

NUREG-0717  
Supplement No. 2

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# **Safety Evaluation Report**

related to the operation of  
**Virgil C. Summer Nuclear Station,**  
**Unit No. 1**

Docket No. 50-395

South Carolina Electric and Gas Company

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**U.S. Nuclear Regulatory  
Commission**

Office of Nuclear Reactor Regulation

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## 1 INTRODUCTION AND GENERAL DESCRIPTION OF FACILITY

### 1.1 Introduction

Supplement No. 1 to the Nuclear Regulatory Commission's Safety Evaluation Report in the matter of South Carolina Electric & Gas Company's application to operate the Virgil C. Summer Nuclear Station, Unit 1, was issued in April 1981. At that time we identified issues that were not yet resolved with the applicant. These issues were categorized as:

1. Outstanding issues which needed resolution prior to the issuance of an operating license.
2. Issues for which we had completed our review and had determined positions for which there appeared to be no significant disagreement between the applicant and the staff. Further information was needed, however, to confirm these positions.
3. Issues for which we had taken positions and would require implementation and/or documentation after the issuance of the operating license. These would be conditions to the operating license.

The purpose of this supplement to the Safety Evaluation Report is to provide our evaluation of the open items related to emergency preparedness that have been resolved since the issuance of Supplement No. 1.

#### 1.1 Outstanding Issues

The following is an update of the status of each of the outstanding issues identified in Section 1.6 of the Safety Evaluation Report.

##### 1.6.1 Stability of Subsurface Materials and Foundations of the Service Water Pumphouse and Intake Structure

##### 1.6.2 Slope Stability of the West Embankment of the Service Water Pond

Our review of these matters is continuing and we will report the results of our evaluation in a future supplement to the Safety Evaluation Report.

##### 1.6.3 Seismic System and Subsystem Analysis

This matter is resolved. Our evaluation is provided in Section 3.7.2 of Supplement No. 1 to the Safety Evaluation Report.

##### 1.6.4 Seismic Qualification of Seismic Category 1 Instrumentation and Electric Equipment

This matter is resolved. Our evaluation was provided in Section 3.10 of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.5 Environmental Qualification of Mechanical and Electrical Equipment

Our review of this matter is continuing and we will report our evaluation in a future supplement to the Safety Evaluation Report.

#### 1.6.6 Preservice Inspection Program

Our review of this matter is continuing and we will report the results of our evaluation in a future supplement to the Safety Evaluation Report.

#### 1.6.7 Reactor Vessel Integrity - Compliance with Appendix G to 10 CFR Part 50

This matter is resolved. Our evaluation was provided in Sections 5.3.1, 5.3.2, and 5.3.3 of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.8 Engineered Safety Feature and Reactor Protection System Status Monitoring System

This matter is resolved. Our evaluation was provided in Section 22 (Item I.D.1), of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.9 Use of a Load Sequencer with Offsite Power

Our review of this matter is continuing and we will report the results of our evaluation in a future supplement to the Safety Evaluation Report.

#### 1.6.10 Fire Protection

Our review of this matter is continuing and we will report the results of our evaluation in a future supplement to the Safety Evaluation Report.

#### 1.6.11 Emergency Planning

Our review of this matter is continuing and we will report the results of our evaluation in a future supplement to the Safety Evaluation Report. The current status of our review is reported in Sections 13.3, 22 and Appendix A to this supplement to the Safety Evaluation Report.

#### 1.6.12 Quality Assurance

This matter is resolved. Our evaluation is provided in Section 17.4 of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.13 Financial Qualifications

This matter is resolved. Our evaluation is provided in Section 20 of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.14 Conformance with NUREG-0737

The additional matters contained in NUREG-0737 are resolved. Our evaluation is provided in Section 22 of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.15 Joint IE/NRR Audit

This matter is resolved. Our evaluation is provided in Sections 13.1, 13.4 and 22 (Items I.A.1.1, I.A.1.2, I.A.1.3, I.B.1.2, I.C.2, I.C.3, I.C.4 and I.C.5) of Supplement No. 1 to the Safety Evaluation Report.

#### 1.6.16 Inadequate Core Cooling Instruments

Our review of this matter is continuing and we will report the results of our evaluation in a future supplement to the Safety Evaluation Report.

#### 1.6.17 Reactor Coolant System Vents

This matter is resolved. Our evaluation is provided in Section 22 (Item II.B.1) of Supplement No. 1 to the Safety Evaluation Report.

#### 1.7 Confirmatory Issues

The current status of each of the confirmatory issues is provided in Section 1.7 of Supplement No. 1 to the Safety Evaluation Report. No new confirmatory issues have been added nor have any been completed since the issuance of Supplement No. 1 to the Safety Evaluation Report.

#### 1.8 Licensing Conditions

The current status of each of the licensing conditions is provided in Section 1.8 of Supplement No. 1 to the Safety Evaluation Report. No new licensing conditions have been identified since the issuance of Supplement No. 1 to the Safety Evaluation Report.

## 13 CONDUCT OF OPERATIONS

### 13.3 Emergency Planning

Refer to Section 22 and Appendix A to this supplement to the Safety Evaluation Report. This replaces our evaluation contained in Section 22 and Appendix F to the Safety Evaluation Report.

## 22 TMI REQUIREMENTS

In Section 22 of the Safety Evaluation Report, we identified three TMI-related requirements that related to emergency planning. These are III.A.1.1, Upgrade Emergency Preparedness, and III.A.1.2, Upgrade Emergency Support Facilities.

In addition, item III.A.2, Improving Licensee Emergency Preparedness - Long-Term, was added to the TMI-related requirements in NUREG-0737, Clarification of TMI Action Plan Requirements, which was published in November 1980.

