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Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-369 and 50-370 License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Appraisal Conducted: September 3-11, 1985

Team Leader: [signature] 12/16/85
A. L. Cunningham Date Signed

Accompanying Personnel: K. C. McBride
J. E. Fairobent
R. T. Hogan
G. W. Lapinski, Jr.
A. K. Lopser
D. R. Perrotti
D. H. Schultz
M. E. Wangler
E. F. Williams, Jr.

Approved by: [signature] 12/16/85
T. R. Decker, Section Chief Date Signed
Emergency Preparedness Section
Division of Radiation Safety and Safeguards

SUMMARY

Inspection on September 3-11, 1985.

Areas Inspected

This special, announced inspection involved 280 inspector-hours onsite and 68 inspector-hours offsite in the area of an Emergency Response Facilities (ERF) appraisal. The appraisal was conducted using draft Revision 5 of IE Inspection Procedure 82212 to determine if the licensee has successfully implemented the requirements of Supplement 1 to NUREG 0737. The appraisal included the Technical Support Center (TSC), Operational Support Center (OSC), Crisis Management Center, and the respective data acquisition systems, instrumentation, supplies and equipment for these facilities.

Results: No violations or deviations were identified. However, two appraisal weaknesses were identified in the meteorological measurements (1.2.4.2.A) and Control Room dose assessment (1.2.4.2.B) areas respectively.

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INTRODUCTION

The purpose of this appraisal was the performance of a comprehensive evaluation of the Emergency Response Facilities (ERF) to determine if the licensee has successfully implemented the respective requirements defined in Supplement 1 to NUREG-0737, and guidance promulgated in Regulatory Guide 1.97.

EMERGENCY RESPONSE FACILITIES
APPRAISAL EVALUATION

1.0 Technical Support Center (TSC)

1.1 Physical Facilities

1.1.1 Design

1.1.1.1 Size

The McGuire TSC is a multi-room area of approximately 1,400 square feet. There are an estimated 35-50 people expected to man the TSC during emergencies. During the TSC walkthrough, it was observed that three work areas were severely overcrowded, while several other areas provided insufficient workspace for writing and document lay-down. The overcrowded areas were the Emergency Director's room (Room 913), and the computer and the dose assessment areas. The latter area provided only 90 square feet, much of which was occupied by equipment. The dose assessment area provided standing-room-only. Consistent with the spatial constraints, traffic flow into, out of, and through this facility was difficult.

The above findings were discussed in detail with cognizant licensee representatives who indicated that changes to this facility, including reconfiguration, are planned. It was noted, however, that neither the magnitude nor projected completion of the planned changes were defined. This finding will be tracked as an open item until such time that indicated facility modifications are completed (50-369/85-29-01, 50-370/85-28-01). Based upon a human factors evaluation, the minimum facility modifications and recommendations are listed below.

Improvement Items

- The dose assessment area should be expanded to at least three times its present size or approximately 300 square feet, to adequately accomodate the expected staff of six to seven persons (IFI 50-369/85-29-02, 50-370/85-28-02).
- The Emergency Director's office - Room 913, should be sized to accomodate the personnel expected to staff the general area. Since this area is not access-controlled, the manpower estimate should be increased to allow for non-staff personnel and intruders, i.e., a total of 20-30 persons. Sufficient walkthrough space should be provided. It appears that the present size, namely 360 square feet, should be increased to 1,000-1,500 square feet (IFI 50-369/85-29-03, 50-370/85-28-03).

- The computer room lacks adequate walking and equipment maintenance space. The area should be increased in width by two feet (IFI 50-369/85-29-04, 50-370/85-28-04).

- All areas should be provided with additional writing surfaces, document lay-down areas, and chairs (IFI 50-369/85-29-05, 50-370/85-28-05).

1.1.1.2 Layout

The layout of the TSC is generally adequate considering the multi-room constraints. Traffic problems appeared to be a function of size instead of configuration. The exception, however, is the dose assessment area. The dose assessment staff is located in an area that is not readily accessible to the TSC status boards, the computer room, and the Emergency Director. During the walkthrough, the subject staff was updated only by using a runner (the Health Physics Supervisor).

1.1.1.3 Location and 1.1.1.4 Structure

The McGuire Nuclear Station (MNS) Technical Support Center (TSC) is located near the Control Room on the 767 ft. elevation of the Service Building in Rooms 911, 912, 913, and 914. The TSC is in close proximity to the Operations Support Center (OSC) which is located in Rooms 909 and 910 of the Service Building. The TSC's location is within a two minute walk from the Control Room. The only security control point (key card reader) between the Control Room and the TSC is located at the entrance to the Control Room. The TSC provides facilities near the Control Room with detailed analyses of plant systems and status during emergencies and abnormal conditions. The facility is designed to have the same radiological habitability as the Control Room during accident conditions. In the event that the TSC becomes uninhabitable, provision has been made for an alternate location in the rear of the Control Room, namely, Rooms 930 and 931.

1.1.1.5 Habitability/Environment

The facility has been designed to have the same habitability as the Control Room. TSC personnel are protected from gamma radiation hazards by concrete block shielding that is designed to limit the integrated dose under post accident conditions to 2.5 rem. The shielding is the equivalent of 4 inch thick casted concrete walls, a 6 inch thick floor, and 12 inch thick ceiling. The TSC is provided with its own ventilation system that includes high efficiency air particulate (HEPA) and charcoal filtration. Following a safety injection at either Unit 1 or 2, the emergency ventilation system is actuated and air intakes pass through the filter train into the TSC. The air intakes to the TSC are monitored for noble gases. Audio and visual alarms for the radiological monitors have been installed in the TSC and Control Room to alert personnel of adverse conditions. The monitors are calibrated to two trip set points. Trip 1 provides a warning, while trip 2 initiates

an interlock which isolates the TSC ventilation and places it into a recirculation mode. The system also generates a slight positive pressure within the TSC. The system is calibrated and checked for operability, including filter checks and interlock initiation, on a scheduled frequency. It was determined that the two TSC radiological monitors in their normal mode, are turned off. When the TSC is activated for an emergency, someone is supposed to be dispatched to manually actuate the monitors. The effectiveness of this policy is limited to slow moving accidents, and is dependent on assuring that an assigned person does, in fact, turn on the monitors. Further, the monitors must be actuated in sufficient time to stabilize detector response.

Improvement Item

The radiation monitors should be maintained in an operating mode on a continuous basis to assure radiological protection for TSC personnel during an emergency. This item was discussed in detail with cognizant licensee representatives who acknowledged the finding (IFI 50-369/85-29-02, 50-370/85-28-06). This item will be reviewed during subsequent inspections.

1.1.1.6 Display Interface

The McGuire TSC has the following methods of display available:

- Status Board - The status boards are the primary source for recording and communicating site data within the facility. It provides pre-formatted space for recording data on approximately 80 variables for up to 45 minutes, at 15 minute intervals.

- Operator Aid Computer (OAC) Terminals - Two terminals provide access to real-time data from the plant computer as well as historical trending for most monitored plant variables for up to 48 hours. Data is provided in tabular form.

