency operations. Assessment, corrective action, and rescue personnel are dispatched by the OSC to locations in the plant, as directed by the TSC and Control Room.

   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 OSC is located within the Protected Area in the Service Building. The OSC provides dedicated telephone extensions for communicating with the Control Room and the TSC. This permits personnel reporting to the OSC to be assigned to duties in support of emergency operations. The OSC is also equipped with a separate telephone line to provide for communications with on-site and off-site locations, as needed. Section II.F provides a description of the communications capabilities provided in the OSC.

10. **Emergency Equipment and Supplies**

    Dominion performs inspection, inventory, and appropriate operational tests of dedicated emergency equipment and instruments on a quarterly basis consistent with Section II.P. Plant procedures establish requirements for performing inventories and operational tests. Dominion maintains sufficient reserves of equipment and instruments to replace any items that are removed from the emergency kits for calibration or repair.

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

    Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

11. **Emergency Kits**

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

    Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

12. Receipt of Field Monitoring Data

Health Physics personnel located in the EOF are designated as the point of contact for the receipt of off-site monitoring data results and sample media analysis results collected by Dominion personnel.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

I. Accident Assessment

The descriptions of provisions for accident assessment provided in SSAR Section 13.3.2.2.2.i are incorporated by reference.

1. Parameters Indicative of Emergency Conditions

Implementing procedures describe plant system and effluent parameter values that are indicative of off-normal conditions and the various indications that correspond to the emergency initiating conditions. Plant procedures specify the types and capabilities of the instruments used to indicate emergency conditions.

2. Plant Monitoring Systems

Section 7.5.1 of the ESBWR Design Control Document describes the Post-Accident Monitoring Systems and is incorporated into this plan by reference.

3. Determination of Source Term and Radiological Conditions

a. Appendix 2 and plant procedures provide means for relating various measured parameters, including containment radiation monitor reading, to the source term available for release within plant systems.

b. Appendix 2 and plant procedures provide 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 onsite and offsite exposures and contamination for various meteorological conditions. Appendix 2 provides a description of the emergency dose assessment program used at NAPS. 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 provides 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 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.

Appendix 2 provides a description of the emergency dose assessment program used at NAPS. Information includes dose and dose rate determinations based on plant effluent monitors, and contamination estimates based on deposition assumptions and meteorological conditions.

7. Field Monitoring Capability

Dominion provides emergency response field teams composed of one or more radiation protection technicians trained in accordance with the emergency preparedness training requirements established in Section II.O of this plan. SSAR Section 13.3.2.2.2.i discusses field team activities and is incorporated by reference.

Appendix 6 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, Dominion provides 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 Health Physics personnel in the TSC prior to activation of the EOF and, following activation of the EOF, under the direction of Health Physics personnel in that facility.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

8. Assessing Hazards Through Liquid or Gaseous Release Pathways

Dominion trains, designates, equips, dispatches, and coordinates field teams consistent with Section II.I.7. The field teams perform sampling of offsite media as needed to assess the actual or potential magnitude and locations of radiological hazards. Dominion

notifies and activates field team personnel consistent with Section II.E. Mobilization times are consistent with Section II.B.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

9. Measuring Radioiodine Concentrations

Dominion equips field teams with portable air samplers, appropriate filters or other sampling media (e.g., silver zeolite or other media capable of collecting airborne radioiodine samples), 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 provides information regarding emergency supplies, equipment, and instruments.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

10. Relating Measured Parameters to Dose Rates

Plant implementing procedures establish the means for relating measured parameters, such as surface, airborne, or waterborne activity levels, to dose rates for those key isotopes listed in Table 3 of NUREG-0654. Implementing procedures also establish provisions for estimating the projected dose based on projected and actual dose rates. Health Physics personnel are responsible for directing implementation of these procedures under emergency conditions.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

11. Tracking of Plume Using Federal and Commonwealth Resources

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

J. Protective Response

The descriptions of protective response measures provided in SSAR Section 13.3.2.2.2.j are incorporated by reference.

1. On-Site Notification

Dominion establishes and implements methods to inform personnel within the protected area (within the Security fence) and exclusion area (within 5000 feet of the Unit 3 containment) of an emergency condition requiring individual action.

Dominion informs individuals located within the protected area primarily via use of the plant public announcement system and audible warning systems. 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.

Dominion informs individuals located within the exclusion area, but 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 activities of the Virginia Department of Game and Inland Fisheries. Dominion 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.

Dominion 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**

   Dominion has established evacuation routes to assembly areas consistent with Figure II-4. If the evacuation routes are rendered impassable, such as due to radiological or meteorological conditions, then provisions will be made to retain affected personnel on site.

   Affected individuals evacuate the site via personal vehicles. If any individual on site does not have access to a personal vehicle, the affected individual will evacuate with another evacuating individual. Dominion directs evacuees to a designated assembly area.

   Dominion 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), Dominion will direct affected individuals to a safe onsite area (as determined by the *Emergency Coordinator* or designee) for accountability and, if necessary, contamination monitoring and decontamination.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

3. **Personnel Monitoring and Decontamination**

   Dominion has established the primary and secondary assembly areas to provide a location for personnel monitoring. The *Emergency Coordinator* directs contamination monitoring of personnel, vehicles, and personal property arriving at the 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, Dominion may evacuate non-essential personnel (i.e., personnel who do not have an emergency response assignment) consistent with the provisions of Section II.J.2. Appropriate equipment and supplies are provided from the facility to the assembly areas to facilitate contamination monitoring.

5. Personnel Accountability

Dominion 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. Dominion also provides a capability to account for individuals within the protected area continuously after the initial accountability. Dominion maintains these capabilities consistent with the requirements of the facility Security Plan.

6. Protective Measures

Dominion provides equipment and supplies to provide adequate protection for individuals remaining or arriving onsite during an emergency. The equipment and supplies include:

a. respiratory protection equipment;

b. protective clothing; and

c. radioprotective drugs.

Onsite supplies of protective clothing and respiratory protection equipment may be augmented by that provided by offsite responders, such as firefighters 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 *Emergency Coordinator* 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 *Emergency Coordinator*, personnel assembly, accountability, and evacuation may result in undue hazards to site personnel, the *Emergency Coordinator* 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

Public Protective Action Recommendations (PARs) are based on plant conditions, estimated offsite doses, or some combination of both. Dominion provides Protective Action Recommendations promptly to the Virginia EOC. EALs correspond to the projected dose to the population at risk and are determined consistent with the methodology described in implementing procedures.

If the *Emergency Coordinator* declares a General Emergency, then Dominion will communicate to the Virginia EOC a PAR to evacuate at least a two mile radius around the facility, unless impediments to evacuation exist. The PAR may call for other areas within the plume exposure pathway EPZ to evacuate, shelter-in-place, or monitor and prepare to take protective actions as directed.

In addition to the EAL-based PAR, Dominion provides PARs based on offsite dose projections. The Health Physics staff is responsible for conducting offsite 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 offsite consequences. Implementing procedures will establish requirements for performing required calculations and projections.

The projected doses are compared to the Protective Action Guides shown in Table II-3, as derived from EPA 400-R-92-001, “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents,” (Reference 15) and Protective Action Recommendations are developed based on the results of these comparisons as discussed in Section II.J.10.m. Consideration will be given to evacuation, sheltering, and as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate.

Prior to activation of the EOF, the *Emergency Coordinator* is responsible for determining PARs and communicating the PARs to the Virginia EOC. Following activation of the EOF, *EOF Director* assumes these responsibilities. The *Emergency Coordinator* or *EOF Director* provides PAR to the Virginia EOC, which is responsible for implementing the protective actions, using the communications systems discussed in Section II.H of this plan or by direct communications in the EOF.

Table II-3 Protective Action Guides

Projected Dose		
Total Effective Dose Equivalent (TEDE)	**Committed Dose Equivalent Thyroid (CDE Thyroid)**	**Protective Action Recommendation**
< 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**

   Evacuation time estimates (ETEs) are developed within 365 days of when U.S. Census Bureau decennial data becomes available. ETEs are a factor considered in the development of off-site protective action recommendations (see Section II.J.7) and are provided to Commonwealth and local governmental authorities for use in developing off-site protective action strategies.

   Dominion conducted an ETE (Reference 16) in 2008, that was 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 17). The ETE updated the information in SSAR Section 13.3.2.1.

   Dominion updated the ETE report (Reference 20) in November 2012 to be consistent with NUREG/CR-7002, "Criteria for Development of Evacuation Time Estimate Studies" (Reference 21). The updated population distribution and ETEs are summarized in Appendix 4.

   The ETE report, and its 2012 update, have not revealed the existence of any significant impediments to the development of emergency plans.

9. **Implementation of Protective Measures**

   This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

10. **Protective Measures Implementation**

    a. Radiological monitoring locations are shown in Figure II-5. Evacuation routes, evacuation areas, and locations of assembly areas are presented in Figure 10-1 and Figure 10-2 of the ETE report.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Appendix 4 provides maps of the plume exposure pathway EPZ illustrating population distribution around the facility by evacuation area and in a sector format.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

c. Warnings to the public within the plume exposure pathway EPZ are the responsibility of Commonwealth of Virginia and risk jurisdiction officials. The primary method of warning the public is by the use of the Early Warning System sirens. Other warning methods may include telephone communications, television and radio Emergency Alert System stations, public address systems, bull horns from patrol cars and personal contact. There are currently no hospitals, prisons, or nursing homes within the plume exposure pathway EPZ.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

d. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

e. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

f. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

g. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

h. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

i. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

j. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

k. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

l. This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

m. Specific protective action recommendations, based on NUREG-0654, Supplement 3 (Reference 18) and on plant and meteorological conditions, are included in an implementing procedure.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

11. Protective Measures Specified by the Commonwealth

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

12. Registering and Monitoring Evacuees

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

Figure II-4 Map to North Anna Remote Assembly Areas

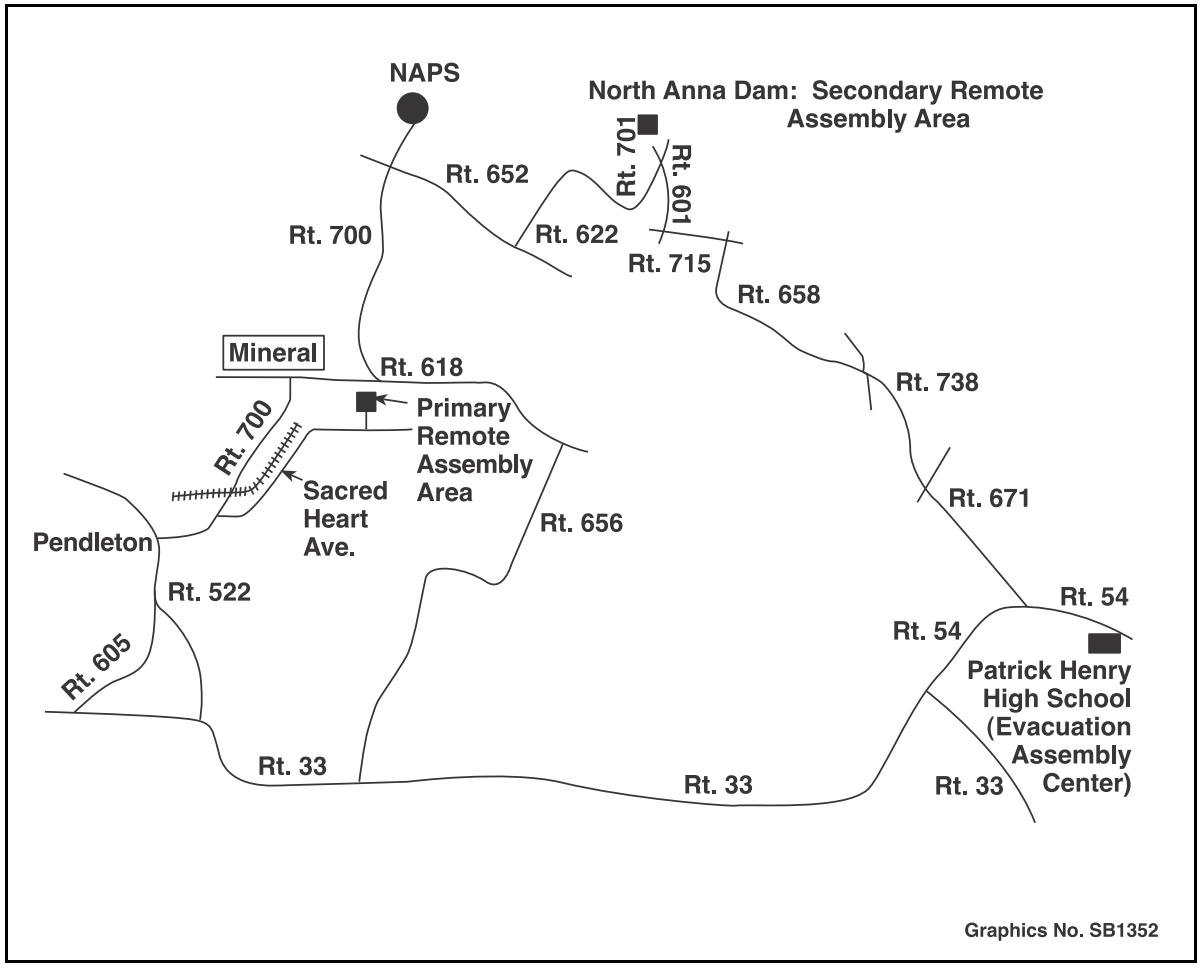
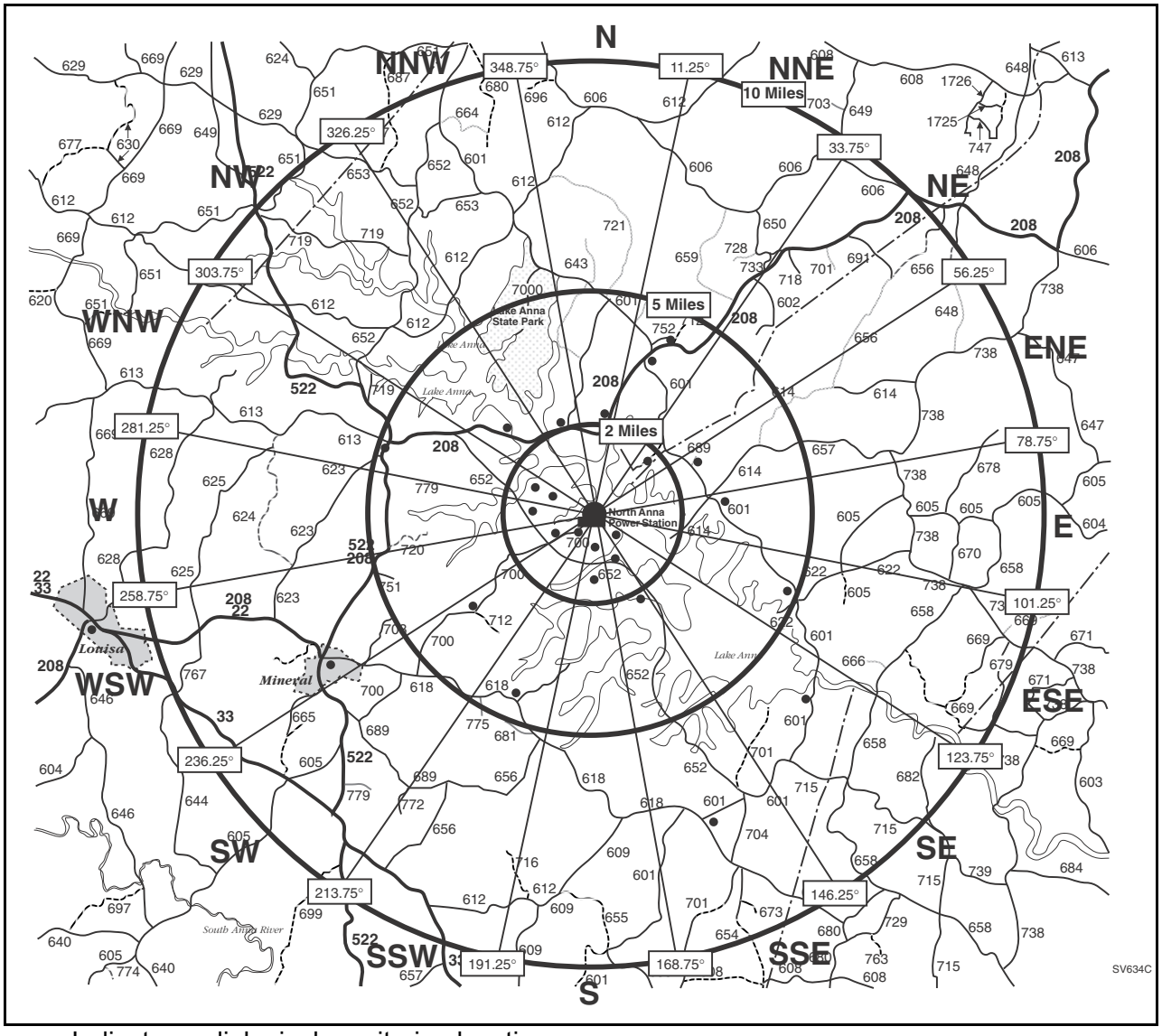