Each of these TMI-related requirements is evaluated in Appendix A to this supplement to the Safety Evaluation Report. For completeness, these requirements are identified in this section and cross-referenced to our evaluation in Appendix A.



### III.A.1.1 Upgrade Emergency Preparedness

#### Requirement

Provide an emergency response plan in substantial compliance with NUREG-0654/FEMA-REP-1, Revision 1 (NUREG-0654), "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980, except that only a description of and completion schedule for the means for providing prompt notification to the population (App. 3), the staffing for emergencies in addition to that already required (Table B.1), and an upgraded meteorological program (App. 2) need be provided. NRC will give substantial weight to FEMA findings on offsite plans in judging the adequacy against NUREG-0654. Perform an emergency response exercise to test the integrated capability and a major portion of the basic elements existing within emergency preparedness plans and organizations.

This requirement shall be met before issuance of a full-power license.

#### Discussion and Conclusion

The applicant submitted an upgraded emergency plan and revisions thereto by letters dated July 18 and October 13, 1980 and January 19 and April 15, 1981. This plan, V.C. Summer Nuclear Station Radiation Emergency Plan, has been upgraded to meet the full-power requirements with the exception of several items for which the applicant has made commitments but has yet to complete. Our evaluation of this plan is provided in Appendix A to this supplement to the Safety Evaluation Report.

An emergency response exercise was conducted by the applicant, State, and local emergency organizations on May 1, 1981, utilizing the upgraded emergency plans.

### III.A.1.2 Upgrade Emergency Support Facilities

#### Requirement

Prior to October 1, 1982, complete upgraded emergency support facilities including:

- (1) An onsite technical support center (TSC) separate from, and in close proximity to, the control room that has the capability to display and transmit plant status to the individuals who are knowledgeable of and responsible for engineering and management support of reactor operations in the event of an accident. The center shall be habitable to the same degree as the control room for postulated accident conditions. The licensee shall revise his emergency plans as necessary to incorporate the role and location of the TSC. Records that pertain to the as-built conditions and layout of structures, systems, and components shall be readily available to personnel in the TSC.
- (2) An operational support center (OSC) separate from the control room and other emergency response facilities as a place where operations support personnel can assemble and report in an emergency situation to receive instructions from the operating staff. Communications shall be provided between the OSC, TSC, EOF, and control room.



- (3) An emergency operations facility (EOF) for continued evaluation and coordination of all licensee activities related to an emergency having or potentially having environmental consequences.

Prior to June 1, 1981, submit to the NRC a description of the conceptual design for the facilities including:

- (1) Task functions of the individuals required to report to the TSC and EOF upon activation and for each emergency class; and
- (2) Description of TSC instrumentation, instrument quality, instrument accuracy, and reliability.
- (3) Descriptions of TSC power supply systems, power supply quality, reliability and availability, and consequences of power supply interruption.
- (4) Descriptions of the design of the TSC data display systems, plant records and data available, and record management systems.
- (5) Descriptions of the data transmission system to be installed between the TSC and control room.
- (6) Description of data to be provided to the EOF.

#### Clarification

NUREG-0696, "Functional Criteria for Emergency Response Facilities," provides more detail design and functional criteria than previously prescribed. The operational date for the final emergency response facilities has been changed to October 1, 1982. The interim TSC and EOF completed by January 1, 1980 shall continue to be operated until the upgraded facilities become fully operational.

An emergency operations facility (EOF) will be operated by the licensee for continued evaluation and coordination of all licensee activities related to an emergency having or potentially having environmental consequences. The criteria regarding the location and habitability of the EOF are given in Table 22-1.

#### Discussion and Conclusion

The applicant has established an onsite technical support center (TSC), operational support center (OSC), and near-site emergency operations facility (EOF). Our evaluation of these facilities is provided in Section 2.H of Appendix A to this supplement to the Safety Evaluation Report.

TABLE 22-1  
EMERGENCY OPERATIONS FACILITY

Criteria for all facilities

- Located outside security boundary
- Space for about 10 NRC employees
- Not designed for severe phenomena, e.g., earthquakes

Additional criteria depending on proximity to plant

Option 1  
Two facilities

Option 2  
One facility

A. Close-in primary facility

- Within 10 miles<sup>(a)</sup>
- Protection factor = 5
- Ventilation isolation with HEPA (no charcoal)

- At or beyond 10 miles
- No special protection factor
- If beyond 20 miles, specific approval required by the Commission, and some provision for NRC site team closer to site
- Strongly recommended location be coordinated with offsite authorities

- Reduced habitability<sup>(b)</sup>

B. Backup facility

- Between 10-20 miles
- No separate, dedicated facility
- Arrangements for portable backup equipment
- Strongly recommend location be coordinated with offsite authorities
- Continuity of dose projection and decisionmaking capability

(a) If a utility has begun construction of a new building for an EOF that is located within 5 miles, that new facility is acceptable (with less than a protection factor of 5 and ventilation isolation with HEPA) provided that a backup EOF similar to "B" in Option 1 is provided.

(b) Habitability requirements are only for that part of the EOF in which dose assessments communications and decision-making take place.

### III.A.2 Improving Licensee Emergency Preparedness - Long-Term

#### Requirement

Upgrade emergency plans to provide greater assurance that adequate protective measures can and will be taken in the event of radiological emergency. Specific criteria to meet this requirement are delineated in NUREG-0654 (FEMA-REP-1), "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparation in Support of Nuclear Power Plants," November 1980.

Prior to issuance of an operating license, the following implementation milestones shall be met.