- Printers - Three printers are available for displaying computer data. Two are associated with the OAC terminals and one is used with the dose assessment terminal to display dose assessment information and meteorological data.

- Site Emergency Planning Maps - Ten and 50 mile reading maps are provided. The 10 mile map in the dose assessment area is overlaid with plexiglass and provided with a compass and cursor-style pointer. This compass and pointer concept is effective, except that pointer increments (5, 10, and 20 mile ranges) are not consistent with the scale of the map. Correct increments are marked on the surface of the pointer with a marking pen; however, the markings are smeared and difficult to read.

The McGuire TSC does not have the capability for graphically trending data. Tabular trends can be generated on the OAC. The displays present data in an easily identifiable and legible form. Data are directly useable and do not require change or conversion. The single exception, however, addresses off-normal core temperature data. The computer performs temperature range checks on the in-core thermocouples to determine that core temperatures are within the expected range. The ranges are set by operations/nuclear engineering and are not equivalent to the instrument range; i.e., in-core thermocouple ranges are set at 500°F to 718°F. When the expected range is exceeded, an asterisk is displayed instead of the actual data value. As a result, if in-core thermocouples read greater than 718°F, only asterisks are displayed. Since thermal excursions may occur under emergency conditions, the displays of core temperature, e.g., the core map, may become meaningless rows of asterisks. According to licensee personnel, this situation could be corrected by changing the range of the variable(s) in question to full instrument range. When the change was demonstrated, the correction of range took only three minutes; however, the correction required a knowledgeable engineer or a control room operator. It appears that the change in range could be more easily accomplished using software algorithms.

An additional concern addressed the timeliness of data updates. As presently configured data from the OAC is manually offloaded to the VAX computer. This process is discussed under data aquisition in Section 1.2.2, below. The process can be implemented in 10 to 15 minutes. The primary source of data in the TSC, the VAX computer, can only provide data that is at least 5 minutes old and could be as much as 15 minutes or more old, depending on the reliability and timeliness of the manual data transfer, and the time that the data was last sampled. The time delay could greatly affect the time that the data was last sampled. This time delay could greatly affect the dose calculation program because the input data (for both releases and meteorology) would then be 15 minute "snapshots" that may be unrepresentative of prevailing conditions. It is possible, therefore, that dose assessment personnel, as well as reactor operations personnel, will make frequent requests for real-time data from the OAC terminal operator and/or crowd around the terminals and printers to get the latest data. This situation could predispose to possible confusion regarding the data itself, e.g., what vintage data was used in the latest dose calculation.

Regarding the usability of the computer terminals, the inspector identified one concern; namely, that the nearly vertical orientation of the OAC terminal keyboards makes key-in commands very difficult.

Improvement Items

Based on the above review and evaluation of display interface, recommended improvement items are listed below.

- A different technique should be used to alert the operators that core temperature data is outside of expected range. Whatever method is chosen, it should not automatically remove the data from display as the present method does, i.e., replacing abnormal values with an asterisk. Two less intrusive options are: (1) putting the data in reverse video, and (2) boxing the data in an outline.

  Since it appeared that the core temperature range checking and replacement of abnormal values with an asterisk was used by licensee personnel as both an alerting function and a data validation function, it is further recommended that the two functions be separately identified on displays so that the operator knows unambiguously whether the data is within the expected range and is valid. The alerting function should be consistent with that used in the Safety Parameter Display System, i.e., color coding as follows: green = normal, yellow = off-normal, orange = abnormal, red = emergency. The boxing and reverse video concepts mentioned above could be used as redundant codes so that video concepts mentioned above could be used as redundant codes. This approach would preclude loss of information on black and white displays such as print-outs (IFI 50-369/85-29-07, 50-370/85-28-07).

- Data validation should be through the use of appropriate software algorithms. Simple range checks are generally insufficient. Data validity (valid, invalid, and unvalidated) should then be displayed in an unambiguous manner, e.g., by showing unvalidated or suspect data followed by a question mark, and by replacing invalid data with an appropriate message such as "off-scale high" or "redundant sensors differ ≥ percent" (IFI 50-369/85-29-09, 50-370/85-28-08).

- The present manual data transfer of data from the OAC to the VAX computers should be eliminated and the VAX should be provided with continuous access to data at, or near, real-time (IFI 50-369/85-29-09, 50-370/85-28-09).

- Graphic trending capability should be provided in the TSC. The sampling frequency of trended data should be adequate to detect significant changes (IFI 50-369/85-29-10, 50-370/85-28-10).

- OAC terminal keyboards that are now fixed in a nearly vertical orientation should be reoriented to an ergonomically correct position so that mis-keying is minimized (IFI 50-369/85-29-11, 50-370/85-28-11).

The items defined above were discussed in detail with cognizant licensee representatives. The licensee acknowledged the items, and stated that such changes are planned. These items will be reviewed during subsequent inspections.

1.1.2 Radiological Equipment and Supplies

1.1.2.1 Radiation Monitoring, 1.1.2.2 Personnel Dosimeters, and 1.1.2.3 Protective Supplies

The TSC is equipped with an installed area radiation monitor and dedicated portable monitoring equipment. Additional dose rate equipment is available from the Surveillance and Control Laboratory (S&C Lab) to monitor TSC dose rates, radiological concentrations in air, and levels of personnel and surface contamination. Supplies of direct reading dosimeters up to 500 mR and a dosimeter charger were available in dedicated TSC lockers. Should a dosimeter of high range be required, it would be obtained from the Dosimetry Control Point or the Dosimetry Office. Adequate supplies of respiratory/protective equipment and protective clothing are available in the TSC lockers. A complete inventory is available in the warehouse. Potassium iodide and instructions for the use thereof were available in a dedicated locker in the TSC. Decontamination facilities used by TSC personnel are located within a few minutes walking distance in the First Aid Room within the restricted area.

Area radiation monitor data is used by the Station Health Physicist in the TSC to brief health physics technicians on the plant radiological conditions when accompanying in-plant teams. Currently, this monitoring data is acquired by sending a messenger to the Control Room to record the data or by contacting the Control Room via telephone. Since hard copy data is accessible from the OAC, procedures or instructions should be developed to describe the method for obtaining monitoring data from the OAC in the TSC (IFI 50-369/85-29-12, 370/85-28-12). Such an improvement would provide easier access and useability of these data by the Station Health Physicist, and avoid the need to contact the Control Room and avoid the possibility of transcription errors. This item will be reviewed during subsequent inspections.

1.1.3 Nonradiological Equipment and Supplies

1.1.3.1 Communications

The licensee has provided multiple systems for transmitting and receiving emergency information between the various Emergency Response Facilities (ERFs) and offsite locations during emergencies. The communications systems for McGuire are similar to those used at Catawba Nuclear Station which were evaluated and discussed in the Catawba ERF Appraisal (Inspection Report Nos. 50-413/85-39, 50-414/85-36).