Figure II-5 Radiological Monitoring Locations



- Indicates radiological monitoring location

K. Radiological Exposure Control

The descriptions of radiological exposure control measures in SSAR Section 13.3.2.2.2.k are incorporated by reference.

1. On-Site Exposure Guidelines and Authorizations

Dominion implements onsite 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.

Prior to activation of the EOF, the *Emergency Coordinator*, in consultation with facility Health Physics personnel, is responsible for authorization of any emergency exposures resulting in doses exceeding the numerical values of the occupational dose limits provided in 10 CFR Part 20. Following activation of the EOF, the *EOF Director*, in consultation with Health Physics personnel and the *Emergency Coordinator*, authorizes any exposures in excess of 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 will be 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.

Table II-4 Emergency Worker Exposure Guidelines

	Dose Guideline in rem		
Activity	**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 (RPP) consistent with the requirements of 10 CFR Part 20. The RPP, in concert with the EPIPs, to be developed prior to loading of nuclear fuel, includes provisions for implementing emergency exposure guidelines. Implementing procedures establish procedures for allowing onsite 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

a. Dominion 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). Dosimeter ranges are sufficient to measure both planned routine and foreseeable accident photon doses. Plant procedures associated with this plan establish requirements for distributing dosimeters to emergency responders, including those individuals responding to the site from offsite locations. Internal doses are typically estimated through the use of whole body counting and/or in-vitro sampling and analysis routines. Plant procedures associated with this plan or the RPP establish requirements for determining internal doses based on in-vivo or in-vitro analyses results or by assessment of individual exposures to airborne radioactive materials.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

4. Commonwealth of Virginia and Risk Jurisdiction Responder Exposure Authorizations

This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

5. Decontamination Action Levels

a. Dominion 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 RPP.

   Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Dominion implements procedures for decontamination of onsite emergency personnel wounds, supplies, instruments and equipment, and for waste disposal. Dominion provides decontamination supplies with emergency kits consistent with Appendix 6.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

6. Contamination Control Measures

a. The FSAR and Security Plan establish requirements for site access control from offsite locations. Following a site evacuation, law enforcement agencies control access to the owner-controlled area consistent with the requirements of the supporting Commonwealth of Virginia and risk jurisdiction plans. The site Security Force controls entry to the restricted area by individuals, including emergency responders, who must enter the site during an emergency. The RPP and its supporting procedures establish requirements for limiting access to areas having significant radiological hazards, consistent with the requirements of 10 CFR Part 20 and Chapter 12 of the FSAR.

b. Should the potential exist for contamination of onsite food or drinking water supplies that renders these supplies non-consumable, arrangements will be made for transport of non-contaminated offsite supplies to the site.

c. Dominion 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 RPP or its supporting procedures.

7. Decontamination of Relocated Site Personnel

Dominion makes provisions for protective clothing, contamination monitoring, and decontamination, including decontamination of radioiodine contamination on the skin, at the offsite assembly area or other location as directed. Appendix 6 provides a description of the emergency equipment and supplies to be provided.

L. Medical and Public Health Support

The descriptions of plans for medical and public health support in SSAR Section 13.3.2.2.2.I are incorporated by reference.

1. Hospital and Medical Support

Dominion has established a certification letter with the Virginia Commonwealth University Medical Center (VCUMC) under which VCUMC will provide medical services for injured personnel from Unit 3. VCUMC has established a specialized area of the

hospital for treatment with appropriate Health Physics functions, and implements a coded system to alert hospital team members. Radiation monitoring equipment, dosimeters, and protective clothing are available at VCUMC.

VCUMC established and 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 consistent with Section II.O, periodic drills and exercises consistent with Section II.N, and services provided consistent with agreements between Dominion and the medical support providers.

In the event that a contaminated injured person is transported from Unit 3 to an offsite medical facility, Dominion may provide to the facility one or more technicians qualified to perform radiological monitoring if requested by the facility to support the radiological aspects of the medical treatment and post-treatment efforts.

Appendix 7 provides a copy of the relevant certification letter.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. **On-Site First Aid Capability**

   Dominion maintains a trained First Aid Team at the site to provide 24 hour per day first aid support consistent with Section II.B. Dominion maintains First Aid Team readiness through training consistent with Section II.O and drills and exercises consistent with Section II.N.

3. **Emergency Medical Facilities Within the Commonwealth**

   This NUREG-0654 criterion does not apply to the licensee, but to State and local plans. Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

4. **Medical Emergency Transportation**

   Contaminated injured personnel will be 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 with VCUMC from the station. The Station can also communicate with the site ambulance, if used, by use of an ultra-high frequency (UHF) radio, and the ambulance can communicate with VCUMC by way of the Hospital Emergency Alerting Radio (HEAR) system. In addition, arrangements have been made with local volunteer rescue squads to transport injured contaminated personnel to VCUMC. Response team members have received training concerning transportation of contaminated injured individuals. A Health Physics technician, with appropriate instrumentation, would normally accompany contaminated injured personnel to VCUMC. The approximate time to transport a patient to VCUMC is

75 minutes. The estimated time for local rescue squads to arrive at the station is 30 minutes.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

M. Recovery and Re-Entry

1. Recovery Plans and Procedures

Dominion implements 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; and
- Methods for periodically updating estimates of total population exposure.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Recovery Organization

Under some circumstances, particularly those involving significant damage to the facility or offsite 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, Dominion establishes a recovery organization consistent with the existing conditions and continuing organizational needs.

The recovery organization includes those management, technical, and administrative personnel necessary to provide for timely and effective recovery of the facility based on assessments of plant conditions and desired end states. The recovery process is further outlined in the EPIP specifically designed for administration of the recovery program. The basic organization may be modified, as required, to address the needs of the given situation. The *EOF Director* assumes control and direction of the recovery operation with the authority and responsibilities set forth in the EPIPs.

The recovery organization develops plans and procedures designed to address both immediate and long term actions. The necessity to maintain protective measures implemented during the emergency will be evaluated and, if deemed appropriate, the recovery organization will recommend relaxation of the protective measures. 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. Any special recovery procedures require the same review and approval process accorded other station procedures.

Depending on plant conditions and the scope of required activities, the recovery organization may discharge its activities from 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 maintain effectiveness and meet ongoing operational needs.

In general, Dominion would not expect a recovery organization to be necessary following declaration and termination of a Notification of Unusual Event or Alert.

3. Changes in Organizational Structure

The recovery process is implemented when the facility's emergency response organization managers, with concurrence of Commonwealth of Virginia and Federal agencies, have determined the station to be in a stable and controlled condition. Upon the determination, Dominion notifies the NRC Operations Center, the Virginia EOC, and the risk jurisdiction EOCs that the emergency has been terminated and any required recovery has commenced.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

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 affected areas. Health Physics personnel initially determine Total Effective Dose Equivalent (TEDE) due to external exposure from airborne material, external exposure from ground deposition, and internal exposure due to inhalation. Initial calculations also are performed for determination of Thyroid Committed Dose Equivalent (CDE) resulting from inhalation of radioiodines. The methodology used is consistent with that presented in EPA-400-R-92-001. Determination of total population doses includes assessments of exposure received from (but not necessarily limited to) immersion, inhalation, ground shine, and ingestion of radioactive materials.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

N. Exercises and Drills

Dominion 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

Dominion conducts emergency exercises in accordance with NRC and FEMA rules (e.g., 10 CFR 50.47(b)(14) and 44 CFR 350.9) and policy. These exercises are developed and implemented to periodically test and evaluate major portions of the affected emergency plans, procedures, and organizations.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Exercise Scenarios and Participation

Dominion conducts exercises on a periodic basis. These exercises allow demonstration of the key skills specific to emergency response duties in the control room, TSC, OSC, EOF, and joint information center in order to implement the principal functional areas of emergency response. The exercises:

- Test the adequacy of timing and content of implementing procedures and methods
- Test emergency equipment and communications networks
- Test the public notification system
- Test the familiarity of emergency organization personnel with their duties

Scenarios are varied so major elements of the plans and preparedness organizations are tested, including, at least once during the eight-year exercise cycle, the following:

- Hostile action directed at the plant site
- No radiological release or an unplanned minimal radiological release that does not require public protective actions
- An initial classification of or rapid escalation to a Site Area Emergency or General Emergency
- Implementation of strategies, procedures, and guidance developed under §50.54(hh)(2)
- Integration of offsite resources with onsite response.

Dominion will conduct a full participation exercise (which tests as much of the licensee, Commonwealth of Virginia and risk jurisdiction emergency plans as is reasonably achievable without mandatory public participation) within two years before initiation of scheduled initial fuel loading. This exercise will include (consistent with existing FEMA rules and policy) participation by the Commonwealth of Virginia, State of Maryland and affected local governments within the plume exposure

pathway EPZ and the ingestion exposure pathway EPZ. The eight-year exercise for Unit 3 starts in the year the first hostile action exercise is conducted for Units 1 & 2.

If the full participation exercise is conducted more than one year before the scheduled date for initial fuel loading, Dominion will conduct an exercise that tests the onsite emergency plans within one year before the scheduled date for initial fuel loading. This exercise may, but need not, have participation by the Commonwealth of Virginia and risk jurisdictions.

Dominion conducts an exercise of its onsite emergency plan every two years. The exercise may be included in the biennial full participation exercise discussed below. Scenarios for these exercises are submitted to NRC at least 60 days before their scheduled use.

Dominion conducts exercises involving full participation by offsite authorities having a role under the plan at least biennially. If any offsite authority has a role under a radiological response plan for more than one site, Dominion offers that authority an opportunity to participate in one exercise every two years.

Dominion offers the Commonwealth of Virginia and State of Maryland, an opportunity to participate in the ingestion pathway portion of exercises, regardless of the state's participation in other licensed facility's emergency exercises.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

c. Off-hours Drills and Exercises

At least once every eight-year exercise cycle, provisions will be made to start a drill or exercise between 6:00 pm and 4:00 am on a weekday or during a weekend. Dominion conducts unannounced exercises on a periodic basis, to the extent such exercises can be supported by affected internal and external organizations.

2. Drills

Dominion 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 onsite emergency response capabilities. The principal functional areas of emergency response include activities such as:

- Management and coordination of emergency response
- Accident assessment
- Event classification

- Notification of offsite authorities
- Assessment of the onsite and offsite impact of radiological releases
- Protective action recommendation development
- Protective action decision making
- Plant system repair and mitigative action implementation

Upon request, Dominion allows affected Commonwealth of Virginia and risk jurisdiction 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. Dominion 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. Dominion may include one or more drills as portions of an exercise. Prior to initial operation and at least once each subsequent eight-year exercise cycle, a drill or exercise will be conducted that demonstrates the following EOF functions:

- Obtaining and displaying key plant data and radiological information for each unit the EOF serves.
- Analyzing plant technical information and providing technical briefings on event conditions and prognosis to licensee staff and offsite agency responders for each type of unit.

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

Dominion conducts monthly tests of communications with Commonwealth of Virginia and risk jurisdiction governments within the plume exposure pathway EPZ, as identified in Section II.A.

Dominion conducts quarterly tests of communications with Federal emergency response organizations, as identified in Section II.A.

Dominion conducts annual tests of communications between the facility, Virginia and risk jurisdiction EOCs, and field assessment teams.

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

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

b. Fire Drills

Dominion conducts fire drills as required by Section 9.5.1 of the FSAR.

c. Medical Emergency Drills

Dominion conducts medical emergency drills that include a simulated contaminated injured individual and participation by the local support services agencies (i.e., medical transportation and offsite medical treatment facility) on a yearly basis.