- (1) Submit an upgraded radiological emergency response plan to include elements of NUREG-0654, Revision 1, Appendix 2.
- (2) Submit emergency implementing procedures and bases including methods, systems, and equipment to assess and monitor actual or potential offsite consequences of a radiological emergency condition.
- (3) Implement a radiological emergency response plan that includes either (a) or (b) below:
  - (a) Four elements of Appendix 2 to NUREG-0654 (four-element meteorological program) with the exception of the Class B model of element 3.
  - (b) A meteorological measurements program which is consistent with the existing technical specifications as the baseline or an element 1 program and/or element 2 system of Appendix 2 to NUREG-0654, or two independent element 2 systems shall provide the basic meteorological parameters (wind direction and speed and an indicator of atmospheric stability) on display in the control room. An operable dose calculational methodology (DCM) shall be in use in the control room and at appropriate emergency response facilities.

The following compensating actions shall be taken if alternative (3)(b) is selected.

- (i) if only element 1 or element 2 is in use:
  - o The licensee (the person who will be responsible for making offsite dose projections) shall check communications with the cognizant National Weather Service (NWS) first order station and NWS forecasting station on a monthly basis to ensure that routine meteorological observations and forecasts can be assessed.
  - o The licensee shall calibrate the meteorological measurements program at a frequency no less than quarterly and identify a readily available source of meteorological data (characteristic of site conditions) to which they can gain access during calibration periods.
  - o During conditions of measurements system unavailability, an alternate source of meteorological data which is available to licensee and which is characteristic of site conditions shall be identified.

- o The licensee shall maintain a site inspection schedule for evaluation of the meteorological measurements program at a frequency no less than weekly.
- o It shall be a reportable occurrence if the meteorological data unavailability exceeds the goals outlined in proposed Revision 1 to Regulatory Guide 1.23 on a quarterly basis.
- (ii) The portion of the DCM related to the transport and diffusion of gaseous effluents shall be consistent with the characteristics of the Class 1 model outlined in Element 3 of Appendix 2 to NUREG-0654.
- (iii) Direct telephone access to the individual responsible for making off-site dose projections (Appendix E to 10 CFR Part 50(IV)(A)(4)) shall be available to the NRC in the event of a radiological emergency. Procedures for establishing contact and identification of contact individuals shall be provided as part of the implementing procedures.

Prior to July 1, 1981, if alternative 3(b) is selected, provide a functional description of the upgraded four-element meteorological program and a schedule for installation and full operational capability if installation and operation are expected to be later than the dates required by Milestones (4) and (5), below. In no case shall alternative (3)(b) be used after July 1, 1982.

Prior to March 1, 1982, implement the following milestones:

- (4) Install emergency response facility hardware and software for the four-element meteorological program, with exception of the Class B model of element 3.

Prior to October 1, 1982, implement the following milestone:

- (5) Provide full operational capability of the four-element meteorological program.

The Class A model (designed to be used out to the plume exposure EPZ) may be used in lieu of a Class B model out to the ingestion EPZ. Compensating actions to be taken for extending the application of the Class A model out to the ingestion EPZ include access to supplemental information (meso and synoptic scale) to apply judgment regarding intermediate and long-range transport estimates. The distribution of meteorological information by the licensee should be as follows:

Meteorological Information	Control Room	Technical Support Center (TSC)	Emergency Operations Facility (EOF)	NRC and Emergency Response Organizations
Measurements identified in Regulatory Guide 1.97	X	X	X	X (NRC)
Measurements identified in Regulatory Guide 1.23		X	X	X
Dose Calculation Methods	X	X	X	X
Class A Model (to plume exposure EPZ)	X	X	X	X
Class A Model or Class B Model (to ingestion EPZ)		X	X	X

Prior to July 1, 1982 or at the time of the completion of Milestone (5), whichever is sooner, implement the following milestone:

- (6) Review the dose calculation methods (DCM) to ensure consistency with the operational Class A model. Thus, actions recommended during the initial phases of a radiological emergency would be consistent with those after the TSC and EOF are activated.

Prior to September 1, 1982, implement the following milestone:

- (7) Provide a description for selection of the type Class B model, including the technical bases and justification for selection of the type Class B model with a discussion of the site-specific attributes.

Prior to June 1, 1983, implement the following milestone:

- (8) Provide full operational capability of the Class B model of Element 3 in Appendix 2 to NUREG-0654, Revision 1.

#### Clarification

In accordance with Task Action Plan Item III.A.1.1, "Upgrade Emergency Preparedness" each nuclear power facility was required to immediately upgrade its emergency plans with criteria provided October 10, 1979, as revised by NUREG-0654 (FEMA-REP-1, issued for interim use and comment, January 1980). New plans were submitted by January 1, 1980, using the October 10, 1979 criteria. Reviews



were started on the upgraded plans using NUREG-0654. Concomitant to these actions, amendments were developed to 10 CFR Part 50 and Appendix E to 10 CFR Part 50, to provide the long-term implementation requirements. These new rules were issued in the Federal Register on August 19, 1980, with an effective date of November 3, 1980. The revised rules delineate requirements for emergency preparedness at nuclear reactor facilities.

NUREG-0654 (FEMA-REP-1), "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," provides detailed items to be included in the upgraded emergency plans and, along with the revised rules, provides for meteorological criteria, means for providing for a prompt notification to the population, and the need for emergency response facilities (see Item III.A.1.2).

Implementation of the new rules levied the requirement for the licensee to provide procedures implementing the upgraded emergency plans to the NRC for review. Revision 1 to NUREG-0654 (FEMA-REP-1) which incorporates public comments was published in November 1980. This is the document that was used by NRC and FEMA in their evaluation of emergency plans submitted in accordance with the new NRC rules.