The TSC provides communication interface between the Control Room, Crisis Management Center (the Emergency Operations Facility for the Catawba and McGuire Nuclear Stations), State and county warning points/Emergency Operations Centers (EOCs), and NRC (via the ENS phone). The Crisis Management Center is located at the licensee's

General Office in Charlotte, North Carolina. State/county warning points are manned 24 hours per day. The primary communication link with offsite agencies is a selected service telephone system (SSS). A direct "intercom" line exists between the Emergency Coordinator (EC) at the TSC and Recovery Manager (RM) at the Crisis Management Center (CMC). Backup communication links consist of commercial telephone and/or radio. The TSC has radio communication with the McGuire offsite field monitoring teams. Key personnel in the TSC are provided with their own communication link (e.g., inplant phone, offsite phone or intercom). The communication systems are described in Section F and illustrated in Figures F-2 of the McGuire emergency plan. Communication equipment in the Control Room and TSC was inspected on January 7-11, 1985 (Inspection Report Nos. 50-369/85-02, 50-370/85-02). Records reviewed during that inspection disclosed that communication tests were conducted at the frequency specified in NUREG-0654.

1.1.3.2 Records/Drawings

As configured in the non-emergency mode, the McGuire TSC has available most of the documents expected to adequately support operations in the emergency mode. These items included the FSAR, Emergency Plan and its Implementing Procedures, off-normal and emergency procedures, and other wall displays expected in the emergency configuration. Technical manuals, piping, instrumentation, and electrical drawings are not routinely available in the TSC, but are obtained from nearby satellite libraries. The instrument and electrical (IAE) library is across the hall from the TSC. The mechanical library is 200 feet away from the TSC, outside of the TSC's controlled ventilation environment. It was observed that the IAE library was very comprehensive relative to mechanical areas, and included all piping diagrams and systems descriptions that could be reasonably expected to be required for preliminary investigative efforts. Most emergency type drawings (e.g., system flow) were maintained in hard copy. All drawings were on aperture cards; however, power for the printer was observed to be nonessential. Many persons manning the TSC during the walkthroughs were noted to bring "other" documents that they personally found necessary to support emergency functions (e.g., steam tables). Documents in use at the TSC during the walkthrough were observed to be current, controlled copies, and consistent with station administrative directives and procedures.

1.1.3.3 Support Supplies

The TSC was determined to have adequate supplies of nonradiological supplies requird to implement its intended function. Locked cabinets were used as emergency kits, and are under Emergency Plan administrative controls.

Appropriate status boards were available in the TSC. Trending capability for wall-type display were simply columnar display of

successive values on the status board. Graph paper was available for plotting parameters of interest on a small scale.

1.1.3.4 Power Supplies

Four main areas of power continuity were considered in evaluating the ability of the TSC to function during a station blackout: (1) the operator aid computer (OAC) which is the TSC data acquisition system; (2) ventilation and cooling; (3) communications; and (4) lighting.

The TSC does not have its own dedicated power system such as a diesel, but rather relies on power from plant essentials (vital) busses, or in some cases, power from an "alternate" bus, meaning the other unit. Observations in each of the above cited areas are listed below.

1. The OAC is normally powered from a constant current charger on the auxiliary control power battery through a static inverter, static transfer switch (to shift to other unit battery), and isolation transformer to a computer power distribution panel (#1 and 2 KY). Videos and line printers, as well as the console, in use in the TSC are powered from this distribution panel. Design duration of the battery upon loss of all AC is eight hours. Distribution of the crisis data sheets in the TSC would be adversely affected since the copy machine used to reproduce the data sheets would become inoperative on loss of all AC. Data transmission to the CMC and other facilities such as the counties, States, and NRC would be modified to accommodate the loss of the station computer (VAX) in the event of loss of all AC. Transmission to the CMC by modem from the OAC room would permit operation under such circumstances.

2. Ventilation and cooling, including control valve operating power (both air and electrical) for the TSC is fed from two nonessential sources. Normal power is Motor Control Center (MCC) 1 EMXA. Alternate power is MCC 2 EMXA (Units #1 and #2, respectively). In event of loss of AC power to Unit 1, an automatic transfer switch shifts power to the unaffected unit. A loss of all AC would result in the loss of TSC ventilation and cooling.

3. TSC communications (phones) are powered in a fashion similar to the OAC, that is from the DC auxiliary control power bus through a static inverter (different from the OAC inverter), and then from appropriate distribution panels. Offsite systems, including the numerous bell lines in the TSC, and the company microwave link are powered from emergency power sources including batteries and diesel. Radio-telephone transceivers in the TSC use AC powered battery trickle chargers on emergency battery packs.

4. Lighting systems in the TSC include both AC and DC units. AC lighting is powered in a normal mode analogous to the power for ventilation and cooling. Normal power is nonessential Load Center

(LC) 1SLXF, and alternate power is LC 2SLXF (i.e., Units #1 and 2, respectively). A difference does exist, however, because an automatic transfer function is not provided. If normal power were lost, operations personnel would manually shift lighting to the alternate feeder. A loss of AC causes ten 40-watt DC light units which operate on continuous AC chargers to come on automatically. Since the TSC is relatively small, the DC lighting is adequate to move around, but insufficient to perform close administrative work. Emergency hand-held devices are available in the emergency kits, and are possessed by most individuals manning the TSC. AC wall receptacles are similarly powered (as lights); therefore, a loss of AC would cause the loss of computerized dose assessment since the terminal is a portable unit brought to the TSC.

1.1.3.5 Conclusion

Based on these findings, this portion of the licensee's program meets the requirements of Supplement 1 to NUREG-0737.

1.2 Information Management

1.2.1 Variables Provided

1.2.1.1 Regulatory Guide 1.97 Variables

Duke Power Company letter dated March 29, 1984, responded to Generic Letter 82-33 (Supplement 1 to NUREG-0737) regarding the McGuire Station conformance to Regulatory Guide 1.97, Rev. 2. Included in this letter was a Regulatory Guide 1.97 comparison section wherein the McGuire Station instruments are compared with the recommendations of the Regulatory Guide for "PWR variables" (Table 2). Instrument ranges, design, environmental qualification, type of display and company position statements are provided for each variable. Additionally, an implementation schedule is included where modifications are planned. The majority of these planned modifications were scheduled to be completed by the end of the first refueling outage following January 1986, for each unit. The inspectors were informed that a request has or will be made to delay implementing the planned changes from the 1986 timeframe until the first outage following January 1988.

The Operator Aids Computer (OAC) is capable of displaying, both in the Control Room (CR) and the Technical Support Center (TSC) essentially all parameters or variables available in the CR, including those Regulatory Guide 1.97 variables currently presented in the CR. At the TSC console, a floppy disc transcription of desired data can be made and then injected into the VAX system for storage, computations, and/or retransmission. Data in the VAX can be accessed by the TSC dose assessment team via a terminal/printer located at their station.