Appendix 8 provides a cross-reference to the related provisions in risk jurisdiction RERPs.

d. Radiological Monitoring Drills

Dominion conducts radiological monitoring drills, involving both onsite and offsite radiological monitoring activities on a yearly basis. Radiological monitoring drills include collection and analysis of the sample media for which the facility is responsible, communications with monitoring teams, and recordkeeping activities. Dominion may coordinate radiological monitoring drills with those drills conducted by Commonwealth of Virginia and risk jurisdiction government entities or may conduct these drills independently.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

e. Health Physics Drills

Dominion conducts on-site Health Physics drills on a semi-annual basis. Health Physics drills include:

- Response to and analysis of simulated elevated airborne and liquid samples and direct radiation measurements in the environment
- Analysis of in-plant liquid samples with simulated or actual elevated radiation levels

Appendix 8 provides a cross-reference to the related provisions in the COVRERP.

3. Conduct of Drills and Exercises

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

a. Basic objectives and evaluation criteria

b. Date, time period, location, and participating organizations

c. Simulated events

d. Time schedule of real and simulated initiating events

e. Narrative summary describing the conduct of the exercise or drill, including items such as simulated casualties, offsite response to the facility, personnel rescue, use of protective equipment, monitoring team deployment, and public information activities

f. Arrangements for official observers and the advance materials to be provided to them

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

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 Manager Emergency Preparedness 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.

Exercises may be critiqued by Federal and Commonwealth of Virginia observers/evaluators.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

5. Drill and Exercise Critiques

Dominion conducts a critique following conduct of the exercise. Participants may include selected Dominion, NRC, Commonwealth of Virginia, risk jurisdiction, and other participants and observers/evaluators. Input from the critique participants, is evaluated to determine the need for changes to the plan, procedures, equipment, facilities, and other components of the emergency preparedness and response program.

Dominion tracks identified corrective actions to completion using the facility's corrective action program.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

O. Radiological Emergency Response Training

1. General

Dominion implements a training program that provides for initial training and retraining for individuals who have been assigned emergency response duties, including both

onsite staff and offsite individuals who may be called on to provide assistance in the event of an emergency.

The description of the emergency preparedness training program in SSAR Section 13.3.2.2.2.o is incorporated by reference.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

a. Offsite Emergency Response Training

Dominion provides for the conduct of site-specific training for offsite 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.

Dominion offers training for affected hospital, ambulance/rescue, police, and firefighting personnel that includes their expected emergency response roles, notification procedures, and radiation protection precautions. For these and any other offsite emergency responders who may be required to enter the site under emergency conditions, Dominion offers training that addresses site access procedures and identifies (by position) the individual who will control their activities on site.

Training for offsite 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 will direct their activities onsite
- Definition of support roles

Appendix 8 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 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Onsite Emergency Response Training

The emergency response training program includes on-site Dominion personnel who may be called upon to respond to an emergency. The training program includes, to the extent appropriate, practical drills consistent with Section II.N, during which individuals demonstrate the ability to discharge the assigned emergency response function. The instructor/evaluator corrects any erroneous performance noted during these practical drills and, as appropriate, demonstrates proper performance consistent with approved procedures and accepted standards.

3. First Aid Team Training

Dominion provides first aid training equivalent to Red Cross Multi-Media Training (e.g., Red Cross First Aid/Cardiopulmonary Resuscitation (CPR), Automated External Defibrillation (AED) for the Workplace), consistent with the projected hazards and events, for those individuals assigned to render treatment during a medical emergency.

4. Emergency Response Training and Qualification

Dominion conducts a program for instructing and qualifying personnel who implement this plan. Individuals complete the required training prior to assignment to a position in the emergency response organization. The training program establishes the scope, nature, and frequency of the required training and qualification measures.

Emergency response personnel are trained in the following subjects, to the extent appropriate to their duties and responsibilities: emergency response organization; emergency classification system; personnel accountability; emergency exposure limits; ERFs; security access control and site evacuation process; and exposure control techniques.

Dominion 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, and the scope of the associated training programs, include:

a. Emergency response directors and coordinators – Emergency condition assessment and classification, notification systems and procedures, organizational interfaces, site evacuation, radiation exposure controls, offsite support, and recovery.

b. Accident assessment personnel - Emergency condition assessment and classification, notification systems and procedures, organizational interfaces.

c. Radiological monitoring and analysis personnel – Dose assessment, emergency exposure evaluation, protective measures, protective actions, contamination control and decontamination, monitoring systems and procedures.

d. Police, Security and firefighting personnel - Notification of station personnel, facility activation, personnel accountability and evacuation, and access control. (Note: Offsite police and firefighting personnel will receive training consistent with Section II.O.1.a.)

e. Damage control/repair/corrective action teams - Damage control organization, communication systems, and planning and coordination of damage control tasks.

f. First aid/rescue personnel - Emergency organizational interfaces, firefighting, search and rescue procedures, and communications systems.

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

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

i. Corporate office support personnel - Applicable procedures and organizational interfaces.

j. Emergency communicators - Notifications and reports to offsite authorities and communication systems as appropriate for individual position assignments.

Dominion offers to provide training for local support services personnel, including emergency service, police, and firefighting personnel, consistent with Section II.O.1.a.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

5. Retraining

Dominion conducts, or supports the conduct of, annual retraining for those categories of emergency response personnel listed in Section II.O. Failure of Dominion ERO members to successfully complete this training in a timely manner as specified in plant training program requirements results in the individual's removal from the ERO pending completion of the required training.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

P. Responsibility for the Planning Effort

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

The descriptions of plans for maintaining emergency preparedness in SSAR Section 13.3.2.2.2.p are incorporated by reference.

1. Training

Dominion develops and implements a process to provide training to the Manager Emergency Preparedness and support staff. 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 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

2. Responsibility for Radiological Emergency Response Planning

The *Site Vice President* holds the overall authority and responsibility for ensuring that an adequate level of emergency preparedness is maintained.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

3. Manager Emergency Preparedness

Dominion establishes a Manager Emergency Preparedness position. The incumbent is responsible for developing and updating site emergency plans and coordination of these plans with other response organizations.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

4. Plan Reviews and Updates

The Manager Emergency Preparedness is responsible for conducting or coordinating an annual review of this plan to verify the plan and its supporting agreements are current. This review includes consideration of any changes that may be necessary to address issues identified during the course of drills, exercises, and actual emergency events. The Manager Emergency Preparedness also reviews and updates the plan and agreements as needed (e.g., following changes to Commonwealth of Virginia and risk jurisdiction plans that may affect the content of the facility's plan) to verify they remain current.

Evacuation Time Estimates (ETEs) are reviewed against estimated EPZ permanent resident population changes at least once a year and within 365 days of the date of the previous ETE or its most recent review. Increases of ETEs greater than the limits detailed in 10 CFR 50 Appendix E require the ETE analysis be updated. The decennial ETE and its updates are submitted to NRC as required by 10 CFR 50 Appendix E.

Upon completion of the annual review, the Manager Emergency Preparedness (or designee) incorporates any necessary changes. Changed pages are marked and dated to highlight the changes. The Manager Emergency Preparedness forwards the updated plan to the Facility Safety Review Committee (FSRC) 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 completion of the annual review and any required updates, the Manager Emergency Preparedness certifies the plan to be current.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

5. Distribution of Revised Plans

The facility's document control organization distributes the updated plan to organizations/individuals with responsibility for implementing the plans.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

6. Supporting Plans

The following list identifies supporting plans and their sources.

- Commonwealth of Virginia Plan (Virginia Emergency Operations Plan, Radiological Emergency Response Basic Plan)
- Louisa County Radiological Emergency Response Plan
- Spotsylvania County Radiological Emergency Response Plan
- Orange County Radiological Emergency Response Plan
- Caroline County Radiological Emergency Response Plan
- Hanover County Radiological Emergency Response Plan
- Virginia Commonwealth University Medical Center Radiation Emergency Plan
- Department of Energy – Federal Radiological Monitoring and Assessment Center Operations Plan

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

7. Implementing Procedures

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

Certain emergency plan features recommended by NUREG-0654 (e.g., Evaluation Criterion D.1, which addresses identification of parameter values and status for each emergency class, and Evaluation Criterion I.3, which addresses methods and techniques for determining source terms and the magnitude of releases) are procedural in nature and have been more appropriately placed in plant procedures, including EPIPs. Changes to the affected portions of these procedures are developed and approved consistent with the requirements of 10 CFR 50.54(q).

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

8. Table of Contents

The format for this Emergency Plan directly follows the format of NUREG-0654, Rev. 1 as outlined in the Table of Contents.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

9. Emergency Plan Reviews

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

- The Emergency Plan
- Emergency plan implementing procedures and practices
- The emergency preparedness training program
- Readiness testing (e.g., drills and exercises)
- ERFs, equipment, and supplies
- Interfaces with Commonwealth of Virginia and risk jurisdiction government agencies

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

Dominion's independent assessment organization documents review results and improvement recommendations and reports these results to Dominion management. Dominion makes those portions of the reviews that address the adequacy of interfaces

with Commonwealth of Virginia and risk jurisdiction governments available to the affected governments.

Dominion retains review records for a period of at least five years in accordance with facility document control requirements.

10. Emergency Telephone Numbers

The Manager Emergency Preparedness is responsible for ensuring a review of the emergency personnel notification list is performed on a quarterly basis and for ensuring required revisions are incorporated. Documentation of this review shall be filed by the facility's records management organization.

Appendix 8 provides a cross-reference to the related provisions in the COVRERP and risk jurisdiction RERPs.

III. References and Appendices

A. Cited References

1. U.S. Nuclear Regulatory Commission, “Early Site Permits; Standard Design Certifications; And Combined Licenses For Nuclear Power Plants,” 10 CFR Part 52, as amended.

2. U.S. Nuclear Regulatory Commission, “Domestic Licensing Of Production And Utilization Facilities,” 10 CFR Part 50, as amended.

3. U.S. Nuclear Regulatory Commission, “Emergency Plans,” 10 CFR 50.47, as amended.

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21. U.S. Nuclear Regulatory Commission, “Criteria for Development of Evacuation Time Estimate Studies,” NUREG/CR-7002, September 2011.

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2. USNRC IN 93-81 – Implementation of Engineering Expertise On Shift

3. USNRC IN 95-48 – Results of Shift Staffing Study

4. USNRC IN 86-16 – NRC On-Scene Response During a Major Emergency

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7. USNRC RIS 2003-18 - Use of NEI 99-01, Methodology for Development of Emergency Action Levels (including Supplements 1 and 2)

8. USNRC IN 97-05 – Offsite Notification Capabilities

9. USNRC RIS 00-011 – NRC Emergency Telecommunications System, including Supplement 1
10. USNRC IN 87-58 – Continuous Communications Following Emergency Notifications
11. USNRC IN 93-53 – Effect of Hurricane Andrew on Turkey Point Nuclear Generating Station and Lessons Learned
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40. USNRC Generic Letter 80-34 – Clarification of NRC Requirements for Emergency Response Facilities at Each Site
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44. USNRC Generic Letter 91-14 – Emergency Telecommunications

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C. Appendices

Appendix 1 - [reserved]

Appendix 2 - Assessment and Monitoring for Actual or Potential Offsite Consequences of a Radiological Emergency

Appendix 3 - Public Alert and Notification System

Appendix 4 - Evacuation Time Estimates (summary)

Appendix 5 - Emergency Plan Implementing Procedures – Topical List

Appendix 6 - Emergency Equipment and Supplies

Appendix 7 - Certification Letter

Appendix 8 - Cross-Reference to Regulations, Guidance, and State and Local Plans

Appendix 1–Reserved

Appendix 2–Assessment and Monitoring for Actual or Potential Offsite Consequences of a Radiological Emergency

1.0 Introduction

This appendix provides information regarding atmospheric transport and diffusion assessment discussed in Appendix 2 to NUREG-0654, Rev. 1, "Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants."[1] Three topics are identified in Appendix 2 to NUREG-0654:

- Meteorological measurements
- Atmospheric transport and diffusion assessment
- Remote interrogation

Since they are discussed in FSAR Section 2.3, only a brief discussion of meteorological measurements is provided in this Appendix. Similarly, information regarding remote interrogation is included in SSAR Section 2.3 and is only briefly discussed below. This Appendix describes the conceptual design of the software used for the atmospheric transport and diffusion assessment models used by Dominion for its nuclear power plants, including Unit 3.

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."[2] 10 CFR 50, Appendix E, requires emergency facilities and equipment shall include "equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment."[3]

2.1 Meteorological Measurements

Appendix 2 to NUREG-0654, Rev. 1 clarifies that in order to address the requirement in Appendix E, "the nuclear power plant operator shall have meteorological measurements from primary and backup systems."[4] The design of the system for meteorological measurement system is discussed in FSAR Section 2.3. This design addresses the guidance provided in Supplement 1 to NUREG-0737.[5]

1. 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.
2. 10 CFR 50.47(b)(9)
3. 10 CFR 50, Appendix E, IV.E.2
4. NUREG-0654, Rev. 1, Appendix 2, "Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants," Washington, DC, November 1980.
5. U.S. Nuclear Regulatory Commission, NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements," Washington, DC, January 1983

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.”[1] Two classes of atmospheric transport and diffusion models are discussed in NUREG-0654. This Appendix discusses the software used for Unit 3, which addresses guidance associated with the “Class B” model described in Appendix 2 of NUREG-0654, Rev. 1: “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.”[2]

2.3 Remote Interrogation

Guidance concerning remote interrogation is also discussed in Appendix 2 of NUREG-0654, Rev. 1. 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.”[3] Provisions related to remote interrogation and communications are discussed in SSAR Section 2.3.

3.0 Conceptual Design: Atmospheric Transport and Diffusion Assessment

The remainder of this Appendix focuses on the conceptual design for the atmospheric transport and diffusion assessment models used by Dominion. Inspections, tests, analyses, and acceptance criteria (ITAAC) address requirements in 10 CFR 50.47(b)(9), discussed previously in this Appendix, and address evaluation criteria from NUREG-0654, Rev. 1 that are discussed in Section II.I of this plan. The conceptual design addresses the following program elements for accident assessment:

- The means exist to provide initial and continuing radiological assessment throughout the course of an accident. This addresses both Generic ITAAC Element 6.1 and the requirements of SSAR Section 13.3.2.2.2.i.
- 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. This addresses both Generic ITAAC Element 6.2 and the requirements of SSAR Section 13.3.2.2.2.h.3.