NUREG-0654, Revision 1; NUREG-0696, "Functional Criteria for Emergency Response Facilities"; and the amendments to 10 CFR Part 50 and Appendix E to 10 CFR Part 50 regarding emergency preparedness, provide more detailed criteria for emergency plans, design, and functional criteria for emergency response facilities and establishes firm dates for submission of upgraded emergency plans for installation of prompt notification systems. These revised criteria and rules supersede previous Commission guidance for the upgrading of emergency preparedness at nuclear power facilities.

Revision 1 to NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," provides meteorological criteria to fulfill, in part, the standard that "Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use" (see 10 CFR §50.47). The position in Appendix 2 to NUREG-0654 outlines four essential elements that can be categorized into three functions: measurements, assessment, and communications.

Proposed Revision 1 to Regulatory Guide 1.23, "Meteorological Measurements Programs in Support of Nuclear Power Plants," has been adopted to provide guidance criteria for the primary meteorological measurements program consisting of a primary system and secondary system(s) where necessary, and a backup system. Data collected from these systems are intended for use in the assessment of the offsite consequences of a radiological emergency condition.

Appendix 2 to NUREG-0654 delineates two classes of assessment capabilities to provide input for the evaluation of offsite consequences of a radiological emergency condition. Both classes of capabilities provide input to decisions regarding emergency actions. The Class A capability should provide information to determine the necessity for notification, sheltering, evacuation, and, during the initial phase of a radiological emergency, making confirmatory radiological assessments. The Class B capability should provide information regarding the placement of supplemental meteorological monitoring equipment and the

need to make additional confirmatory radiological measurements. The Class B capability shall identify the areas of contaminated property and foodstuff requiring protective measures and may also provide information to determine the necessity for sheltering and evacuation.

Proposed Revision 1 to Regulatory Guide 1.23 outlines the set of meteorological measurements that should be accessible from a system that can be interrogated. The results of the assessments should be accessible from this system; this information should incorporate human-factors engineering in its display to convey the essential information to the initial decision-makers and subsequent management team. An integrated system should allow the eventual incorporation of effluent monitoring and radiological monitoring information with the environmental transport to provide direct dose consequence assessments.

#### Discussion and Conclusion

Milestone (1) was met when the applicant submitted the upgraded emergency plan. Our evaluation is provided in Appendix A to this supplement to the Safety Evaluation Report.

Milestone (2) was met when the applicant submitted emergency implementing procedures by letter dated April 15, 1981. The applicant has committed to meet the remaining milestones and criteria in Appendix 2 to NUREG-0654. Our evaluation is provided in Appendix A to this supplement to the Safety Evaluation Report.



APPENDIX A  
EMERGENCY PREPAREDNESS EVALUATION REPORT  
FOR  
VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1

## 1.0 Introduction

The Nuclear Regulatory Commission's (NRC) evaluation of the state of emergency preparedness associated with the Virgil C. Summer Nuclear Station, Unit 1 (Summer) involves review of the applicant's onsite emergency preparedness plus review of the Federal Emergency Management Agency (FEMA) findings and determinations pertaining to State and local emergency preparedness. This evaluation report only addresses the applicant's emergency preparedness. A subsequent supplement to this report will address the FEMA findings and determinations and provide the NRC's overall conclusions on the status of emergency preparedness associated with the Summer site.

The South Carolina Electric & Gas Company (applicant or SCE&G) filed with the NRC comprehensive revisions to the Summer Station Radiation Emergency Plan (Plan) by letters dated July 18 and October 13, 1980 and January 19, and April 15, 1981, and submitted additional information concerning emergency preparedness by letters dated April 22, May 12, and May 21, 1981. The staff has reviewed these revisions to the Plan and the additional submittals. Previously, the staff had reviewed preliminary versions of the Plan, conducted a site visit to the facility, and held a local public meeting on emergency preparedness.

The Plan was reviewed against the sixteen planning standards in Section 50.47 of 10 CFR Part 50, the requirements of Appendix E to 10 CFR Part 50, and the specific criteria of NUREG-0654/FEMA-REP-1, Revision 1 entitled "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980.

This evaluation report follows the format of Part II of NUREG-0654 in that each of the Planning Standards is listed and followed by a summary of applicable portions of the Plan that relate principally to that specific standard. The conclusions of the staff review are provided in Section 3.0 of this appendix.

## 2.0 Evaluation of Applicant's Emergency Plan

### A. Assignment of Responsibility (Organization Control)

#### Standard

Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations within the Emergency Planning Zones (EPZ) have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

#### Evaluation

When an emergency condition arises, the shift supervisor is designated as the Interim Emergency Director and it is the shift supervisor's responsibility to evaluate the situation. If, in the shift supervisor's judgment,

conditions meet or exceed any of the emergency classification action levels, it is his responsibility to implement the Plan. There is 24-hour per day communication linkage capability between the Virgil C. Summer Nuclear Station and Federal, State and local response agencies and organizations to assure rapid transmittal of accurate notification information and emergency assessment data.

The authority, responsibility, and duties of the plant staff personnel for coping with emergencies are clearly defined for both the normal, operating staff and the augmented staff. The operational relationships between the onsite emergency centers and offsite agencies are identified. The Emergency Control Officer is responsible for assuring continuity of the applicant's resources and overall management of the emergency and recovery operation.

The Plan describes the functions and responsibilities of each State and local organization with response roles. The South Carolina Emergency Preparedness Division - Adjutant General's Office, is responsible for coordinating emergency response action decisions affecting the general public with the State and involved local governments. The South Carolina Department of Health and Environmental Control, Bureau of Radiological Health is responsible for initiating the State emergency plans and for offsite radiological monitoring and assessments. The Fairfield County Disaster Preparedness Agency, Newberry County Public Safety Department, Richland County Civil Defense Agency, and Lexington County Public Safety Department are responsible for implementing protective actions in their respective counties.