1.2.1.2 Other Variables

All Regulatory Guide 1.97 variables appropriate to the performance of the TSC in technical and logistic support to the CR, and performance of Crisis Management Center (CMC) functions prior to the activation, are available, or acceptable substitutes have been identified except one. The exception is containment sump water temperatures, which the licensee contends is not used in the management of a design basis accident, nor is that parameter used in the execution of any of the Emergency Operating Procedures (EOPs). As noted in the comparison of plant specific variables, and discussed in Section 1.2.1.1, not all of the instruments meet the Regulatory Guide 1.97 guidelines for one or more reasons, e.g., seismic qualification, range, environmental qualification, power sources, etc. Refer to the subject exception requests currently under review by NRR.

The TSC provides access to the National Weather Service (NWS) via telephone to the Charlotte Airport. A NOAA tone alert radio (weather data) is located in the TSC. Additionally, weather forecasting is available to the TSC by telephone from the CMC.

The TSC has access to emergency medical assistance and to emergency vendor assistance by telephone. Offsite monitoring information is received in the TSC by radio from the field monitoring teams. Evacuation time estimates are contained in the CMC Implementing Procedure CMIP-1. A copy of the subject procedure is available in the TSC.

1.2.1.3 Relationship to Functional Needs

The plant OAC has a console for each unit in the TSC that can perform all functions available to the Control Room with the exception that the Control Room has a separate video presentation for alarm status. All functions concerning alarm status may be "called up" for presentation on the TSC video, if desired. In addition to alarm status, system diagrams with pertinent parameters, Critical Safety Function (CSF) status trees, and transient monitor functions (window of approximately 150 parameters stored to memory for the 10 minutes before a trip, and 30 minutes after the reactor trip for maximum of two trips without operator action) are also available. The selected transient monitor functions may be downloaded to an IBM 9000, running software entitled "transient monitor delog" that will make a 4 color plot of all the variables versus time; therefore, permitting rapid accident analysis.

Approximately 200 parameters have been selected based on engineering analysis that are the "crisis parameters" routinely selected for continual observation (at 15-minute intervals) in the TSC, and distribution to "other" facilities such as the CMC. This 15-minute interval introduces a delay in the availability of real time data in the TSC and CMC by as much as a half-hour. Approximately 50 parameters may also be added to the parameter list with a few keystrokes upon

decision of TSC managers to monitor additional items. Distribution of these parameter logs to the various emergency response personnel manning the TSC would be adversely affected by a loss of all AC. The licensee has submitted (March 29, 1984) for NRC review and approval, the list of numerous Regulatory Guide 1.97 exceptions. A technical evaluation review (TER) is expected in late 1985. Many of the exceptions that the licensee committed to correct prior to the 1986 outage have been the subject of a request to delay correction to 1988. This finding will be tracked as an open item (50-369/85-29-13 and 50-370/85-28-13). This item will be reviewed during subsequent inspections.

1.2.2 Data Acquisition

1.2.2.1 Data Collection Method and 1.2.2.2 Time Resolution

Emergency Response Facility (ERF) functions are supported by two different computer systems: a Honeywell 4400 system, and a DEC VAX 11-780 system network. The Honeywell 4400 system, referred to as the Operator Aid Computer (OAC) performs data acquisition and reporting. User selectable parameter reporting and sensor trend plotting is performed by either one of two VAX 11-780 systems (one at the McGuire site in the Administration Building and one at the licensee's General Office in Charlotte, North Carolina).

The OAC is configured as follows:

Item	Quantity
Random Access Memory (RAM)	64K words
bulk RAM	1.6M words
hard disk drives	none
flexible disk drives (8 inch)	1
magnetic tape drives	none
line printers (OAC and TSC)	2
terminal printers (OAC and TSC)	2
Tektronix 4006 Cathode Ray Tube (CRT) terminal	1

Sensors monitored by the OAC include approximately 1560 analog (continuously variable) and 3840 digital (two-state) sensors. Plant safety sensors are scanned every 15-minutes, but selected sensors may be displayed on OAC or TSC CRTs, or printers on OAC or TSC printers as per user-specified time intervals (1 second to 1 hour). The time resolution for the data transmission is adequate to assure transmission without loss, since the data acquisition rate is low speed.

Two VAX 11-780 computers support ERF functions by providing safety parameters sensor reports and trend plots. The two VAX 11-780 systems are linked via DECNET, and sensor data may be transferred using the

Virtual Memory System (VMS) mail software. Configurations for the VAX 11-780 systems are as follows:

System	McGuire	Charlotte
RAM	4 MB	6 MB
Hard Disk memory	1000 MB	2000 MB
Magnetic Tape Drive	none	2
Dial-up Ports	12	12

Data trend plots at McGuire or at Charlotte may be done using a VAX 11-780 computer system. The plots are performed by Tektronix 4010 series graphics display terminals with hard copy devices. Any plant safety parameter data may be trended for a historical time period.

Sensor data availability at the VAX 11-780 computer depends on two processes, namely: (1) data transmission from the OAC to the VAX computers; and (2) the editing and engineering approval of a data set prior to release for general access.

The current simplified procedure for transferring sensor data from the OAC to an available VAX 11-780 entails the following: (1) load an 8-inch floppy disk into the Honeywell diskette subsystem; (2) write sensor data set to the floppy; (3) transfer the data diskette to a Mohawk series 21 microcomputer system drive in the OAC; (4) establish a dial-up link to an available VAX 11-780 (dial number, type in use ID, and password); (5) transmit sensor data set to VAX computer; and (6) log off VAX system. The transfer of 48 hours plant data was observed to require roughly 10 to 15 minutes.

One potential problem discovered during discussions with licensee design engineers is a result of the data transfer process and the OAC environmental control system. Currently, the data transfer involves entering a ventilation system which is part of the service building ventilation and therefore, has no protective filtration systems (i.e., HEPA or charcoal filters). Although it is highly unlikely that contamination would enter the service building ventilation system, data transfer from the OAC to a VAX 11-780 would be awkward if, indeed, radioactive or other contamination were present (i.e., protective clothing and breathing apparatus may be required).

1.2.3.3 Isolation

Licensee testing has assured adequate signal isolation for variables obtained from safety systems. Current and future design modifications have established equipment characteristics and required testing to assure that no degradation of safety systems will occur with planned improvements to the data acquisition systems.

1.2.3 Data Communication

1.2.3.1 Capacity, 1.2.3.2 Error Detection, and 1.2.3.3 Transmission Between ERFs

Data communications from the Honeywell computer to peripheral devices in the OAC and TSC are implemented by hard-wired serial data links. Data sent to the Honeywell computer from the plant sensor front-end multiplexors is checked for transmission errors using error detecting/correction techniques. McGuire personnel reported that data/characters sent from the Honeywell to OAC/TSC peripherals is done without using error detection/correction techniques. It is therefore recommended that McGuire review the feasibility of implementing error detection/correction for all communications. Data transmission from the VAX systems to remote TSC/CMC terminals use parity checking to verify data correctness.