1. 10 CFR 50, Appendix E, IV.B
2. NUREG-0654, Rev. 1, Appendix 2, “Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants,” Washington, DC, November 1980.
3. 10 CFR 50, Appendix E, IV.E.9.c

- The means exist to continuously assess the impact of the release of radioactive materials to the environment, accounting for the relationship between effluent monitor readings, and onsite and offsite exposures and contamination for various meteorological conditions. This addresses both ITAAC 6.1 (COLA Part 10, Table 2.3-1) and the requirements of SSAR Section 2.3.3.1.1.
- The means exist to make rapid assessment of potential magnitude and locations of any radiological hazards through gaseous release pathways. This addresses both ITAAC 6.5 (COLA Part 10, Table 2.3-1) and the requirements of SSAR Section 13.3.2.2.2.i.1.
- 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). This addresses both ITAAC 6.7 (COLA Part 10, Table 2.3-1) and the requirements of SSAR Section 13.3.2.2.2.k.3.

3.1 Overview, Introduction, and Functions

The software system is designed for use by Dominion's nuclear power plant units to address their emergency preparedness and accident analyses needs. This software is referred to as MIDAS (Meteorological Information and Dose Assessment System) or MIDAS-NU (MIDAS-Nuclear). Section 3.2 discusses the accident and routine release calculations. Section 3.3 is divided into general categories such as "data acquisition," "data summary display," and "utilities."

3.1.1 Summary and Purpose

The MIDAS system is comprised of a series of software components that function in a multi-tasked Microsoft Windows™ environment. The computer receives data from external devices including meteorological and plant effluent monitors. Data can be received via serial port devices or over a local area network (LAN)/wide area network (WAN) connection. Reports are displayed on the screen and printed out. Also, reports can be sent via LAN/WAN connection to central control units.

Input data are available periodically from measuring devices on a meteorological tower and from effluent monitors that measure concentrations or dose. Calculations are made in the computer that can be used to determine the health impact of the release. The user schedules runs from a Graphic User Interface (GUI).

The released material is tracked in the environment as it is carried by the wind and dispersed. The three most important parameters are wind speed, wind direction, and atmospheric turbulence. The wind speed determines the initial dilution and plume travel speed. The wind direction determines the effluent plume trajectory. The turbulence determines the rate of spread or growth of the plume. These factors, along with assumptions related to the rate of deposit of particulate matter, are used to determine plume concentration and deposition as a function of location and time.

The accumulated doses to a stationary person are computed based on the estimated variation of the effluent concentration and deposition. The plume tracks are plotted on site maps.

The time-integrated doses resulting from a longer exposure or release can be calculated and results plotted or printed in tabular form. For proper display of time-integrated long-term releases, doses from each release are added on the grid and an isopleth (filled contour showing potentially dangerous areas) is plotted.

3.1.2 General Software Specifications

Software is written in ANSI 1977 compatible FORTRAN, Visual Basic 5 (compiled), or C. The modular nature of the software facilitates modifications. Software modifications follow established quality assurance procedures. Each computer is run under the Microsoft Windows™ operating system as a stand-alone unit. Separate files are available for receipt of meteorological and effluent monitor data. Running of the plume model calculations does not interfere with ongoing, real-time data acquisition and storage.

3.1.3 User Interface

The software is written to interact with the user from the GUI. The user is prompted for information needed from a series of input screens. The software checks for invalid entries insofar as practicable. The user is not allowed to confirm an input screen until requirements for input from that screen are satisfied. Entries are made with the mouse including those on the keypad pop-up menu.

3.2 Accident Calculations

The primary functions of the MIDAS system are to collect and process data, perform atmospheric dispersion calculations, prompt the user for minimum input, estimate dose due to radiological exposure, and display results in a color graphics format. MIDAS-NU incorporates a fast-running, time-dependent, variable trajectory, Gaussian plume segment atmospheric dispersion model. The transport portion of model enables the plume direction and location to vary every 15 minutes as the wind speed, direction, and other weather conditions change. Radiation doses/exposures are accumulated in a polar grid, enabling plume direction changes when the meteorological conditions vary. Results are contoured and displayed on a map. Wind fields are computed from onsite meteorological data input to the system.

MIDAS-NU also has a simple model that estimates transport and dispersion of releases in a uniform wind field, with no changes in the meteorological or release parameters. This is used only in the back calculation module.

It is important to note that the models used in MIDAS-NU are estimating tools. MIDAS-NU results are highly dependent on the accuracy of the current local weather conditions and other input data (e.g., terrain, building characteristics, and amount of material released) that are processed within MIDAS-NU. The more accurate the data that is supplied to MIDAS-NU, the more accurate its predictive estimates will be. Due to uncertainties associated with input information and inherent in dispersion models in general, MIDAS-NU predictions should not necessarily be regarded as fact.

3.3 Data Acquisition

Meteorological and field sensor data is collected and its quality checked to assure that an adequate database is available for dispersion calculations and support of emergency operations. Hardware and software specific to the data being collected may be needed in order to collect the data and transmit it to the MIDAS system. The collected data are stored within the overall MIDAS system and therefore available for calculations in the future. Fifteen-minute averages of meteorological data are computed from the data collected and written into the appropriate files. Bad or missing data will be flagged by the data codes for each record. There are a number of tasks in MIDAS that can be used to display or edit the data. A task is a discrete processing action within the software that performs an important function. For each function selected a different task list will be shown. The tasks are selected by clicking on the task text and then “Run Task” to execute. These tasks are accessed using the MDVDCOLL icon. When selected the user will be presented with the menu shown below. Every task may not be available on every system.

Calculations assume that the hourly average is representative of the 15 minute period centered on each 15 minute period (00, 15, 30, 45) (e.g., the time on the hour is from 7.5 minutes before the hour to 7.5 minutes after the hour.).

For the hourly averaging, the following technique is used:

- Speeds, delta temperatures, temperatures, and miscellaneous sensors are averaged. Directions are vector averaged.
- Rain is accumulated.
- Field radiation monitor data are reported as rad/hr.
- Cloud cover is in percent.
- Effluent monitor data are averaged.

3.4 Data Summary Displays

After the databases have been conditioned, the file contents can be inspected using a series of data summary displays described in the following sections. The resulting function/task menu is displayed.

When the Average display tasks are selected the user will enter parameters to describe the data to be displayed. These parameters will include the amount of data displayed for each parameter (time groups), the sensors to be displayed, the date range (start date and end date), averaging time for the data (data frequency) and the type of data (raw or workspace). Similar data are required for Data Quality.

3.4.1 Meteorological Displays

A task is provided to print the hour or 15 minute meteorological parameter averages received over any specified time period (within the bounds of the file). The “trend plot” tasks can be used to plot meteorological data making it easy to spot problem areas in the data. The data summary routines can be used in conjunction with edits to inspect and correct data. The summaries may show, for example, that a particular edit was not successful or resulted in data that was suspect. Further edits of data would then be in order.

3.4.2 Radiological Displays

Radiation monitors typically send gamma dose rate measurements (in R/hr). Averages would be updated every 15 minutes.

3.5 Utilities

The system incorporates a series of utilities that are separate from standard Microsoft WINDOWS™ utilities. These include the ability to initialize raw data and other types of files as appropriate. They also include capability to save (archive) from or restore to workspace or raw data files. Other utilities necessary for system startup will be provided along with any data that must be loaded.

Appendix 3–Public Alert and Notification System

The Public Alert and Notification System is the same as that used for NAPS Units 1 and 2. COVRERP Appendix 3 provides a description of the Public Alert and Notification System.

Appendix 4–Evacuation Time Estimates (summary)*

*Note: Attachment 4 is the executive summary from the full report.

EXECUTIVE SUMMARY

This report describes the analyses undertaken and the results obtained by a study to develop Evacuation Time Estimates (ETE) for the North Anna Power Station (NAPS) located in Louisa County, Virginia. ETE are part of the required planning basis and provide Dominion and State and local governments with site-specific information needed for Protective Action decision-making.

In the performance of this effort, guidance is provided by documents published by Federal Governmental agencies. Most important of these are:

- Criteria for Development of Evacuation Time Estimate Studies, NUREG/CR-7002, November 2011.
- 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.
- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/CR-6863, January 2005.
- 10CFR50, Appendix E – "Emergency Planning and Preparedness for Production and Utilization Facilities"

Overview of Project Activities

This project began in February, 2012 and extended over a period of 9 months. The major activities performed are briefly described in chronological sequence:

- Attended "kick-off" meetings with Dominion personnel and emergency management personnel representing state and county governments.
- Accessed U.S. Census Bureau data files for the year 2010. Studied Geographical Information Systems (GIS) maps of the area in the vicinity of the NAPS, then conducted a detailed field survey of the highway network.
- Synthesized this information to create an analysis network representing the highway system topology and capacities within the Emergency Planning Zone (EPZ), plus a Shadow Region covering the region between the EPZ boundary and approximately 15 miles radially from the plant.
- Designed and sponsored a telephone survey of residents within the EPZ to gather focused data needed for this ETE study that were not contained within the census database. The survey instrument was reviewed and modified by the licensee and offsite response organization (ORO) personnel prior to the survey (survey from the 2007 COLA was used since EPZ demographics did not significantly change).
- Counties provided school and transportation resources data. Data for transient facilities

was collected through phone calls to specific facilities.

- The traffic demand and trip-generation rates of evacuating vehicles were estimated from the gathered data. The trip generation rates reflected the estimated mobilization time (i.e., the time required by evacuees to prepare for the evacuation trip) computed using the results of the telephone survey of EPZ residents.
- Following federal guidelines, the EPZ is subdivided into 25 Protective Action Zones (PAZ). These PAZ are then grouped within circular areas or "keyhole" configurations (circles plus radial sectors) that define a total of 41 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, Snow). One special event scenario involving the Kinetic Triathlon at Lake Anna State Park was considered. One roadway impact scenario was considered wherein a northbound segment of US-522 NB at CR-612 was closed for the duration of the evacuation.
- Staged evacuation was considered for those regions wherein the 2 mile radius and sectors downwind to 5 miles were evacuated.
- As per NUREG/CR-7002, the Planning Basis for the calculation of ETE is:
    - A rapidly escalating accident at the NAPS that quickly assumes the status of General Emergency such that the Advisory to Evacuate is virtually coincident with the siren alert, and no early protective actions have been implemented.
    - While an unlikely accident scenario, this planning basis will yield ETE, measured as the elapsed time from the Advisory to Evacuate until the stated percentage of the population exits the impacted Region, that represent "upper bound" estimates. This conservative Planning Basis is applicable for all initiating events.
- If the emergency occurs while schools are in session, the ETE study assumes that the children will be evacuated by bus directly to Evacuation Assembly Centers (EAC) 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 schoolchildren are calculated separately.
- Evacuees who do not have access to a private vehicle will either ride-share with relatives, friends or neighbors, or be evacuated by buses provided as specified in each of the counties Radiological Emergency Response Plans (RERP). Those in special facilities will likewise be evacuated with public transit, as needed: bus, van, or ambulance, as required. Separate ETE are calculated for the transit-dependent evacuees, for homebound special needs population, and for those evacuated from special facilities.
- Attended final meeting with Dominion personnel and emergency management personnel representing state and county governments to review results and receive comments.

Computation of ETE

A total of 574 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 41 Evacuation Regions to evacuate from that Region, under the circumstances defined for one of the 14 Evacuation Scenarios (41 x 14 = 574). Separate ETE are calculated for transit-dependent evacuees, including schoolchildren for applicable scenarios.

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

The computation of ETE assumes that 20% of the population within the EPZ but outside the impacted region, will elect to "voluntarily" evacuate. In addition, 20% of the population in the Shadow Region will also elect to evacuate. These voluntary evacuees could impede those who are evacuating from within the impacted region. The impedance that could be caused by voluntary evacuees is considered in the computation of ETE for the impacted region.

Staged evacuation is considered wherein those people within the 2-mile region evacuate immediately, while those beyond 2 miles, but within the EPZ, shelter-in-place. Once 90% of the 2-mile region is evacuated, those people beyond 2 miles begin to evacuate. As per federal guidance, 20% of people beyond 2 miles will evacuate (non-compliance) even though they are advised to shelter-in-place.

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 traffic engineering procedures.
- The evacuation trips are generated at locations called "zonal centroids" located within the EPZ and Shadow Region. 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 evacuation model computes the routing patterns for evacuating vehicles that are compliant with federal guidelines (outbound relative to the location of the plant), 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 90 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. The 90^{th} percentile ETE have been identified as the values that should be considered when making protective action decisions because the 100^{th} percentile ETE are prolonged by those relatively few people who take longer

to mobilize. This is referred to as the "evacuation tail" in Section 4.0 of NUREG/CR-7002.

The use of a public outreach (information) program to emphasize the need for evacuees to minimize the time needed to prepare to evacuate (secure the home, assemble needed clothes, medicines, etc.) should also be considered.

Traffic Management

This study references the comprehensive traffic management plans provided by Louisa, Spotsylvania, Orange, Caroline, and Hanover Counties, and identifies critical intersections.

Selected Results

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

- Figure 6-1 displays a map of the NAPS EPZ showing the layout of the 25 PAZ that comprise, in aggregate, the EPZ.
- Table 3-1 presents the estimates of permanent resident population in each PAZ based on the 2010 Census data.
- Table 6-1 defines each of the 41 Evacuation Regions in terms of their respective groups of PAZ.
- Table 6-2 lists the Evacuation Scenarios.
- Tables 7-1 and 7-2 are compilations of ETE. These data are the times needed to clear the indicated regions of 90 and 100 percent of the population occupying these regions, respectively. These computed ETE include consideration of mobilization time and of estimated voluntary evacuations from other regions within the EPZ and from the Shadow Region.
- Tables 7-3 and 7-4 present ETE for the 2-mile region for un-staged and staged evacuations for the 90^{th} and 100^{th} percentiles, respectively.
- Table 8-7 presents ETE for the schoolchildren in good weather.
- Table 8-11 presents ETE for the transit-dependent population in good weather.
- Figure H-8 presents an example of an Evacuation Region (Region R08) to be evacuated under the circumstances defined in Table 6-1. Maps of all regions are provided in Appendix H.

Conclusions

- General population ETE were computed for 574 unique cases – a combination of 41 unique Evacuation Regions and 14 unique Evacuation Scenarios. Table 7-1 and Table 7-2 document these ETE for the 90^{th} and 100^{th} percentiles. These ETE range from 1:45 (hr:min) to 3:45 at the 90^{th} percentile.
- Inspection of Table 7-1 and Table 7-2 indicates that the ETE for the 100^{th} percentile are significantly longer than those for the 90^{th} percentile. This is the result of the long trip generation "tail". As these stragglers mobilize, the aggregate rate of egress slows since many vehicles have already left the EPZ. Towards the end of the process, relatively few evacuation routes service the remaining demand. See Figures 7-7 through 7-20.