In the event of a General Emergency, the Summer Station will notify the County Warning Points of Fairfield, Newberry, Lexington, and Richland Counties by telephone and/or backup radio communications. In the event of any class of emergency, the Summer Station will notify the State (Department of Health and Environmental Control, Bureau of Radiological Health) by telephone. These communication links are manned on a 24-hour per day basis. Arrangements have been made for the counties to accomplish protective actions based upon the applicant's protective action recommendations.

Updated written agreements have been executed with appropriate Federal, State and local agencies and organizations to provide for radiological support, medical assistance, medical transportation, and fire protection during an emergency. The emergency plans of the surrounding counties provide for law enforcement, social services, medical services and emergency protective actions.

## B. Onsite Emergency Organization

### Standard

On-shift facility licensee responsibilities for emergency responses are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available, and the interfaces among various onsite response activities and offsite support and response activities are specified.

## Evaluation

In an emergency situation, the Shift Supervisor assumes the function of Interim Emergency Director and, as such, has the authority and responsibility to implement the Plan and initiate any necessary emergency actions, including notification of and recommendation of protective actions to local authorities. The Station Manager, or designee, assumes the position of Emergency Director upon arrival onsite and after becoming thoroughly cognizant of the situation. The functional responsibilities of the Emergency Director are established and the Plan clearly specifies that the Emergency Director may not delegate the responsibility to notify and make protective action recommendations to offsite authorities. The Emergency Director operates from the Technical Support Center.

Station staff emergency assignments have been made and the relationship between the emergency organization and normal staff complement are specified in the Plan. Positions and/or titles of shift and plant staff personnel, both onsite and offsite, assigned emergency functional duties are listed. Minimum shift manning requirements are in the Plan and provisions for timely shift augmentation are provided. The specified shift staffing for single unit operation satisfies the criteria in Table B-1 of NUREG-0654, except for the absence of an on-shift Rad/Chem Technician. The applicant has committed to meet the requirements pertaining to staffing either by complying with the specific criteria and implementation dates or meeting an alternative acceptable to the staff. The shift augmentation capability satisfies the criteria in Table B-1.

The Plan establishes the framework for a long term augmented emergency organization. This organization, under the Emergency Control Officer is utilized for the direction and control of all emergency and recovery activities and is centered at the Emergency Operations Facility. Interfaces between and among the applicant's onsite and offsite organizations and governmental and private sector organizations have been specified.

### C. Emergency Response Support and Resources

#### Standard

Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's near-site Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.

#### Evaluation

The Emergency Operations Facility will be activated for a Site or General Emergency. It will be the central location for collecting and providing information and making recommendations for offsite protective actions. Provisions have been made to accommodate representatives from Federal, State, and local government organizations and from contractor and other support groups. Additionally, provisions have been made for the dispatch of the applicant's representatives to the offsite governmental emergency operations centers.



Request for support under the Federal Radiological Monitoring and Assessment Plan will be coordinated through the S.C. Department of Health and Environmental Control, Bureau of Radiological Health. A written agreement with the Department of Energy pertaining to the Federal response has been completed.

The Plan identifies the radiological laboratories and their availability. In addition to the station laboratory facilities, a backup laboratory is available at the applicant's Parr Facility, two miles from the plant, which can be operational within one hour of an accident. The S.C. Bureau of Radiological Health maintains a laboratory facility at Columbia, S.C. and has a mobile laboratory, which can be activated within three hours, for analyzing environmental samples.

D. Emergency Classification System

Standard

A standard emergency classification and action level scheme, the basis of which include facility system and effluent parameters is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial response measures.

Evaluation

The four standard emergency classes (i.e., Unusual Event, Alert, Site Area Emergency, and General Emergency) have been established by the applicant. Emergency Action Levels (EALs) have been established based upon onsite and offsite radiation monitoring information and upon readings from various reactor sensors. These EALs are used for rapid classification of emergency situations. The EALs are observable and measurable and, in general, are identified using specific instrumentation, parameters, and equipment status. The emergency classification and action level scheme is consistent with the criteria of Appendix 1 to NUREG-0654.

Station implementing procedures contain specific information and guidance for evaluating and properly classifying an emergency condition, as well as the appropriate actions to be taken.

E. Notification Methods and Procedures

Standard

Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all response organizations; the content of initial and followup messages to response organizations and the public has been established; and means to provide early notification and clear instructions to the populace within the plume exposure pathway Emergency Planning Zone have been established.

## Evaluation

The Plan and associated procedures establish and describe a notification and verification system which is consistent with Appendix 1 to NUREG-0654. The system provides for notification of the S.C. Bureau of Radiological Health for each class of emergency, and for additional notification of Fairfield, Newberry, Richland, and Lexington counties for a General Emergency. The Emergency Director has the authority and responsibility to make prompt notification to State and local response organizations and to provide protective action recommendations.

Procedures have been established for notifying, alerting, and mobilizing the applicant's emergency response personnel, including both station and corporate staff.

The information to be reported to the offsite agencies in the event of an emergency has been predetermined in accordance with the recommendations in NUREG-0654 and the format of the notification messages is included in the Plan. A means for verification of the messages has been provided. The Plan specifies the supporting information to be provided for inclusion in written messages intended for release to the public, including recommended protective actions.

The applicant has provided a description of, and is currently installing, an alert and notification system to be used to promptly inform the public within the plume exposure pathway Emergency Planning Zone. The system is designed to meet the criteria of Appendix 3 to NUREG-0654. The staff has reviewed the system description and found it acceptable in concept. Upon completion, the alert and notification system will be evaluated by demonstration.