McGuire did not have a Tektronix 4010 series graphics terminal in the TSC (probably because there is no room for one). If this situation is changed and data trend plotting is done in the TSC, the dial-up mechanism would probably require multiple attempts to establish communications, since this is what occurred in an engineering trailer at McGuire.

Improvement Item

A dedicated line should be acquired if trend plotting will be relied on to support critical plant safety analysis. The cited recommendation was discussed with cognizant licensee representatives (IFI 50-369/85-29-14 and 50-370/85-28-14).

1.2.4 Data Analysis

1.2.4.1 Reactor Technical Support

Several programs assist the TSC in history review and accident forecasting. Data storage in the OAC takes several formats including a data point accumulation. This permits the operator to select any parameter and list the value at any desired time interval for as much as 24 hours in the past. Classical graphic plots of this type of information would have to be done manually. However, graphic plotting of the transient monitor function (120 analog and 24 digital parameters scanned each second) is possible with a download to another computer equipped with appropriate software. Further innovative data processing schemes with much greater resolution are under test at the present time.

1.2.4.2 Dose Assessment at the Technical Support Center

A. Technical Support Center (TSC)

Dose assessment capabilities in the TSC are provided by a computerized dose assessment system ("Class A Model"), and manual methods. Procedures describing the use of the computerized system were referenced in Implementing Procedure HP/O/B/1009/08 (Evaluation of a Reactor Coolant Leak). Procedures for using the manual methods are found in RP/O/A/5700/01 (Notification of Unusual Event), RP/O/A/5700/02 (Alert), HP/O/B/1009/05 (First Response Evaluation of Offsite Dose From a Reactor Coolant Leak Inside Containment), HP/O/B/1009/06 (Quantifying High Level Gaseous Radioactive Release During Accident Conditions), HP/O/B/1009/08 (Evaluation of a Reactor Coolant Leak Inside Containment), and HP/O/B/1009/09 (Release of Reactor Coolant Through Unit Vent Exceeding Technical Specifications).

The "Class A Model," or Model, is a computerized environmental model for calculating and projecting radiation doses from radioactive materials released in gaseous effluents during an emergency. For this model, source term or meteorological data may be keyed manually or may be derived from 15 minute old monitor readings transferred from the Operator Aid Computer (OAC). Doses to the whole body from plume exposure and to the thyroid from inhalation of radioiodines are available. Doses that may result from ingestion of contaminated food are not available in the model.

The manual methods are hand calculation methods that use simplifying assumptions and dedicated forms to aid in the calculation.

Additionally, dose calculations may be based on samples taken by field monitoring teams, which can be quickly dispatched. For the purpose of evaluating monitoring team data, vehicles with beta-gamma survey meters, air samplers, and single-channel analyzers with GeLi detectors are available. Vegetation and water samples may be taken, but must be analyzed in the environmental lab located at the training center near the McGuire Station. Because of its proximity to the McGuire station, this laboratory may not be available during an accident. Also available in the field as part of the Radiological Environmental Monitoring Program are five permanent airborne particulate and radioiodine monitors and 40 TLDs to measure environmental radiation.

1. Source-Term

Adequate information is available in the TSC to determine source terms for all potential release pathways. Airborne process radiation monitors are located to monitor ventilation

exhaust concentration and flow for containment and containment purge effluent, annulus effluent, Auxiliary Building effluent, condenser air ejector exhaust, and all other identified release point effluents. However, these individual monitors are not specifically listed for accident monitoring by Regulatory Guide 1.97 since these systems exhaust through the unit vent where the primary monitors are located. The unit vent flow is monitored by three channels of instrumentation covering an equivalent range of 10^{-6} to 5×10^{3} Ci/cc Kr^{85} for low and mid ranges, and 1 to 10^{8} R/hr gross gamma for the high range. Readouts include three Control Room indicators, three computer points, and three recorded channels.

The vent from the steam generator safety relief valves or atmospheric dump valves is monitored by four area radiation monitors located adjacent to the main steam lines and upstream of the main steam isolation valves, to detect secondary side radiation. Correlation curves provide for conversion from R/hr to Ci/cc over a range of 10^{-2} to 10^{4} R/hr. Each monitor is read out by a CR indicator, a computer point, and a channel recorder.

Containment monitors provide for personnel protection area radiation monitoring over a 10^{-1} to 10^{4} mR/hr range with special monitors located adjacent to the reactor coolant filters which cover a 10^{-1} to 10^{4} R/hr range. High range containment monitoring is accomplished using two redundant channels covering the range of 1 to 10^{7} R/hr. Each channel is displayed on a CR indicator and is read into the OAC. One of the channels is recorded.

It should be noted that the area radiation monitors in the 10^{-1} to 10^{4} mr/hr range do not meet Regulatory Guide 1.97 criteria (i.e., 10^{-1} to 10^{4} R/hr). This finding was referenced in NRC letter to the licensee dated August 6, 1985 (TER). The licensee is planning a response to this letter.

Containment leak rate and containment breach situations are provided for in procedure HP/0/B/1009/08. A leak rate determination method and curves are provided for estimating leak rates of various hole sizes and varying pressures.

The fuel storage building exhaust passes through the unit vent and thus any radioactivity exhausting from that area is monitored by the unit vent monitors. Post accident sampling results and in-plant radiological monitoring results are coordinated by the Health Physics Office and provided to the TSC on data sheets delivered by runner or passed by telephone. Inoperable or off-scale monitoring instruments are provided for in source term determination by procedure

HP/O/B/1009/06, "Alternate Method for Determining Dose Rate Within the Reactor Building."

All of the variables addressed above are available in the TSC, either by OAC, VAX (via OAC/FLOPPY DISC input), or in the case of Post Accident Sampling System (PASS) and in-plant radiological monitoring results, by runner-delivered data sheets or by direct telephone communication.

Source term methods provide for contribution by radionuclides. Specifically, the noble gases and iodine activities are monitored, using the unit vent detectors for real time measurements. Default values, when needed, are obtained from the CMC Dose Assessment group by telephone. Procedures provide methods for converting gross activity readings to Xenon-133 equivalents for ease of handling subsequent computations. Lab analysis is available; samples which have not undergone isotopic analysis are considered to be all I-131 for simplification and conservatism.

2. Meteorology

Onsite meteorological measurements at the McGuire station are made on two towers co-located at plant grade and approximately 350 meters (350m) west of the reactor complex. The meteorological towers are located on a small plateau, with terrain elevations falling sharply to the south and west, and rising to the north. Recently, two warehouse buildings (approximately 10m in height) were constructed east of the towers. The closest building is located approximately 50m from the towers. The presence of the nearby buildings, the relative proximity of major plant structures, and topography of the terrain could influence meteorological measurements, particularly low-level (10 meters) wind speed and direction. It is conceivable that upper-level measurements of these parameters could also be affected. Reflection from the metal surfaces of the warehouse buildings may possibly affect the measurement of vertical temperature difference on the principal meteorological tower during strong insolation. The measurements program was upgraded in July 1983. It is recommended that the upgraded documentation of meteorological measurements program should be incorporated into the FSAR.