- Inspection of Table 7-3 and Table 7-4 indicates that a staged evacuation provides no benefits to evacuees from within the 2 mile region and unnecessarily delays the evacuation of those beyond 2 miles (compare Regions R02 and R04 through R15 with Regions R29 through R41, respectively, in Tables 7-1 and 7-2). See Section 7.6 for additional discussion.
- Comparison of Scenarios 9 (winter, weekend, midday) and 13 (winter, weekend, midday, special event) in Table 7-1 indicates that the special event does not materially affect the ETE. See Section 7.5 for additional discussion.
- Comparison of Scenarios 1 and 14 in Table 7-1 indicates that the roadway closure – a northbound section of US-522 NB at CR-612 – does not have a significant impact on the 90th or 100th percentile ETE. Sufficient reserve capacity exists on CR-612 to service the additional evacuating traffic demand. See Section 7.5 for additional discussion.
- There is minimal traffic congestion within the EPZ. All congestion within the EPZ clears by 2 hours and 10 minutes after the Advisory to Evacuate (earlier for winter cases). See Section 7.3 and Figures 7-3 through 7-6.
- Separate ETE were computed for schools, the one medical facility, transit-dependent persons and homebound special needs persons. The average single-wave ETE for these facilities are within a similar range as the general population ETE at the 90th percentile. See Section 8.
- Table 8-5 indicates that there are enough buses and wheelchair vans available to evacuate the entire transit-dependent population within the EPZ in a single wave, if transportation resources are shared by the counties. However, if for any reason transportation resources could not be shared, then Spotsylvania County would require a second wave for two of their schools in order to evacuate all schoolchildren. The second-wave ETE for schools do exceed the general population ETE at the 90th percentile. Mutual aid agreements with neighboring counties and assistance from the state could be used to address the shortfall in bus resources (See Section 8.4).
- The general population ETE at the 90th percentile is insensitive to reductions in the base trip generation time of 5½ hours. The general population ETE at the 100th percentile, however, closely mirrors trip generation time. See Table M-1.
- The general population ETE is insensitive to the voluntary evacuation of vehicles in the Shadow Region. Tripling the shadow evacuation percentage results in no change in the 90th percentile ETE. See Table M-2.
- An increase in permanent resident population of 150% or more, or a decrease in population of 85% or more results in ETE changes which meet the criteria for updating ETE between decennial Censuses. See Section M.3.
- The additional employees present during an outage concurrent with construction of the New Unit 3, does not affect the ETE, with the exception of the 90th percentile ETE for the 2-mile region, which decreased by 5 minutes. See Section M.4.

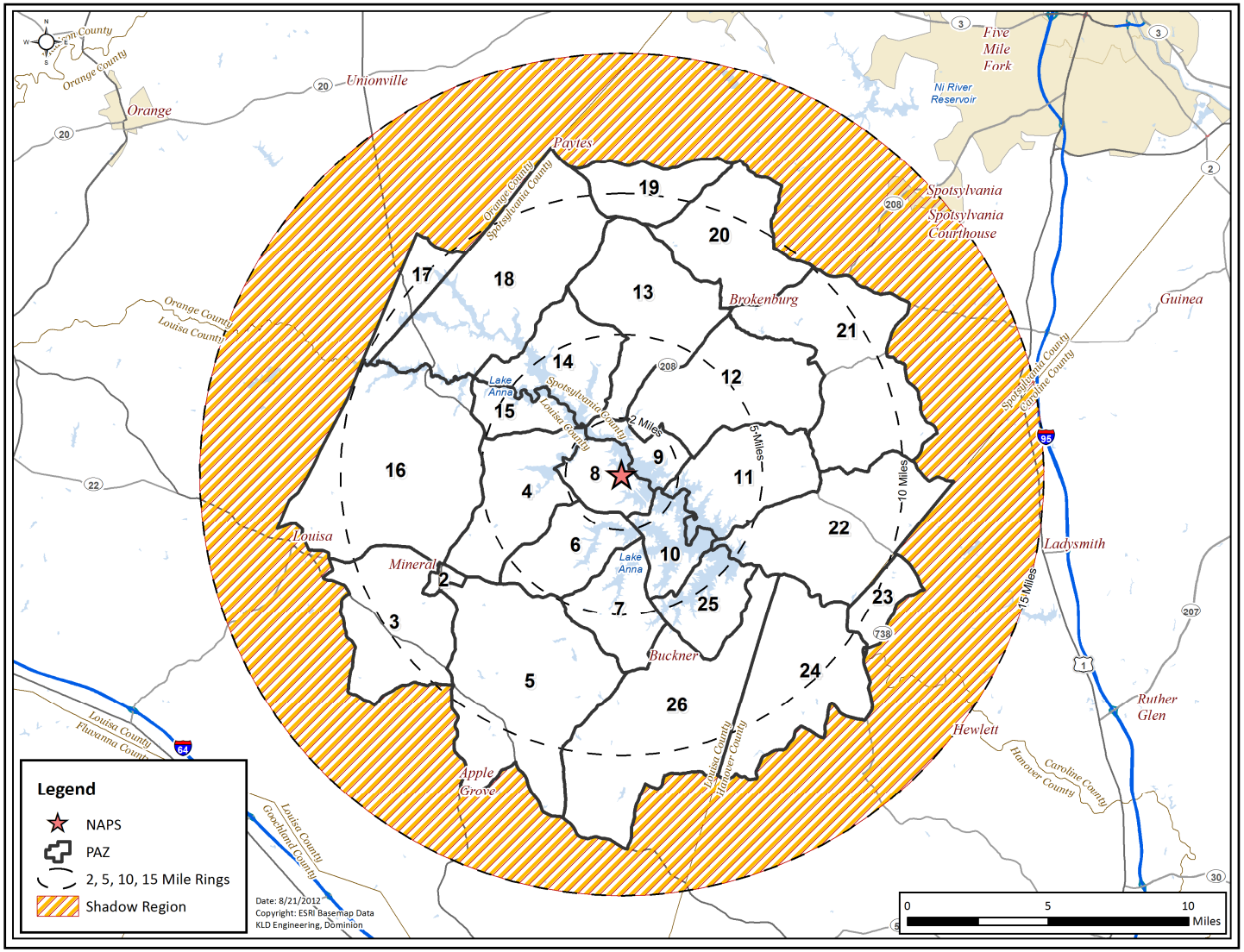

Figure 6-1. NAPS EPZ PAZ

Table 3-1. EPZ Permanent Resident Population

PAZ	2000 Population	2008 Population (Estimated)[1]	2010 Population
2	418	645	466
3	1,241	1,843	1,490
4	837	1,842	1,107
5	1,331	1,740	1,472
6	308	727	484
7	318	939	484
8	287	885	409
9	117	426	203
10	245	1,151	429
11	740	1,345	981
12	1,222	1,467	1,561
13	991	1,312	1,364
14	541	1,719	803
15	451	1,589	697
16	1,138	2,153	1,601
17	50	223	144
18	1,664	3,624	2,416
19	246	352	383
20	894	1,025	1,026
21	1,901	2,125	2,232
22	1,355	1,639	1,538
23	263	341	260
24	716	989	946
25	312	902	464
26	1,729	2,420	2,242
TOTAL	**19,315**	**33,423**	**25,202**
EPZ Population Growth:		**2000-2010**	**30.48%**
EPZ Population Difference:		**2008-2010**	**-24.60%**

Notes: 1 - 2008 COLA ETE – Resident address points within each county (except Caroline County) were provided by VDEM. Average household size from telephone survey (2.57) was used to determine 2008 EPZ population. 2000 Census projected to 2008 using county growth rate was used for Caroline County.

Table 6-1. Description of Evacuation Regions

Region	Description	Site PAR Description	Protection Action Zone (PAZ)																								
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
R01	2-Mile Radius	2- Mile Radius					x		x	x	x																
R02	5-Mile Radius	5-Mile Radius			x		x	x	x	x	x	x	x	x	x	x										x	
R03	Full EPZ	Full EPZ	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Evacuate 2-Mile Radius and Downwind to 5 Miles																											
Region	**Wind Direction Toward:**	**Site PAR Description**	**Protection Action Zone (PAZ)**																								
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
R04	N, NNE	349° - 33°					x		x	x	x		x	x	x												
R05	NE	34° - 56°					x		x	x	x	x	x	x													
R06	ENE, E	57° - 101°					x		x	x	x	x	x														
R07	ESE	102° - 123°					x		x	x	x	x														x	
R08	SE	124° - 146°					x	x	x	x	x	x														x	
R09	SSE, S	147° - 191°					x	x	x	x	x															x	
R10	SSW	192° - 213°					x	x	x	x	x																
R11	SW	214° - 236°			x		x	x	x	x	x																
R12	WSW	237° - 258°			x		x		x	x	x																
R13	W	259°- 281°			x		x		x	x	x					x											
R14	WNW, NW	282° - 326°			x		x		x	x	x				x	x											
R15	NNW	327° - 349°					x		x	x	x			x	x	x											
Evacuate 5-Mile Radius and Downwind to the EPZ Boundary																											
Region	**Wind Direction Toward:**	**Site PAR Description**	**Protection Action Zone (PAZ)**																								
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
R16	N	349° - 11°			x		x	x	x	x	x	x	x	x	x	x			x	x	x					x	
R17	NNE	12° - 33°			x		x	x	x	x	x	x	x	x	x	x			x	x	x	x				x	
R18	NE	34° - 56°			x		x	x	x	x	x	x	x	x	x	x				x	x	x				x	
R19	ENE	57° - 78°			x		x	x	x	x	x	x	x	x	x	x					x	x	x			x	
R20	E	79° - 101°			x		x	x	x	x	x	x	x	x	x	x						x	x	x		x	
R21	ESE	102° - 123°			x		x	x	x	x	x	x	x	x	x	x						x	x	x	x	x	x
R22	SE	124° - 146°			x		x	x	x	x	x	x	x	x	x	x							x	x	x	x	x
R23	SSE, S	147° - 191°			x	x	x	x	x	x	x	x	x	x	x	x									x	x	x
R24	SSW	192° - 213°		x	x	x	x	x	x	x	x	x	x	x	x	x										x	x

Region	Description	Site PAR Description	Protection Action Zone (PAZ)																								
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
R25	SW, WSW	214° - 258°	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									x	
R26	W	259° - 281°	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x							x	
R27	WNW, NW	282° - 326°			x		x	x	x	x	x	x	x	x	x	x	x	x	x							x	
R28	NNW	327° - 349°			x		x	x	x	x	x	x	x	x	x	x		x	x	x						x	
Staged Evacuation - 2-Mile Radius Evacuates, then Evacuate Downwind to 5 Miles																											
Region	**Wind Direction Toward:**	**Site PAR Description**	**Protection Action Zone (PAZ)**																								
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
R29	-	5-Mile Radius			x		x	x	x	x	x	x	x	x	x	x										x	
R30	N, NNE	349° - 33°					x		x	x	x		x	x	x												
R31	NE	34° - 56°					x		x	x	x	x	x	x													
R32	ENE, E	57° - 101°					x		x	x	x	x	x														
R33	ESE	102° - 123°					x		x	x	x	x														x	
R34	SE	124° - 146°					x	x	x	x	x	x														x	
R35	SSE, S	147° - 191°					x	x	x	x	x															x	
R36	SSW	192° - 213°					x	x	x	x	x																
R37	SW	214° - 236°			x		x	x	x	x	x																
R38	WSW	237° - 258°			x		x		x	x	x																
R39	W	259°- 281°			x		x		x	x	x					x											
R40	WNW, NW	282° - 326°			x		x		x	x	x				x	x											
R41	NNW	327° - 349°					x		x	x	x			x	x	x											

Shelter-in-Place until 90% ETE for R01, then Evacuate	PAZ Shelter-in-Place	PAZ Evacuate

Table 6-2. Evacuation Scenario Definitions

Scenario	Season[1]	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Midweek	Midday	Snow	None
9	Winter	Weekend	Midday	Good	None
10	Winter	Weekend	Midday	Rain	None
11	Winter	Weekend	Midday	Snow	None
12	Winter	Midweek, Weekend	Evening	Good	None
13	Winter	Weekend	Midday	Good	Kinetic Triathlon at Lake Anna State park
14	Summer	Midweek	Midday	Good	Roadway Impact – One Segment of US-522 NB will be Closed

[1] Winter means that school is in session (also applies to spring and autumn). Summer means that school is not in session.