## F. Emergency Communications

### Standard

Provisions exist for prompt communications among principal response organizations, to emergency personnel and to the public.

### Evaluation

The station communication system is designed to provide reliable redundant and diverse communications to all essential onsite and offsite locations during normal operations and under accident conditions. Within-station systems are comprised of a commercial telephone system, station telephone system, public-address system, radio networks, and intercom systems. Offsite systems are comprised of a commercial telephone system, private telephone system, dedicated telephone lines, radio systems, and a microwave system. Additional telephone lines are dedicated to NRC communications.

The communications systems are located in plant areas manned 24-hours per day. The NRC, State and county communication offices are manned 24-hours per day. In an emergency situation, the Emergency Director can communicate directly with the NRC, the State (Bureau of Radiological Health) and each of the four surrounding counties.

Communications between the Technical Support Center and the Interim Emergency Operations Facility consist of several telephone systems and a radio system. Communications between the station and the emergency operations centers of the State and Fairfield, Lexington, Newberry, and Richland counties includes dedicated telephone lines and a radio system.

Communications with the State and local governments will be tested monthly, and communications with Federal response organizations, the State and local emergency operations centers, and field monitoring teams will be tested annually as part of the communication drills.

#### G. Public Information

##### Standard

Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency; the principal points of contact with the news media for dissemination of information during an emergency (including physical location or locations) are established in advance; and procedures for coordinated dissemination of information to the public are established.

##### Evaluation

The Plan provides for the dissemination of information to the public regarding how they will be notified and what their actions should be during an emergency. This information includes: 1) educational information on radiation, 2) methods of notification during an emergency, 3) planned protective actions, 4) location of reception centers and identification of evacuation routes, 5) a detailed map, 6) who to contact for additional information, and 7) special needs of the handicapped. The information will be disseminated approximately annually in a brochure format to the permanent adult population within the plume exposure pathway EPZ and it will be available for the transient population. The brochure will be mass-mailed and also distributed to local business establishments. Signs with instructions to be followed in the event of an emergency will be posted at recreation areas. The staff has reviewed the information brochure and has determined that it is acceptable. The staff has noted several items for improvement which will be recommended to the applicant for incorporation in the next version of the brochure.

In an emergency, the Interim Emergency Operations Facility will serve as the principal point of interaction between the station and governmental authorities for the exchange of information. The interim news media area, which is located adjacent to the Interim Emergency Operations Facility and contains equipment and facilities adequate to support media representatives, will be utilized for all news media briefings and interviews. The Media Coordinator is responsible for disseminating information to the public via the media. The Media Coordinator will hold press conferences and release information approved by the Offsite Emergency Coordinator.



The applicant will conduct annual training for personnel of the news media which will acquaint these persons with the Plan, information concerning radiation, and points of contact for release of public information during an emergency.

#### H. Emergency Facilities and Equipment

##### Standard

Adequate emergency facilities and equipment to support the emergency response are provided and maintained.

##### Evaluation

Emergency facilities needed to support an emergency response have been provided including a Technical Support Center, Interim Emergency Operations Facility, and an Operations Support Center. The Technical Support Center and Operations Support Center are activated for an Alert or higher emergency classification. The interim Emergency Operations Facility is brought to a standby status for an Alert and is fully activated for the Site Area and General Emergencies.

The Technical Support Center has been established in the same building as, and in close proximity to, the Control Room. The Technical Support Center will be used by plant management and technical and engineering support personnel directly involved in assessment of plant accident response and mitigation. The Emergency Director and supporting staff will be located at the Technical Support Center.

The Interim Emergency Operations Facility will be utilized to evaluate and coordinate emergency re-entry/recovery operations on a continuing basis by the applicant, Federal and State officials. It will also be the center for coordination of field monitoring information. The facility is located at the Administrative Office Annex approximately 1000 feet from the reactor building. The applicant has made provisions for an alternate Emergency Operations Facility at the Parr facility located approximately two miles from the reactor building.

The Operations Support Center (assembly area) is located in the Service Building and will be the assembly point for unassigned support personnel. Emergency equipment and supplies are available.

The applicant's emergency facilities satisfy the interim staff criteria. The finalized staff criteria for a permanent Technical Support Center, Operations Support Center and Emergency Operations Facility are contained in NUREG-0696, February, 1981. The applicant has committed to meet the requirements pertaining to these facilities either by complying with the specific criteria and implementation dates or meeting an alternative acceptable to the staff.

The Plan describes the following equipment used to initiate and assess emergencies: (1) meteorological instrumentation, (2) radiological monitors

to include field survey monitors, (3) process monitors, (4) seismic instrumentation, (5) fire detection devices, (6) environmental radiological monitors, and (7) laboratory facilities. The description of the instrumentation identified in the emergency action levels includes location, type, alarms setpoint, and range.

The applicant has made provisions for offsite monitoring equipment which includes an extensive TLD network and portable radiation monitoring instruments for use by the offsite field assessment teams. Mobile monitoring capabilities, in addition to those of the applicant are available through the South Carolina Bureau of Radiological Health.

Meteorological instrumentation is installed on a self-supporting tower located approximately 1500 feet from the reactor building and on a power pole on the shore of the Monticello Reservoir across from the tower. Meteorological data is displayed and recorded in the Control Room. The applicant's capabilities pertaining to meteorology presently do not meet the criteria identified in Appendix 2 to NUREG-0654. The applicant has committed to meet the requirements pertaining to meteorology either by complying with the specific criteria and implementation dates or meeting an alternative acceptable to the staff.

The Plan contains a summary of emergency equipment and supplies and a listing of radiological monitoring equipment. Emergency Plan Procedures specify the calibration and maintenance of emergency equipment.