Meteorological parameters include wind speed and wind direction which are monitored at the 10m and 40m towers. Atmospheric stability indicators available include vertical temperature difference (ΔT) measured between the 10m and 40m levels on the 40m tower, and the standard deviation of horizontal wind direction (sigma-theta) at the 10m level. A

measurement of precipitation is also available. All meteorological parameters are transmitted to the OAC and stored as 15-minute averages, updated every minute, with a minimum recall of data from the preceding 24-hour period. The meteorological data stored in the OAC are downloaded to the VAX computer for dissemination to plant personnel involved in dose assessments and projections. However, at the time of the inspection, the meteorological data processed through the OAC was not validated and would not have been appropriate for use in a real emergency response situation.

Meteorological data, including two levels of wind speed and direction, vertical temperature difference (ΔT), and precipitation are recorded on strip charts in the Control Room area. Vertical temperature difference is recorded on a multi-point recorder which is difficult to read and somewhat confusing for determining 15-minute averages. The levels of measurement for wind speed and direction were poorly indicated on the recorders, and the recorders for upper level wind speed and direction were mounted at such a height as to make determinations of 15-minute average conditions extremely difficult. The recorders should be re-configured and better identified. No backup or redundant onsite measurements are available. If site meteorological data are not available, meteorological information can be obtained from either the National Weather Service (NWS) station at Charlotte, or the Catawba Plant. However, procedures for dose assessment which utilize meteorological data do not reflect the hierarchy for substitution of missing onsite data. The Charlotte NWS station also provides regional and forecast meteorological conditions, although the type and extent of information is not specified in plant procedures. Information on severe weather is available to Control Room operators through a tone-alert weather radio and through the DPC load dispatcher, although no specific procedure apparently exists for dispatcher notification to the Control Room.

Atmospheric transport and diffusion is characterized either through a puff-advection model (which considers only temporal variations in meteorological conditions) used through the VAX computer as part of the Class A Model, or through a simple straight-line, Gaussian plume model incorporated in manual dose assessment procedures. All atmospheric releases from the plant are considered as ground-level, with consideration for initial mixing in wake of plant structures. However, the display of model output is not consistent with stated model assumptions and constraints. For example, the output indicates doses from elevated releases, and, for extremely unstable conditions, displays a vertical plume spread parameter (sigma-Z) which exceeds the assumed limitation on vertical mixing. The puff-advection model uses either 15-minute averages of onsite meteorological data processed

through the OAC and downloaded to the VAX computer, or information keyed manually into the computer. This model can provide dose projections through manual input of forecast conditions or the assumption of persistence of observed conditions.

The procedures for dose assessment which use meteorological data not available in computer files neither specify the averaging period (i.e., 15 minutes) nor the valid time of the meteorological observations. All dose assessment procedures should be re-examined to ensure identification and incorporation of averaging period and valid observation time. Although measurements of sigma-theta and precipitation are available, neither are reflected in assessments of atmospheric transport and diffusion. Availability of sigma-theta data from only the 10m level is not consistent with the use of wind direction from the 40m level as the primary indicator of transport direction. If sigma-theta is to be used as an indicator of atmospheric stability for dose assessments, it should be determined from the same level as the primary wind direction. During the appraisal, use of the puff-advection model through the VAX computer could not be demonstrated to provide dose estimates within 15 minutes. Accordingly, the licensee agreed to use a number of test cases provided by the NRC to demonstrate the capability of the puff-advection model during variable meteorological conditions. The results of these test cases and review of documentation describing the model and its technical basis will provide the bases for NRC-acceptance of the puff-advection model for dose assessments. This finding is summarized and classified on page 20 below.

Although neither the puff-advection model nor the straight-line model explicitly provide estimates of uncertainties associated with plume position, written procedures exist which expand the projected affected area based on wind speed and/or data source. These procedures could be improved to expand the projected affected area considering applicability of available information and hierarchy for data substitution. The puff-advection model could be improved to consider decay, depletion, and deposition of radioactive material. The output of the model could also be expanded to include calculated relative concentrations (X/Q) at specified distances for review and assessment by licensee meteorologists.

The onsite meteorological measurements program at McGuire station has provided a reliable indication of meteorological variables. Joint recovery of the primary meteorological parameters (wind speed, wind direction, and atmospheric stability) demonstrated an efficiency greater than 90% from

January 1982 - June 1985. The licensee should continue to monitor data availability to ensure that meteorological data will be available for use in an emergency situation.

The OAC could provide a check on the validity of meteorological data by comparison with pre-determined acceptable ranges and flag suspect data on the visual display and in the data downloaded to the VAX computer. The licensee considers meteorological data from the McGuire station to represent conditions throughout the plume exposure EPZ, and also considers data from the Charlotte NWS station and Catawba to represent real-time conditions at the McGuire site. However, no studies or assessments supporting these positions have been performed.

Based on the above review, the finding listed below will be tracked as indicated. These items will be reviewed during subsequent inspections.

- Locations of the meteorological towers should be evaluated to determine the quality of data, and the effects of the nearby warehouse buildings, proximity of major plant structures, and topography of the area on such data (IFI 50-369/85-29-15, 50-370/85-28-15). This finding is considered an improvement item.

- The meteorological measurements program, as upgraded in 1983, should be incorporated into the FSAR (50-413/85-39-16, 50-414/85-36-16). This finding is classified as an improvement item.

- Validation of the meteorological data processed through the OAC (50-369/85-29-17, 50-370/85-28-17). This item relates to guidance promulgated in Regulatory Guide 1.23 and will be tracked as an appraisal weakness.

- Evaluation of the representativeness of meteorological data from the NWS station at Charlotte and/or Catawba for real-time conditions at McGuire or installation of backup or redundant onsite meteorological measurements, backup or redundant measurements - including separate power supplies, cabling, and recorders (IFI 50-369/85-29-18, 50-370/85-28-18). This finding is considered an improvement item.

- Revision of procedures which provide for use of meteorological data to reflect the hierarchy for data substitution, and specify averaging period (e.g., 15 minutes) and valid time of the observations (IFI 50-369/85-29-19, 50-370/85-28-19). This finding is classified as an improvement item.

- Digital displays of meteorological data (e.g., via the OAC or the summary sheet provided through the VAX computer) should specify the averaging period and valid time of the observation (IFI 50-369/85-29-20, 50-370/85-28-20). This item will be tracked as an improvement item.

- Submittal of complete documentation (i.e., description of the technical bases) for the puff-advection atmospheric dispersion model and a complete description of the upgraded meteorological measurements program (50-369/85-29-21, 50-370/85-28-21). This item will be tracked as an open item.

- Identification of the regional and forecast meteorological information to be provided on request by the NWS station in Charlotte (IFI 50-369/85-29-22, 50-370/85-28-22). This finding is an improvement item.

All of the above comments and identified findings were fully discussed with cognizant licensee representatives. The licensee is committed to development of an improved meteorological program, and acknowledged the findings disclosed herein. These items will be reviewed during subsequent inspections.