Table 7-1. Time to Clear the Indicated Area of *90* Percent of the Affected Population

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:30
R02	2:25	2:25	1:50	1:50	1:50	2:30	2:35	3:25	1:50	1:50	2:55	1:55	1:50	2:30
R03	2:35	2:35	2:00	2:00	2:00	2:40	2:40	3:30	2:00	2:00	3:05	2:00	2:00	2:35
2-Mile Region and Keyhole to 5 Miles														
R04	2:20	2:20	1:45	1:45	1:45	2:30	2:30	3:15	1:50	1:50	2:55	1:50	1:50	2:20
R05	2:25	2:25	1:50	1:50	1:50	2:30	2:30	3:20	1:50	1:50	2:55	1:50	1:50	2:25
R06	2:25	2:25	1:50	1:50	1:50	2:25	2:25	3:15	1:50	1:50	2:55	1:50	1:50	2:25
R07	2:20	2:20	1:50	1:50	1:50	2:25	2:25	3:10	1:50	1:50	2:55	1:50	1:50	2:25
R08	2:20	2:20	1:50	1:50	1:50	2:25	2:25	3:15	1:50	1:50	2:55	1:50	1:50	2:25
R09	2:15	2:20	1:50	1:50	1:50	2:25	2:25	3:10	1:50	1:50	2:55	1:50	1:50	2:20
R10	2:15	2:15	1:50	1:50	1:50	2:20	2:20	3:05	1:50	1:50	2:50	1:50	1:50	2:20
R11	2:20	2:20	1:50	1:50	1:50	2:25	2:25	3:15	1:50	1:50	2:55	1:50	1:50	2:25
R12	2:15	2:20	1:50	1:50	1:50	2:20	2:25	3:10	1:50	1:50	2:50	1:50	1:50	2:20
R13	2:20	2:20	1:45	1:50	1:50	2:25	2:25	3:10	1:50	1:50	2:55	1:50	1:50	2:20
R14	2:15	2:15	1:45	1:45	1:45	2:25	2:25	3:15	1:50	1:50	2:50	1:50	1:50	2:20
R15	2:15	2:15	1:45	1:45	1:45	2:25	2:25	3:15	1:50	1:50	2:50	1:50	1:50	2:20
5-Mile Region and Keyhole to EPZ Boundary														
R16	2:30	2:30	1:55	1:55	1:50	2:35	2:35	3:25	1:55	1:55	3:00	1:55	1:55	2:30
R17	2:30	2:35	1:55	1:55	1:55	2:35	2:40	3:30	1:55	1:55	3:00	1:55	1:55	2:35
R18	2:30	2:30	1:50	1:55	1:55	2:35	2:35	3:30	1:55	1:55	3:00	1:55	1:55	2:35
R19	2:30	2:35	1:55	1:55	1:55	2:35	2:35	3:30	1:55	1:55	3:00	1:55	1:55	2:35
R20	2:30	2:35	1:55	1:55	1:55	2:35	2:40	3:30	1:55	1:55	3:00	1:55	1:55	2:35
R21	2:35	2:35	2:00	2:05	2:05	2:40	2:40	3:30	2:00	2:00	3:00	2:00	2:00	2:35
R22	2:30	2:35	2:00	2:00	2:05	2:35	2:40	3:30	1:55	1:55	3:00	1:55	1:55	2:35
R23	2:30	2:30	2:00	2:00	2:00	2:35	2:35	3:30	1:55	1:55	3:00	1:55	1:55	2:35

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
R24	2:30	2:30	1:50	1:55	1:55	2:35	2:35	3:25	1:55	1:55	3:00	1:55	1:55	2:35
R25	2:30	2:30	1:55	1:55	1:55	2:35	2:35	3:25	1:55	1:55	3:00	1:55	1:55	2:35
R26	2:30	2:30	1:50	1:50	1:50	2:35	2:35	3:25	1:55	1:55	3:00	1:55	1:55	2:30
R27	2:25	2:30	1:50	1:50	1:50	2:35	2:35	3:25	1:55	1:55	2:55	1:55	1:55	2:30
R28	2:30	2:30	1:55	1:55	1:50	2:35	2:35	3:25	1:55	1:55	2:55	1:55	1:55	2:30
Staged Evacuation - 2-Mile Region and Keyhole to 5 Miles														
R29	2:55	2:55	2:10	2:10	2:10	2:55	2:55	3:45	2:10	2:15	3:30	2:10	2:10	2:55
R30	2:55	2:55	2:10	2:10	2:10	2:55	2:55	3:45	2:15	2:15	3:30	2:15	2:15	2:55
R31	2:55	2:55	2:15	2:15	2:15	2:55	2:55	3:45	2:15	2:15	3:30	2:15	2:15	2:55
R32	2:50	2:50	2:10	2:10	2:10	2:50	2:55	3:40	2:10	2:10	3:25	2:10	2:10	2:50
R33	2:50	2:50	2:05	2:05	2:05	2:50	2:50	3:35	2:05	2:05	3:25	2:05	2:05	2:50
R34	2:50	2:50	2:05	2:05	2:05	2:50	2:50	3:40	2:05	2:10	3:25	2:05	2:05	2:50
R35	2:45	2:45	2:05	2:05	2:05	2:50	2:50	3:35	2:05	2:10	3:25	2:05	2:05	2:50
R36	2:45	2:45	2:05	2:05	2:05	2:45	2:45	3:30	2:05	2:05	3:20	2:05	2:05	2:45
R37	2:45	2:50	2:05	2:05	2:05	2:50	2:50	3:35	2:05	2:05	3:20	2:05	2:05	2:50
R38	2:45	2:45	2:05	2:05	2:05	2:45	2:45	3:35	2:05	2:05	3:20	2:05	2:05	2:45
R39	2:45	2:50	2:05	2:05	2:05	2:50	2:50	3:35	2:05	2:05	3:20	2:05	2:05	2:50
R40	2:50	2:50	2:05	2:05	2:05	2:50	2:50	3:40	2:05	2:10	3:25	2:05	2:05	2:50
R41	2:50	2:50	2:05	2:05	2:05	2:50	2:50	3:40	2:05	2:05	3:25	2:05	2:05	2:50

Table 7-2. Time to Clear the Indicated Area of *100* Percent of the Affected Population

	Summer		Summer		Summer	Winter			Winter			Winter	May	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R02	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R03	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
2-Mile Region and Keyhole to 5 Miles														
R04	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R05	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R06	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R07	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R08	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R09	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R10	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R11	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R12	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R13	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R14	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R15	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
5-Mile Region and Keyhole to EPZ Boundary														
R16	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R17	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R18	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R19	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R20	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R21	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R22	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R23	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40

	Summer		Summer		Summer	Winter			Winter			Winter	May	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
R24	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R25	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R26	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R27	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
R28	5:40	5:40	5:40	5:40	5:40	5:40	5:40	6:40	5:40	5:40	6:40	5:40	5:40	5:40
Staged Evacuation - 2-Mile Region and Keyhole to 5 Miles														
R29	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R30	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R31	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R32	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R33	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R34	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R35	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R36	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R37	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R38	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R39	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R40	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35
R41	5:35	5:35	5:35	5:35	5:35	5:35	5:35	6:35	5:35	5:35	6:35	5:35	5:35	5:35

Table 7-3. Time to Clear 90 Percent of the 2-Mile Region

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region and 5-Mile Region														
R01	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:25
R02	2:25	2:25	1:45	1:50	1:50	2:35	2:35	3:25	1:50	1:50	2:55	1:50	1:50	2:25
Unstaged Evacuation - 2-Mile Region and Keyhole to 5-Miles														
R04	2:25	2:25	1:45	1:45	1:50	2:30	2:30	3:20	1:50	1:50	2:55	1:50	1:50	2:25
R05	2:25	2:25	1:45	1:45	1:50	2:30	2:30	3:20	1:50	1:50	2:55	1:50	1:50	2:25
R06	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:25
R07	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:25
R08	2:25	2:25	1:45	1:45	1:50	2:35	2:35	3:25	1:50	1:50	2:55	1:50	1:50	2:25
R09	2:25	2:25	1:45	1:45	1:50	2:30	2:30	3:25	1:50	1:50	2:55	1:50	1:50	2:25
R10	2:25	2:25	1:45	1:45	1:50	2:30	2:30	3:25	1:50	1:50	2:55	1:50	1:50	2:25
R11	2:25	2:25	1:45	1:45	1:50	2:35	2:35	3:25	1:50	1:50	2:55	1:50	1:50	2:25
R12	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:25
R13	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:25
R14	2:25	2:25	1:45	1:45	1:45	2:30	2:30	3:20	1:50	1:50	2:50	1:50	1:50	2:25
R15	2:25	2:25	1:45	1:45	1:50	2:30	2:30	3:20	1:50	1:50	2:55	1:50	1:50	2:25
Staged Evacuation - 2-Mile Region and Keyhole to 5-Miles														
R29	2:45	2:45	2:00	2:00	2:00	2:45	2:45	3:35	2:00	2:00	3:15	2:00	2:00	2:45
R30	2:40	2:40	1:55	1:55	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40
R31	2:40	2:40	1:55	1:55	1:55	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40
R32	2:35	2:40	1:55	1:55	1:55	2:40	2:40	3:30	2:00	2:00	3:10	2:00	2:00	2:35
R33	2:35	2:40	1:55	1:55	1:55	2:40	2:40	3:30	2:00	2:00	3:10	2:00	2:00	2:35
R34	2:40	2:45	2:00	2:00	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40
R35	2:45	2:45	2:00	2:00	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:45
R36	2:45	2:45	2:00	2:00	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:45
R37	2:45	2:45	2:00	2:00	2:00	2:45	2:45	3:35	2:00	2:00	3:15	2:00	2:00	2:45

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
R38	2:40	2:40	2:00	2:00	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40
R39	2:40	2:40	2:00	2:00	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40
R40	2:40	2:40	2:00	2:00	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40
R41	2:40	2:40	1:55	1:55	2:00	2:45	2:45	3:30	2:00	2:00	3:15	2:00	2:00	2:40

Table 7-4. Time to Clear 100 Percent of the 2-Mile Region

	Summer		Summer		Summer	Winter			Winter			Winter	May	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region and 5-Mile Region														
R01	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R02	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
Unstaged Evacuation - 2-Mile Region and Keyhole to 5-Miles														
R04	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R05	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R06	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R07	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R08	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R09	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R10	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R11	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R12	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R13	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R14	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R15	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
Staged Evacuation - 2-Mile Region and Keyhole to 5-Miles														
R29	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R30	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R31	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R32	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R33	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R34	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R35	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R36	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R37	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30

	Summer		Summer		Summer	Winter			Winter			Winter	May	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
R38	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R39	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R40	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30
R41	5:30	5:30	5:30	5:30	5:30	5:30	5:30	6:30	5:30	5:30	6:30	5:30	5:30	5:30

Table 8-7. School Evacuation Time Estimates – Good Weather

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to EAC (mi.)	Travel Time from EPZ Bdry to EAC (min)	ETE to EAC (hr:min)
LOUISA COUNTY SCHOOLS									
Louisa County High School	90	15	3.7	45.0	5	**1:50**	8.3	11	**2:05**
Louisa County Middle School	90	15	3.4	45.0	5	**1:50**	8.3	11	**2:05**
Mineral Christian Preschool	90	15	4.8	45.0	7	**1:55**	8.3	11	**2:10**
Thomas Jefferson Elementary School	90	15	1.5	45.0	3	**1:50**	8.6	11	**2:05**
SPOTSYLVANIA COUNTY SCHOOLS									
Berkeley Elementary School	90	15	2.1	44.7	3	**1:50**	8.0	11	**2:05**
Livingston Elementary School	90	15	9.1	45.0	13	**2:00**	8.3	11	**2:10**
Post Oak Middle School	90	15	3.4	45.0	5	**1:50**	8.3	11	**2:05**
Spotsylvania High School	90	15	3.2	44.2	5	**1:50**	8.0	11	**2:05**
Spotsylvania High School - Governor's School	90	15	3.2	44.2	5	**1:50**	8.0	11	**2:05**
					Maximum for EPZ:	**2:00**		**Maximum:**	**2:10**
					Average for EPZ:	**1:55**		**Average:**	**2:10**

Table 8-11. Transit-Dependent Evacuation Time Estimates – Good Weather

Route Number	Bus Number	One-Wave						Two-Wave						
		Mobilization (min)	Route Length (miles)	Speed (mph)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)	Distance to EAC (miles)	Travel Time to EAC (min)	Unload (min)	Driver Rest (min)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)
1	1	105	12.6	45.0	17	30	**2:35**	8.2	11	5	10	41	30	**4:15**
2	1	105	17.4	38.9	27	30	**2:45**	8.2	11	5	10	50	30	**4:35**
3	1	105	20.2	44.6	27	30	**2:45**	8.2	11	5	10	51	30	**4:35**
4	1	105	15.3	45.0	20	30	**2:35**	8.2	11	5	10	45	30	**4:20**
5	1	105	13.0	45.0	17	30	**2:35**	8.9	12	5	10	43	30	**4:15**
6	1	105	25.5	45.0	34	30	**2:50**	8.5	11	5	10	59	30	**4:50**
7	1	105	19.8	45.0	26	30	**2:45**	12.1	16	5	10	56	30	**4:45**
8	1	105	32.2	45.0	43	30	**3:00**	8.2	11	5	10	67	30	**5:05**
9	1	105	22.8	45.0	30	30	**2:45**	8.2	11	5	10	55	30	**4:40**
10	1	105	26.3	40.2	39	30	**2:55**	8.2	11	5	10	61	30	**4:55**
11	1	105	17.3	45.0	23	30	**2:40**	9.5	13	5	10	49	30	**4:30**
12	1	105	27.6	45.0	37	30	**2:55**	8.3	11	5	10	61	30	**4:55**
13	1	105	17.0	44.8	23	30	**2:40**	8.3	11	5	10	47	30	**4:25**
14	1	105	36.6	45.0	49	30	**3:05**	13.5	18	5	10	80	30	**5:30**
15	1	105	17.5	45.0	23	30	**2:40**	8.3	11	5	10	48	30	**4:25**
16	1	105	23.2	44.5	31	30	**2:50**	7.8	10	5	10	55	30	**4:45**
17	1	105	9.5	43.0	13	30	**2:30**	7.8	10	5	10	36	30	**4:05**
18	1	105	30.5	45.0	41	30	**3:00**	13.5	18	5	10	72	30	**5:15**
19	1	105	18.5	45.0	25	30	**2:40**	13.5	18	5	10	56	30	**4:40**
20	1	105	29.2	45.0	39	30	**2:55**	13.5	18	5	10	70	30	**5:10**
21	1	105	10.7	45.0	14	30	**2:30**	14.8	20	5	10	47	30	**4:25**
22	1	105	5.1	45.0	7	30	**2:25**	12.6	17	5	10	31	30	**4:00**
23	1	105	7.7	45.0	10	30	**2:25**	13.4	18	5	10	38	30	**4:10**
24	1	105	8.0	35.5	13	30	**2:30**	13.4	18	5	10	41	30	**4:15**
25	1	105	7.2	45.0	10	30	**2:25**	12.7	17	5	10	36	30	**4:05**
						Maximum ETE:	**3:05**						**Maximum ETE:**	**5:30**
						Average ETE:	**2:45**						**Average ETE:**	**4:35**