## I. Accident Assessment

### Standard

Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use.

### Evaluation

The Plan identifies specific instrument readings and other observable and measurable parameters which, if exceeded, will initiate an emergency as discussed in Section D of this evaluation. The estimation of doses, both onsite and offsite, will be accomplished by a real time system, the dose assessment and measurement system. The system receives automatic inputs of relevant parameter values and has provisions for manual entry of readings. The system provides rapid evaluation of parameter inputs to assist in determining protective action recommendations.

The onsite radiation monitoring and sampling system consists of (1) a process radiological monitoring and sampling system, (2) an effluent radiological monitoring and sampling system, (3) an airborne radioactive monitoring system, (4) an area radiation monitoring system, and (5) portable survey and counting equipment.

The applicant has established a methodology to be used for estimating offsite doses in the unlikely event that assessment instrumentation is

offscale or inoperative. The methodology is based upon the accident analyses provided in the Final Safety Analysis Report.

In addition to projecting offsite consequences from measured in-plant parameters, the applicant has also established a field monitoring capability. The Plan describes the field monitoring teams which can be functioning within approximately fifteen minutes. The teams are provided with radiological monitoring and sampling equipment and radio communication equipment.

The applicant's capabilities pertaining to meteorology and dose assessment presently do not meet the criteria identified in Appendix 2 to NUREG-0654. The applicant has committed to meet the requirements pertaining to meteorology and dose assessment either by complying with the specific criteria and implementation dates or meeting an alternative acceptable to the staff.

## J. Protective Response

### Standard

A range of protective actions have been developed for the plume exposure pathway EPZ for emergency workers and the public. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.

### Evaluation

The applicant has established an onsite protective response for employees, contractor personnel, and visitors who may be onsite at the time of an emergency. This response consists of warning and notification, relocation and accountability, and protective actions. Onsite warning and notification will be by means of an alarm system and station public address system. In the case of a Site Area or General Emergency, personnel onsite will be relocated to designated assembly areas and an initial accountability completed within thirty minutes. Evacuation of non-essential personnel is by designated preplanned routes to offsite reassembly locations. Provisions have been made for radiological monitoring and decontamination of personnel at the reassembly locations. Additional onsite protective measures include the use of individual respiratory protection, protective clothing, and radioprotective drugs.

The Plan provides for the prompt notification and recommendations of protective actions to State and local authorities for the population-at-risk in the plume exposure pathway EPZ. The particular recommendation may be sheltering or evacuation depending on the magnitude of the projected dose, the meteorological conditions, the nature of the release, and the predetermined evacuation time estimates for the sector(s) affected. The Plan contains maps and information regarding evacuation routes, and areas, relocation centers, preselected sampling and monitoring points, and the population distribution around the facility.

The Plan contains an evacuation time assessment study for the population within the plume exposure EPZ. The study was reviewed by the staff against Appendix 4 of NUREG-0654 and we conclude that it is acceptable.

K. Radiological Exposure Control

Standard

Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Workers and Lifesaving Activity Protective Action Guides.

Evaluation

The applicant has established a radiation protection program for controlling radiological exposures in the event of an emergency. Emergency exposure guidelines have been provided for the various categories of radiation workers. These guidelines are consistent with the EPA Emergency Worker and Life-Saving Activity Protective Action Guides. The Emergency Directory will authorize any potential personnel emergency exposures in excess of 10 CFR Part 20 limits. The Plan provides for 24-hour per day determination of doses received by onsite emergency workers and offsite response personnel and for appropriate record keeping.

Onsite contamination control measures for personnel, equipment, and access control are provided. The criteria for decontamination of personnel and equipment are specified in emergency procedures. Procedures have been developed for permitting the return of areas and items to normal use.

Provisions have been established for decontaminating relocated onsite personnel including provisions for decontaminants suitable for the type of contamination expected.

L. Medical and Public Health Support

Standard

Arrangements are made for medical services for contaminated and injured individuals.

Evaluation

The station has first aid facilities consisting of a medical room located in the control building and a dispensary located in the service building. The facilities can provide first aid treatment for minor injuries and emergency aid for more serious injuries. Arrangements have been made with a local physician for onsite medical assistance.

The applicant has made arrangements by written agreement with the Pinner Clinic (approximately three miles from the site), the Richland Memorial Hospital (located in Columbia, S.C.), and the REACTS medical facilities



(located in Oak Ridge, Tennessee) to provide medical assistance to personnel injured or exposed to radiation and/or radioactive material. The Richland Memorial Hospital will be used to treat accident victims and the REACTS facility will provide a backup response capability.

Transportation of victims will be provided by the Fairfield County Emergency Medical Service. Augmented transportation capability, including air rescue, can be provided by the U.S. Army Military Assistance for Safety and Traffic Operation.

M. Recovery and Reentry Planning and Postaccident Operations

Standard

General plans for recovery and reentry are developed.

Evaluation

The Plan describes the applicant's general plans for recovery and reentry. The recovery organization, under the direction of the Emergency Control Officer, is described in the Plan. The Emergency Control Officer is responsible for determining the need for, and aspects of, the recovery plan and organization. Emergency plan procedures provide instructions for reentry activities.

Any decision on the applicant's part to relax protective measures will be made by the Emergency Director together with mutual agreement of the NRC and the South Carolina Bureau of Radiological Health. Whenever a recovery operation is initiated or any change is made in the organizational structure, the Offsite Emergency Coordinator will notify representatives of the response organizations.

N. Exercises and Drills

Standard

Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.