3. Computerized Dose Assessment

The Class A Model has the capability to estimate and project doses and dose rates at 11 radial distances from 0.5 miles to 10.0 miles. The model will calculate whole body and thyroid doses and dose rates from submersion in a radioactive gas cloud. Although the computer output lists doses from elevated plumes, as previously stated, reputedly the computer program treats all releases as ground level. To calculate doses the model uses Xenon-133 equivalent source terms for noble gas exposure calculations, and Iodine-131 equivalent for radioiodine inhalation dose calculations. These source terms are provided either by 15 minute old effluent monitor readings, or by manual input of source terms. Meteorological data are provided in a similar manner.

Information supporting validation of the model was provided during the appraisal. Additionally, during the appraisal, an independent, partial validation was attempted on the model. Calculations in the model tended to underestimate whole body doses and overestimate thyroid doses. The observed differences could not be resolved during the appraisal because of lack of time to review available documentation. Upon receipt of appropriate documentation, evaluation of the computer model will be completed. This will be tracked as an

open item and will be reviewed during subsequent inspections (50-369/85-29-23, 50-370/85-28-23).

Although personnel from the TSC have the initial responsibility for environmental sampling, personnel in the Crisis Management Center (CMC) use the field monitoring data to refine previous dose projections. These data may be used to calculate potential dose from contaminated foods. However, the computer model does not compute ingestion doses. Procedure EDA-1 in the CMC implementing procedures is used for this purpose. It is recommended that the computerized model should be modified to include ingestion pathway dose calculations, and that documentation related thereto should be provided to the NRC for review (50-369/85-29-24, 50-370/85-28-24).

B. Control Room (CR)

Dose assessment capability in the Control Room is provided by the OAC using the Nuclear-23 option or a manual method using procedure HP/0/B/1009/05 (First Response Evaluation of Offsite Dose From a Reactor Coolant Leak Inside Containment). No procedure for using the OAC for dose assessment was found in the EPIP. This finding is identified as an appraisal weakness and will be reviewed during subsequent inspections (50-369/85-29-25, 50-370/85-28-25).

Nuclear-23 in the OAC uses a computerized model to calculate a radiation "dose factor" for determining the appropriate protective action recommendation in areas 0-5 miles and 5-10 miles from the plant. Doses are not explicitly calculated for these areas; however, radiation doses to the whole body at the site boundary, are apparently based on this dose factor. This method appears to be used strictly for protective action recommendations and not for classifying the level of the emergency at a plant.

Input from various plant monitors are used to calculate the "dose factor." Source term input is provided by vent gas monitors and containment radiation monitors. Meteorology data (i.e., average wind speed, wind direction, and delta T) from the appropriate monitors are used by Nuclear-23 to determine atmospheric stability class, and the dilution factor in the area of interest. The calculated value of this "dose factor" determines the action to be taken within the areas affected as well as the specific areas. The dose factor appears to be related to whole body dose rather than thyroid dose. Accordingly, the appropriate protective action may not be recommended, particularly for high radioiodine concentrations in the effluent. The manual method uses procedure HP/0/B/1009/05 (First Response Evaluation of Offsite Dose From a Reactor Coolant Leak Inside Containment) to perform the same calculation as the OAC, if the OAC is not available. Input parameters for the manual method must be read directly from

effluent and meteorological monitors. It is therefore recommended that the Nuclear-23 method should be evaluated to ensure that both whole body and thyroid doses are appropriately considered in protective action recommendations (50-369/85-29-26, 50-370/85-28-26).

It should be noted that the Nuclear-23 option could not be exercised during the appraisal. Although the Nuclear-23 screen with monitor information could be viewed, the actual process of determining the appropriate protective action could not be demonstrated. The explanation given at the time of the appraisal was that execution of Nuclear-23 is prevented by interlock or relay until an actual emergency occurs. This situation should be rectified to permit periodic execution of the program outside of an emergency by Control Room personnel to ensure their knowledge and proficiency in the use of the program (IFI 50-369/85-29-27, 50-370/85-28-27). This item was discussed with licensee representatives. This finding is an improvement item.

As discussed in Section 1.2.4.2 (A), wind speed, wind direction, and vertical temperature difference are available in the control room area through strip chart recorders and the OAC. At the time of the inspection, the meteorological data processed through the OAC was not validated and would not have been appropriate for use in a real emergency response situation. Other concerns related to the strip chart recorders and the display of meteorological information on the OAC are discussed in Section 1.2.4.2 (A). Procedures which use meteorological information in emergency classification, protective action recommendations, or dose assessment should specify averaging period for meteorological data and the hierarchy of substitution of missing meteorological data. These items are the subject of recommended improvement items discussed above.

1.2.5 Data Storage

1.2.5.1 Storage Capabilities

Section 1.2.2 describes the storage capability for the Honeywell 4400 and the VAX 11-780 minicomputer systems. Routinely, 48 hours of 15-minute interval scan data is stored in the Honeywell bulk memory. Data transmitted to the VAX computers may be stored continuously on hard disk and magnetic tape or on the Honeywell floppy drive system. Overall, system storage capability satisfies NRC requirements.

The OAC also has the capability to store 10-minute pre-transient and 30-minute post-transient data storage in the Honeywell's bulk RAM memory. After a transient has been detected and the 40 minutes of data stored, the transient storage mechanism is halted until an operator has served the data to a floppy disk.

1.2.5.2 Conclusion

Based on above findings, this portion of the licensee's program meets the requirements of Supplement 1 to NUREG-0737.

1.2.6 System Reliability

1.2.6.1 Verification

System verification was conducted on the OAC and VAX largely by means of operator observations during exercises and drills. Prior to acceptance of the OAC, factory and site acceptance tests were conducted to assure that the hardware and software which made up the system at that time functioned correctly. Subsequently, only module-level testing was conducted as software and hardware were modified or added to the system. Correlation with control room indications is confirmed routinely during exercises and drills to assure that the TSC is receiving data that is consistent with control room instruments. The dose assessment software was verified by providing the system with simulated input, running the program, and comparing the results with hand calculations. No independent verification was conducted at the system level for either the OAC or the VAX; however, module-level independent verification is routinely done on any new software, such as the dose assessment program.

1.2.6.2 Computer-Based Systems

The reliability of the OAC and VAX systems was tracked by the use of unavailability records (hardware and software), maintenance logs, and comparison with similar systems in sister plants. The OAC availability appeared to be greater than .99 based on current information. The VAX system availability appeared to be consistent with the OAC. The latest data compiled during May 1985 through July 1985 indicated an average total system availability of 99.86 percent.

There are, however, several concerns regarding system reliability. To date, these concerns are based on configuration rather than McGuire's availability records. Although the OAC and the VAX have proven reliable over time, the link between the systems does not have much of an empirical record upon which it can be judged. The VAX is useless without data from the OAC and that data must be fed to the VAX by manual transfer of a floppy disk. Since both humans and disk drives are characterized by lapses in performance, the manual data link between the OAC and the VAX may be a point of vulnerability in the system.