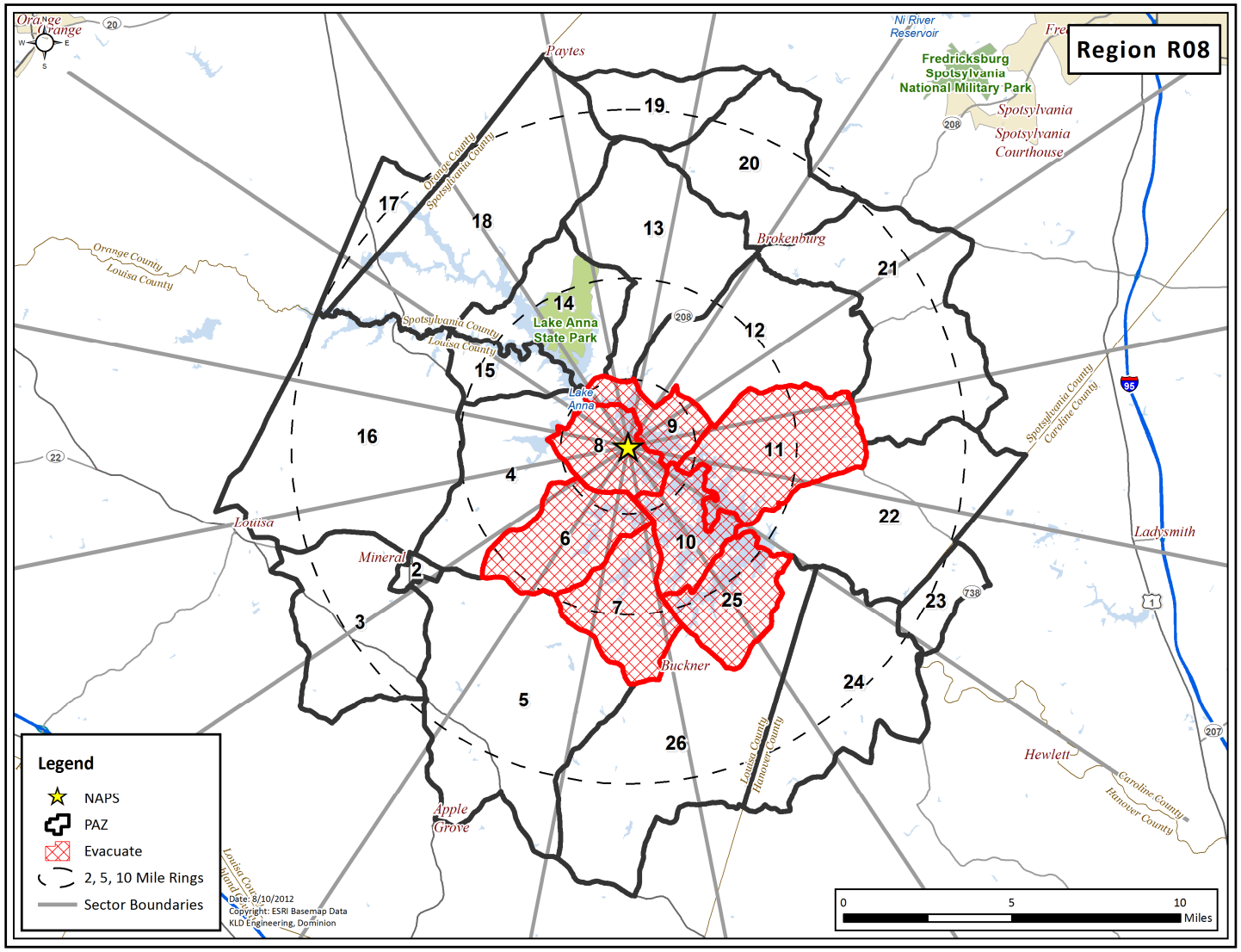

Figure H-8. Region R08

Appendix 5–Implementing Procedures – Topical List

Emergency plan implementing procedures address a range of actions needed to implement the contents of this emergency plan. The emergency plan implementing procedures 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 (I.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 Offsite 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

Dominion maintains inventories of emergency equipment and supplies for use by emergency response personnel in the ERFs and by Dominion's offsite field monitoring teams. The actual inventories are based on the activities that occur in, or are dispatched from, the affected facility. Actual inventories are established in inventory lists in accordance with plant 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
- Plans, procedures, and drawings
- Communications equipment
- Administrative and recordkeeping supplies
- Batteries and other expendable supplies
- First aid supplies (e.g., bandages, stretchers, splints, topical ointments)

Appendix 7–Certification Letter

COMMONWEALTH of VIRGINIA

Department of Emergency Management

MICHAEL M. CLINE
State Coordinator

JACK E. KING
Chief Deputy Coordinator

BRETT A. BURDICK
Deputy Coordinator

10501 Trade Court
Richmond, Virginia 23236-3713
(804) 897-6500
(TDD) 674-2417
FAX (804) 897-6506

June 11, 2010

MEMORANDUM

TO: Mrs. Leslie N. Hartz
Vice President, Nuclear Support Services
Dominion Resources Services, Inc.

FROM: Signatory Agencies in Support of the Original North Anna Power Station Emergency Operations Plan, dated July 1974

SUBJECT: Combined License Application for a new nuclear generating unit at the North Anna Power Station

The below-signed state agencies and localities have reviewed the emergency plan supporting the revised Combined License Application for a new nuclear generating unit at the North Anna Power Station. This memorandum updates correspondence filed with Dominion Resources Services, Inc., dated during the period of August-September 2007. The organizations severally certify its commitment that:

- Proposed emergency plans are practicable;
- Virginia Department of Emergency Management is committed to participating in further development of the plans, including any required field demonstrations; and
- Virginia Department of Emergency Management is committed to executing their responsibilities under the plans in the event of an emergency.

Furthermore, the organizations concur with the proposed emergency classification system, initiating conditions, and emergency action levels described in the Combined License Application Emergency Plan and evacuation time estimates.

It is with joint 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 North Anna Unit 3 Combined License Application Emergency Plan if and when Dominion Energy proceeds with construction and operation of this nuclear facility.

We, the below signed, look forward to continuing our partnership in these efforts:

Karen Remley, M.D.
State Health Commissioner
Karen.Remley@vdh.virginia.gov
Nancy.glasheen@vdh.virginia.gov

Date: 6/11/10

Michael M. Cline
State Coordinator, Virginia Department of Emergency Management
Michael.Cline@vdem.virginia.gov

Date: 11 Jun 10

On Behalf of Col. Flaherty.
Captain Steven L. Chumley

Colonel W. S. (Steve) Flaherty
Superintendent, Virginia Department of State Police
Steve.Flaherty@vsp.virginia.gov
STEVEN.CHUMLEY@VSP.VIRGINIA.GOV
DIV. 1 COMMANDER

Date: 6/11/10

~~Robert W. Duncan~~ Dabney W. Watts

Director, Virginia Department of Game and Inland Fisheries, Law Enforcement Division
Bob.Duncan@dgif.virginia.gov

Date: 06-11-2010

V.P. Support Services

John F. Duval
~~Chief Executive Officer, Virginia Commonwealth University Medical Center~~
JDuval@mcvh-vcu.edu CEO MCV HOSPITALS

Date: 6-11-10

David E. Layman
Caroline County Department of Fire and Rescue and Emergency Management
DLayman@co.caroline.va.us

Date: 6-15-2010

A. A. "Tony" Lippa, Jr.
Sheriff, Caroline County
TLippa@co.caroline.va.us

Date: 6/11/10

Cecil R. Harris, Jr.
County Administrator, Hanover County
~~Jim~~ Taylor
JPTaylor@co.hanover.va.us

Date: 6-16-10

Colonel V. Stuart Cook
Sheriff, Hanover County
VSCook@co.hanover.va.us

Date: 6-16-10

Dale Mullen
County Administrator, Louisa County
DMullen@louisa.org

Date: 6/11/2010

Ashland D. Fortune
Sheriff, Louisa County
AFortune@louisa.org

Date: 6/11/10

Robert C. Dubé, MS, EFO
Fire Chief and Coordinator of Emergency Management, County of Louisa
rdube@louisa.org

Date: 6/11/10

Howard D. Smith
Sheriff, Spotsylvania County
Hds@spotsylvaniava.us

Date: 6-15-10

Julie G. Jordan
County Administrator, Orange County
JJordan@orangecountyva.gov

Date: 6/11/2010

Mark A. Amos
Sheriff, Orange County
maamos@orangecountyva.gov

Date: 6/15/2010

Douglas P. Boggs
Division Chief – Emergency Management
Spotsylvania County Department of Fire, Rescue, and Emergency Management
DBoggs@spotsylvaniava.us

Date: 6/15/10

Appendix 8–Cross-Reference to Regulations, Guidance, and State and Local Plans

Note: To a limited extent, certain details of the Commonwealth and risk jurisdiction plans may be specific to Unit 3. Such details will be developed at a later date consistent with the commitments outlined in the certification letter 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, II.F, II.J
10 CFR 50.47(b)(6)	II.E, II.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)	II.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.1.f
10 CFR 50.72(c)(3)	II.E.4
10 CFR 50 App E.IV.1-7	COL Emergency Plan, including App. 4 and Evacuation Time Estimate, II.J, II.P
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

Requirement	Corresponding COL Emergency Plan Provision
10 CFR 50 App E.IV.H	II.M
10 CFR 50 App E.IV.I	II.J

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
A.1.a	Plan §II.A.1.a	Plan §VII, App. 3	Plan §VII	Plan §VII	Plan §VII	Plan §VII	Plan §VII
A.1.b	Plan §II.A.1.b	Plan §VIII, App. 3	Plan §VIII	Plan §VIII	Plan §V.II	Plan §V.II	Plan §VIII
A.1.c	Plan §II.A.1.c	App. 3	Plan Att. 12 & 13	Plan Att. 12 & 13	Plan Att. 12 & 13	Plan Att. 12 & 13	Plan Att. 12 & 13
A.1.d	Plan §II.A.1.d	Plan §VII.C	Plan §VII.A	Plan §VII.A	Plan §VII.A	Plan §VII.A	Plan §VII.A
A.1.e	Plan §II.A.1.e	App. 10 §II.A	Plan §§VII.A, IX.A., IX.B, ESF #5	Plan §§VII.A, IX.A., IX.B, ESF #5	Plan §VII.A, App. 5	Plan §VII.A, App. 5	Plan §§VII.A, IX.A., IX.B, ESF #5
A.2.a		App. 2 Tab A	Plan Att. 13	Plan Att. 13	Plan Att. 13	Plan Att. 13	Plan Att. 13
A.2.b		Plan §I	Plan §I.A	Plan §I.A	Plan §I	Plan §I	Plan §I.A
A.3	Plan §II.A.3	Plan Att. 1	Plan Att. 14	Plan Att. 14	Plan Att. 14	Plan Att. 14	Plan Att. 14
A.4	Plan §II.A.4	App. 1 §C	Plan §VII	Plan §VII	Plan §V.II	Plan §V.II	Plan §VII
B.1	Plan §II.B.1						
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	Plan §II.B.7						
B.7	Plan §II.B.7						

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
B.7	Plan §II.B.7						
B.7	Plan §II.B.7						
B.8	Plan §II.B.8						
B.9	Plan §II.B.9						
C.1.a	Plan §II.C.1.a	App. 2 §1.E					
C.1.b	Plan §II.C.1.b	App. 2 §II					
C.1.c	Plan §II.C.1.c	App. 2 Tab B	Plan §IX.A	Plan §IX.A	Plan §IX.A	Plan §IX.A	Plan §IX.A
C.2.a		Plan §VII.D, App. 1 §D.3, App. 2 §I.A.2	not applicable	not applicable	not applicable	not applicable	not applicable
C.2.b	Plan §II.C.2.b						
C.3	Plan §II.C.3	App. 6 §II.C.3					
C.4	Plan §II.C.4, App. 7	App. 6	Plan Att. 14	Plan Att. 14	Published separately	Published separately	Plan Att. 14
C.5	Not used						
C.6	Reserved for future revision per 10 CFR 50, Appendix E, IV.A.7 implementation schedule						
D.1	Plan §II.D.1, App. 1						
D.2	Plan §II.D.2, App. 1						
D.3		App. 5	Plan §VIII.A	Plan §VIII.A	Plan §VIII.A	Plan §VIII.A	Plan §VIII.A

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
D.4		Plan §VIII.B, App. 5	Plan §VIII.E	Plan §VIII.E	Plan §VIII.E	Plan §VIII.E	Plan §VIII.E
E.1	Plan §II.E.1	App. 4	Plan §VIII.C, ESF #2 & #5	Plan §VIII.C, ESF #2 & #5	Plan §VIII.C, App. 1 & 5	Plan §VIII.C, App. 1 & 5	Plan §VIII.C, ESF #2 & #5
E.2	Plan §II.E.2	Plan §VIII.C, App. 1 Tab A, App. 4	Plan §VIII.C, ESF #2 & #5	Plan §VIII.C, ESF #2 & #5	Plan §VIII.C, App. 1 & 5	Plan §VIII.C, App. 1 & 5	Plan §VIII.C, ESF #2 & #5
E.3	Plan §II.E.3						
E.4	Plan §II.E.4						
E.4.a	Plan §II.E.4						
E.4.b	Plan §II.E.4						
E.4.c	Plan §II.E.4						
E.4.d	Plan §II.E.4						
E.4.e	Plan §II.E.4						
E.4.f	Plan §II.E.4						
E.4.g	Plan §II.E.4						
E.4.h	Plan §II.E.4						
E.4.i	Plan §II.E.4						
E.4.j	Plan §II.E.4						
E.4.k	Plan §II.E.4						
E.4.l	Plan §II.E.4						