Evaluation

Annual exercises will be conducted to test the integrated capability and a major portion of the basic elements existing within the Plan. Offsite, as well as applicant, response organizations will be involved. Although the State Plan will be exercised annually, it may be done separately from the applicant in some years due to the existence of other nuclear power reactor facilities within the State's jurisdiction. At least once every six years, an exercise will be started between 6:00 P.M. and midnight and

another between midnight and 6:00 A.M. The scenarios used for the various exercises will contain the essential elements set forth in NUREG-0654. Arrangements will be made for qualified observers and a critique will be held after the exercise. The critique will provide a formal evaluation of the exercise. Management control has been established to assure that any necessary corrective actions are implemented. The first such exercise was conducted on May 1, 1981.

In addition to the exercises, various drills will be conducted covering communications, fires, medical emergencies, health physics and radiological monitoring. Drills are supervised instruction periods aimed at testing, developing, and maintaining skills in these areas. Depending on the particular drill, the frequency varies from monthly to annually in accordance with that set forth in NUREG-0654. Minimum requirements have been established for each of the drills. Management control is established such that necessary corrective actions are implemented.

The Emergency Coordinator is responsible for the planning, scheduling, and coordinating of drills and exercises. All drills and exercises are approved by the Station Manager. The annual exercise is approved by the General Manager-Nuclear Operations.

#### 0. Radiological Emergency Response Training

##### Standard

Radiological emergency response training is provided to those who may be called upon to assist in an emergency.

##### Evaluation

The Plan provides for training and qualifying all personnel on the emergency tasks for which they are responsible as specified in the Plan. The Nuclear Training Coordinator is responsible for coordinating the training of all station personnel. The training and periodic retraining of personnel composing the offsite organization is to include details of the Plan, procedures relevant to the EOF, facilities at the EOF, and the role of offsite agencies and organizations.

The applicant will provide training and annual retraining for those offsite organizations whose services may be required in an emergency, such as fire, police, medical support, and rescue personnel. The training will be consistent with the organizations emergency functions.

Selected station personnel on each shift will attend the multi-media National Red Cross First Aid Course.

The training program for members of the applicant's emergency organization will include practical drills as discussed in Section N of this evaluation.

P. Responsibility for the Planning Effort: Development, Periodic Review, and Distribution of Emergency Plans

Standard

Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained.

Evaluation

The Emergency Planning Coordinator has the authority and responsibility for the applicant's emergency response planning. Changes to the Plan are reviewed by the Emergency Coordinator and submitted to the Plant Manager and Plant Safety Review Committee for review and approval. The Plan and revisions thereto are maintained and distributed under strict administrative controls.

The Plan, as well as any changes thereto, are provided to the organizations and individuals having a responsibility for implementation of the Plan. Provisions exist for an annual review of the Plan and for the incorporation of necessary revisions. An independent review of the overall emergency preparedness program will be conducted at least annually by the corporate Nuclear Safety Review Committee.

3.0 Conclusions on Emergency Plan

Based on our review against the criteria in "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," NUREG-0654, Revision 1, November 1980, we conclude that the Virgil C. Summer Nuclear Station Radiation Emergency Plan, upon satisfactory completion of those items for which the applicant has made commitments as identified in Section 2.0 of this evaluation and as set forth below, will provide an adequate planning basis for an acceptable state of emergency preparedness and will meet the requirements of 10 CFR Part 50 and Appendix E thereto.

Areas in which the applicant has made commitments are as follows:

1. Minimum shift manning requirements (Table B-1, NUREG-0654).
2. Emergency response facilities (NUREG-0696).
3. Meteorological and dose assessment capability (Appendix 2, NUREG-0654).

We will assure that these commitments are implemented in a satisfactory manner prior to the required completion dates, which may be later than the date of issuance of the operating license for the facility.

The final NRC approval of the state of emergency preparedness for the Summer site will be made following review of the findings and determinations made by FEMA on State and local emergency response plans, and review of the joint exercise held to demonstrate the capability to implement the applicant, State, and local plans.



<b>NRC FORM 335</b> (7-77)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b> <b>BIBLIOGRAPHIC DATA SHEET</b>		1. REPORT NUMBER (Assigned by DDC) NUREG-0717 Supplement No. 2	
4. TITLE AND SUBTITLE (Add Volume No., if appropriate) Safety Evaluation Report related to the operation of Virgil C. Summer Nuclear Station, Unit No. 1				2. (Leave blank)	
7. AUTHOR(S)				3. RECIPIENT'S ACCESSION NO.	
9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code) U. S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Washington, DC 20555				5. DATE REPORT COMPLETED MONTH   YEAR MAY   1981	
12. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code) Same as 9, above.				DATE REPORT ISSUED MONTH   YEAR MAY   1981	
13. TYPE OF REPORT Technical Report - Safety Evaluation Report				6. (Leave blank)	
15. SUPPLEMENTARY NOTES Docket 50-395				8. (Leave blank)	
6. ABSTRACT (200 words or less)				10. PROJECT/TASK/WORK UNIT NO.	
Supplement No. 2 to the Safety Evaluation related to the operation of the Virgil C. Summer Station, Unit 1 updates the emergency planning information contained in the Safety Evaluation Report issued in February 1981. Supplement No. 1 to the Safety Evaluation Report issued in April 1981 updated information contained in the Safety Evaluation Report.				11. CONTRACT NO.	
On December 10, 1976, the South Carolina Electric & Gas Company filed an application for a license to operate the Virgil C. Summer Nuclear Station. Subject to favorable resolution of the items discussed in the Safety Evaluation Report and Supplements 1 & 2, the staff of the Office of the Nuclear Reactor Regulation concludes that the plant can be operated without endangering the health and safety of the public.				13. PERIOD COVERED (Inclusive dates) April 1981 - May 1981	
17. KEY WORDS AND DOCUMENT ANALYSIS				14. (Leave blank)	
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