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
E.4.m	Plan §II.E.4						
E.4.n	Plan §II.E.4						
E.5		Plan §IX.C, App. 9, Annex M Tab A & B	Plan §§VIII.D & IX.C, ESF #2 & #5	Plan §§VIII.D & IX.C, ESF #2 & #5	Plan §VIII.D, App. 2 & 5	Plan §VIII.D, App. 2 & 5	Plan §§VIII.D & IX.C, ESF #2 & #5
E.6	Plan §II.E.6	Plan §IX.C, App. 4 §II.B	Plan §§VIII.D & IX.C, ESF #2	Plan §§VIII.D & IX.C, ESF #2	Plan §VIII.D, App. 2 & 5	Plan §VIII.D, App. 2 & 5	Plan §§VIII.D & IX.C, ESF #2
E.7	Plan §II.E.7	Annex M Tab A Att. 1	Plan §IX.C, ESF #2	Plan §IX.C, ESF #2	Plan §IX.C, App. 2	Plan §IX.C, App. 2	Plan §IX.C, ESF #2
F.1.a	Plan §II.F.1.a	App. 10 §II	Plan §IX.B	Plan §IX.B	Plan §VII, App. 5	Plan §VII, App. 5	Plan §IX.B
F.1.b	Plan §II.F.1.b	App. 10 §IV.H	Plan §IX.B, ESF #5	Plan §IX.B, ESF #5	Plan §IX.B.	Plan §IX.B.	Plan §IX.B, ESF #5
F.1.c	Plan §II.F.1.c	App. 10 §IV.I	See COVRERP	See COVRERP	See COVRERP	See COVRERP	See COVRERP
F.1.d	Plan §II.F.1.d	App. 10 §II	Plan §IX.B	Plan §IX.B	Plan §IX.B	Plan §IX.B	Plan §IX.B
F.1.e	Plan §II.F.1.e	App. 10 §II	Plan §VIII.C	Plan §VIII.C	Plan §VIII.C, App. 5	Plan §VIII.C, App. 5	Plan §VIII.C
F.1.f	Plan §II.F.1.						
F.2	Plan §II.F.2	App. 10 §III.E	Plan §IX.B	Plan §IX.B	Plan §IX.B	Plan §IX.B	Plan §IX.B
F.3	Plan §II.F.3	App. 10, App. 13 §II.C.1	Plan §IX.B	Plan §IX.B	Plan §IX.B	Plan §IX.B	Plan §IX.B
G.1	Plan §II.G.1	App. 10 §II.A.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1
G.2	Plan §II.G.2	App. 9 §II.A	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
G.3.a	Plan §II.G.3.a	App. 9 §III.A	Plan §IX.C.2	Plan §IX.C.2	Plan §IX.C.2	Plan §IX.C.2	Plan §IX.C.2
G.3.b	Plan §II.G.3.b						
G.4.a	Plan §II.G.4.a	App. 9 §III	Plan §IX.C.2, ESF #5	Plan §IX.C.2, ESF #5	Plan §IX.C.2, App. 2	Plan §IX.C.2, App. 2	Plan §IX.C.2, ESF #5
G.4.b	Plan §II.G.4.b	App. 9 §III.A	ESF #5	ESF #5	Plan §IX.C.2, App. 2	Plan §IX.C.2, App. 2	ESF #5
G.4.c	Plan §II.G.4.c	App. 9 §III	Plan §IX.C.2, ESF #5	Plan §IX.C.2, ESF #5	Plan §IX.C.2, App. 2	Plan §IX.C.2, App. 2	Plan §IX.C.2, ESF #5
G.5	Plan §II.G.5	App. 9, Annex M	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1	Plan §IX.C.1
H.1	Plan §II.H.1						
H.2	Plan §II.H.2						
H.3		Plan §VII, App. 1, App. 4	Plan §IX.A, App. 1	Plan §IX.A, App. 1	Plan §IX.A, App. 2	Plan §IX.A, App. 2	Plan §IX.A, App. 1
H.4	Plan §II.H.4	App. 1 §C	Plan §IX.A, ESF #5	Plan §IX.A, ESF #5	Plan §IX.A, App. 1 & 5	Plan §IX.A, App. 1 & 5	Plan §IX.A, ESF #5
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						

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
H.6.c	Plan §II.H.6.c						
H.7	Plan §II.H.7, App. 6	App. 7 §III & Tab E	Plan §VII.B	Plan §VII.B	Plan §VIII.B, App. 6	Plan §VIII.B, App. 6	Plan §VII.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. 7 §III.A.1 & Tab E	Plan §VII.A.1	Plan §VII.A.1	Plan §VII.A.1	Plan §VII.A.1	Plan §VII.A.1
H.11	Plan §II.H.11, App. 6	App. 7	ESF #6 & #7 & #8	ESF #6 & #7 & #8	App. 3 & 6	App. 3 & 6	ESF #6 & #7 & #8
H.12	Plan §II.H.12	App. 6 §II.C	Plan §VIII.B, ESF #10	Plan §VIII.B, ESF #10	Plan §VIII.B, App. 6	Plan §VIII.B, App. 6	Plan §VIII.B, ESF #10
I.1	Plan §II.I.1						
I.2	Plan §II.I.2						
I.3.a	Plan §II.I.3.a						
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	App. 6 §II.C	Plan §VIII.B, ESF #10	Plan §VIII.B, ESF #10	Plan §VIII.B, App. 6	Plan §VIII.B, App. 6	Plan §VIII.B, ESF #10

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
I.8	Plan §II.I.8	App. 6 §II.C, App. 7 §II.B	ESF #10	ESF #10	App. 6	App. 6	ESF #10
I.9	Plan §II.I.9	App. 6 §II.C.3.b					
I.10	Plan §II.I.10, App. 2	Bureau of Radiological Health SOP					
I.11		App. 6 §II.C.3					
J.1.a	Plan §II.J.1						
J.1.b	Plan §II.J.1						
J.1.c	Plan §II.J.1						
J.1.d	Plan §II.J.1						
J.2	Plan §II.J.2	App. 5 Tab A, App. 5 Tab B Att. 6	Not applicable in Caroline County.	Not applicable in Hanover County.	Not applicable in Louisa County	Not applicable in Orange County	Not applicable in Spotsylvania County.
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						
J.6.c	Plan §II.J.6.c						
J.7	Plan §II.J.7, App. 2						

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
J.8	Plan §II.J.8, App. 4						
J.9		App. 6 §II.C	Plan §§V.D & VIII.F	Plan §§V.D & VIII.F	Plan §§V.D & VIII.F	Plan §§V.D & VIII.F	Plan §§V.D & VIII.F
J.10.a	Plan §II.J.10.a	App. 5 Tab B Att. 6	Plan Att. 10 & 11, ESF #6 & #10	Plan Att. 10 & 11, ESF #6 & #10	Plan Att. 10, App. 4 & 6	Plan Att. 10, App. 4 & 6	Plan Att. 10 & 11, ESF #6 & #10
J.10.b	Plan §II.J.10.b	App. 5 Tab B Att. 6	Plan Att. 6-9	Plan Att. 6-9	Plan Att. 9 & 10	Plan Att. 9 & 10	Plan Att. 6-9
J.10.c	Plan §II.J.10.c, App. 3	App. 4 §II.B	Plan §VIII.D, ESF #2	Plan §VIII.D, ESF #2	Plan §VIII.D, App. 4	Plan §VIII.D, App. 4	Plan §VIII.D, ESF #2
J.10.d		App. 4 §II.B.3, App. 5	Plan §§V.D & VII.A.4, ESF #6 & 10	Plan §§V.D & VII.A.4, ESF #6 & 10	Plan §§V.D & VII.A.4, App. 4	Plan §§V.D & VII.A.4, App. 4	Plan §§V.D & VII.A.4, ESF #6 & 10
J.10.e		App. 8	Plan §V.D, ESF #6 & 10	Plan §V.D, ESF #6 & 10	Plan §V.D, App. 3, App. 6	Plan §V.D, App. 3, App. 6	Plan §V.D, ESF #6 & 10
J.10.f		App. 8	not applicable	not applicable	not applicable	not applicable	not applicable
J.10.g		App. 5	Plan §V.D, ESF #13	Plan §V.D, ESF #13	Plan §V.D, App. 3	Plan §V.D, App. 3	Plan §V.D, ESF #13
J.10.h		App. 5, App. 11	Plan §V.D, ESF #6	Plan §V.D, ESF #6	Plan §V.D, App. 3	Plan §V.D, App. 3	Plan §V.D, ESF #6
J.10.i		App. 5 Tab B Att. 6	Plan Att. 5 & 10	Plan Att. 5 & 10	Plan Att. 5 & 10	Plan Att. 5 & 10	Plan Att. 5 & 10
J.10.j		Annex A Tab C	Plan §§V.D & VII.A.2, ESF #13	Plan §§V.D & VII.A.2, ESF #13	Plan §§V.D & VII.A.2, App. 4	Plan §§V.D & VII.A.2, App. 4	Plan §§V.D & VII.A.2, ESF #13

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
J.10.k		App. 12 §III.A	Plan §VII, ESF #13	Plan §VII, ESF #13	Plan §V.D, App. 4	Plan §V.D, App. 4	Plan §VII, ESF #13
J.10.l		App. 5 Tab B Att. 6	Plan Att. 5 & 10	Plan Att. 5 & 10	Plan Att. 11	Plan Att. 11	Plan Att. 5 & 10
J.10.m	Plan §II.J.10.m	App. 7					
J.11		App. 7 (Also see Maryland Plan)					
J.12		App. 11	Plan §V.D, ESF #6	Plan §V.D, ESF #6	Plan §V.D, App. 3	Plan §V.D, App. 3	Plan §V.D, ESF #6
K.1	Plan §II.K.1						
K.1	Plan §II.K.1						
K.1	Plan §II.K.1						
K.1	Plan §II.K.1						
K.1	Plan §II.K.1						
K.1	Plan §II.K.1						
K.1	Plan §II.K.1						
K.2	Plan §II.K.2						
K.3.a	Plan §II.K.3.a	App. 7 §II & III	Plan §§VIII.B & VIII.F, ESF #10	Plan §§VIII.B & VIII.F, ESF #10	Plan §§VIII.B & VIII.F, App. 6	Plan §§VIII.B & VIII.F, App. 6	Plan §§VIII.B & VIII.F, ESF #10
K.3.b	Plan §II.K.3.b	App. 7 Tabs C & G	Plan §VIII.F, ESF #10	Plan §VIII.F, ESF #10	Plan §VIII.F, App. 6	Plan §VIII.F, App. 6	Plan §VIII.F, ESF #10

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
K.4		App. 7	Plan §VIII.F, ESF #10	Plan §VIII.F, ESF #10	Plan §VIII.F, App. 6	Plan §VIII.F, App. 6	Plan §VIII.F, ESF #10
K.5.a	Plan §II.K.5.a	App. 7 §II.B.3	ESF #6	ESF #6	App. 3 & 6	App. 3 & 6	ESF #6
K.5.b	Plan §II.K.5.b	App. 7 Tab D, App. 11	ESF #6 & #10	ESF #6 & #10	App. 3 & 9	App. 3 & 9	ESF #6 & #10
K.6.a	Plan §II.K.6.a						
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	Annex H Tab A	ESF #6	ESF #6	App. 3 & 8 & 9	App. 3 & 8 & 9	ESF #6
L.2	Plan §II.L.2						
L.3		Annex H Tab A					
L.4	Plan §II.L.4	Annex H Tab C	ESF #6	ESF #6	App. 3 & 8	App. 3 & 8	ESF #6
M.1	Plan §II.M.1	App. 11	ESF #5	ESF #5	App. 1 & 6	App. 1 & 6	ESF #5
M.2	Plan §II.M.2						
M.3	Plan §II.M.3	App. 11					
M.4	Plan §II.M.4	App. 11					
N.1.a	Plan §II.N.1.a	App. 13	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
N.1.b	Plan §II.N.1.b	App. 13 §II	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
N.1.c	Plan §II.N.1.c	This evaluation criterion does not apply to off-site plans.					
N.2.a	Plan §II.N.2.a	App. 13 §II.C.1	Plan §XII.B.1	Plan §XII.B.1	Plan §XII.B.1	Plan §XII.B.1	Plan §XII.B.1

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
N.2.b	Plan §II.N.2.b						
N.2.c	Plan §II.N.2.c	App. 13 §II.C.2	not applicable, see COVRERP	not applicable, see COVRERP	not applicable, see COVRERP	not applicable, see COVRERP	not applicable, see COVRERP
N.2.d	Plan §II.N.2.d	App. 13 §II.C.3	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
N.2.e(1)	Plan §II.N.2.e	App. 13 §II.C.4					
N.2.e(2)	Plan §II.N.2.e						
N.3.a	Plan §II.N.3.a	App. 13 §II.D.1	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
N.3.b	Plan §II.N.3.b	App. 13 §II.D.2	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
N.3.c	Plan §II.N.3.c	App. 13 §II.D.3	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
N.3.d	Plan §II.N.3.d	App. 13 §II.D.4	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
N.3.e	Plan §II.N.3.e	App. 13 §II.D.5	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
N.3.f	Plan §II.N.3.f	App. 13 §II.D	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
N.4	Plan §II.N.4	App. 13 §II.A.4	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
N.5	Plan §II.N.5	App. 13 §II.A.4	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
O.1	Plan §II.O.1	App. 13 §II.E	Plan §XII.A	Plan §XII.A	Plan §XII.A	Plan §XII.A	Plan §XII.A
O.1.a	Plan §II.O.1.a						

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
O.1.b		App. 13 §II.E.1	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
O.2	Plan §II.O.2						
O.3	Plan §II.O.3						
O.4.a	Plan §II.O.4.a	App. 13 §II.E	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
O.4.b	Plan §II.O.4.b	App. 13 §II.E.2	See COVRERP	See COVRERP	See COVRERP	See COVRERP	See COVRERP
O.4.c	Plan §II.O.4.c	App. 13 §II.E.6	See COVRERP	See COVRERP	See COVRERP	See COVRERP	See COVRERP
O.4.d	Plan §II.O.4.d	App. 13 §II.E.3	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
O.4.e	Plan §II.O.4.e						
O.4.f	Plan §II.O.4.f	App. 13 §II.E.3	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
O.4.g	Plan §II.O.4.g		Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
O.4.h	Plan §II.O.4.h	App. 13 §II.E.3	Plan §XII	Plan §XII	Plan §XII	Plan §XII	Plan §XII
O.4.i	Plan §II.O.4.i						
O.4.j	Plan §II.O.4.j	App. 13 §II.E.4	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
O.5	Plan §II.O.5	App. 13 §§II.E.1 & 6	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP	Plan §XII, see COVRERP
P.1	Plan §II.P.1	App. 13 §§II.E.1 & 6	Plan §§VII.A & XII.A	Plan §§VII.A & XII.A	Plan §§VII.A & XII.A	Plan §§VII.A & XII.A	Plan §§VII.A & XII.A
P.2	Plan §II.P.2	Plan §VII.B, App. 2	Plan §VII	Plan §VII	Plan §VII	Plan §VII	Plan §VII
P.3	Plan §II.P.3	Plan §X.C	Plan §VII	Plan §VII	Plan §VII	Plan §VII	Plan §VII

NUREG-0654 Eval. Criterion	COL EPlan	Commonwealth of Virginia	Caroline County	Hanover County	Louisa County	Orange County	Spotsylvania County
P.4	Plan §II.P.4	Plan §X.C.1	Plan §§VII & XI	Plan §§VII & XI	Plan §§VII & XI	Plan §§VII & XI	Plan §§VII & XI
P.5	Plan §II.P.5	Plan §X.C, App. 2	Plan §§VII & XI	Plan §§VII & XI	Plan §§VII & XI	Plan §§VII & XI	Plan §§VII & XI
P.6	Plan §II.P.6	Plan Att. 1	Plan §I	Plan §I	Plan §I	Plan §I	Plan §I
P.7	Plan §II.P.7, App. 5	Plan Att. (un-numbered)	Plan §XIV	Plan §XIV	Plan §XIV	Plan §XIV	Plan §XIV
P.8	Plan §II.P.8, App. 8	Plan pages i through ix	Plan pages i through xvii	Plan pages i through xvii	Plan pages i through xvii	Plan pages i through xvii	Plan pages i through xvii
P.9	Plan §II.P.9						
P.10	Plan §II.P.10	Plan §IX.B	Plan §X	Plan §X	Plan §X	Plan §X	Plan §X