Other concerns regard the power supplies for various portions of the system. The OAC is provided with an uninterrupted power supply (UPS) to assure continuity of data acquisition and storage. However, the VAX at McGuire is neither provided with UPS nor is it powered from a vital bus.

Improvement Item

Based on the above findings, the following is a recommendation for improvement: an uninterrupted power supply should be provided for all necessary components of the data acquisition and display system, e.g., the VAX computer, the dose assessment terminal, the Mohawk data link, etc. (IFI 50-369/85-29-28, 50-370/85-28-28). This item was fully discussed with cognizant licensee representatives. The licensee acknowledged the item which will be reviewed during subsequent inspections.

1.2.6.3 Manual Systems

Manually collected data is subjected to the same validity check as computer-acquired data; that is, one or more reactor engineers scan the data for reasonableness. Data collected in the Control Room is further validated by cross-checking data sheets from two independent technicians. If deemed necessary, verbal checks are made with the Crisis Management Center (CMC) to assure that the data at the Control Room, TSC, and CMC are consistent.

1.2.7 On-Shift Dose Assessment

1.2.7.1 Dose Assessment Proficiency

Information is available in the Control Room and the TSC via the OAC to support computations of dose projections at the site boundary. At the first indication of a potential radiological release problem, on-shift health physics personnel are summoned to the Control Room to perform dose assessment/dose projection calculations. The OAC "Nuclear-23" is routinely used. In the event the OAC is unavailable, manual calculations are conducted using procedure HP/0/B/1009/05 (First Response Evaluation of Offsite Dose From a Reactor Coolant Leak Inside Containment).

The dose assessment model used in the VAX system is not the same as models used by the State or the NRC; however, the licensee had compatibility comparisons made to the offsite models. The CMC is equipped to provide to both the State and the NRC all data needed to run their codes.

It was reported, but not specifically observed, that when the CMC accessed the VAX, McGuire station was essentially relegated to manual calculations since the CMC has a higher priority on the VAX computer.

Improvement Item

It is recommended that this item be reviewed by McGuire Station and CMC personnel to determine if the existing situation is acceptable, and if not, to develop a fix (IFI 50-369/85-29-29, 50-370/85-28-29). This

item was discussed with licensee representatives who acknowledged the item. This item will be reviewed during subsequent inspections.

1.2.7.2 Dose Assessment Technical Adequacy

Based on discussions with on-shift Control Room personnel, and observations of procedures, the on-shift staff was capable of performing dose assessment calculations without impacting the immediate response to an accident.

The assessment procedures were considered adequate to allow the operator to arrive at the proper EALs for emergency classification. However, in reviewing procedures RP/0/A/5700/01 Notification of Unusual Event; and RP/0/A/5700/02 Alert, a possible area for improvement was noted.

Procedure 5700/01 (Enclosure 4.1, Event Category 5, and Enclosure 4.2, Item 4.2.2), and Procedure 5700/02 (Enclosure 4.1, Event Category 5, and Enclosure 4.2, Items 4.2.15), refer to Technical Specifications for required EAL rather than defining the actual EALs in the procedures which correspond to the respective emergency classifications cited.

Improvement Item

It is recommended that the actual levels at which emergency action is required for event classification be inserted into the procedures in lieu of referencing "Exceeds Technical Specifications" or "Exceeds 10 x Tech Specs". This would preclude the operator having to rely on memory or refer to a second reference, at a time when he may be pressed to cope with a developing emergency (IFI 50-369/85-29-30, 50-370/85-28-30). This recommended improvement item was fully discussed with cognizant licensees and is considered merely as a possible aid to the operations. The licensee acknowledged this finding.

1.3 Functional Capabilities and Walkthroughs

1.3.1 Operations

1.3.1.1 Organization, 1.3.1.2 Staffing, and 1.3.1.3 Activation

The functional capability of the TSC was evaluated by presenting an NRC developed, hypothetical accident scenario to key members of the licensee's staff normally assigned to the TSC during an emergency. Licensee personnel responded to the postulated circumstances by describing to the inspectors their actions and use of equipment and supplies available in the TSC. The evaluation disclosed that the TSC would be adequately staffed and capable of performing its assigned functions. Shift staffing and augmentation was reviewed during an inspection on January 7-11, 1985 (Inspection Report Nos. 50-369/85-02, 370/85-02). Records reviewed during the referenced inspection

disclosed that augmentation drills were held on June 25 and October 28, 1984. It was determined that staff augmentation times were consistent with the criteria in Table 2 of Supplement 1 to NUREG-0737. The staffing levels for the TSC shown in the McGuire Emergency Plan conform to the criteria of Table 2 of Supplement 1 to NUREG-0737. Activation of the TSC was reviewed during an October 30, 1984, exercise at McGuire Station. The TSC was staffed and activated promptly upon notification by the Emergency Coordinator and prior to a Site Area Emergency declaration (Inspection Report Nos. 50-369/84-31, 50-370/84-28).

1.3.1.4 Communications Interfaces

The communications interfaces between the Control Room, TSC, OSC, and CMC are designated in the McGuire emergency plan and are identifiable in the TSC. The procedures used during the walkthrough appeared to be adequate. Previous exercises identified problems in establishing and maintaining communications from the TSC. This finding relates to the high ambient noise levels that were experienced during the exercises. The referenced elevated noise levels are consistent with the spatial constraints of the TSC. Communications procedures and equipment, however, appeared to be adequate.

1.3.1.5 Offsite Interfaces and 1.3.1.6 Transfer of Responsibilities

Communication interfaces between the TSC and offsite organizations are identified in Section F and illustrated in Figure F-2 of the McGuire Emergency Plan. Controlled procedures for notification of offsite agencies are available in the TSC. The inspectors interviewed licensee personnel and reviewed the licensee's procedures to determine how the transfer of various responsibilities and functions were made, including notification of offsite agencies, emergency direction and control, protective action decisionmaking and recommendations. The transfer of responsibilities from the TSC to the CMC is addressed in Station Directive (SD) 3.8.4 and Crisis Management Plan Implementing Procedure CMIP-1. The inspectors interviewed licensee personnel and determined that the licensee demonstrated a clear understanding of implementing the transfer of responsibilities and functions from the TSC to the CMC.

1.3.2 Control Room Support

1.3.2.1 Technical Support and 1.3.2.2 Walkthroughs

The functional capability of the TSC was evaluated by presenting the fully activated TSC staff with an NRC developed, hypothetical accident scenario. Persons normally assigned to the facility during an emergency staffed the facility in preparation for the walkthrough. Licensee personnel were expected to respond to the postulated events involving a total loss of AC power without auxiliary feedwater systems available by describing their actions, and how procedures, equipment, and supplies in the TSC would be used. The evaluation determined that the TSC would be adequately staffed and capable of performing its

intended function. Comments in other areas of this report amplify observations made during the walkthrough and related and investigative effort.

1.3.3 Conclusion

Based on these findings, this portion of the licensee's program met the requirements of Supplement 1 to NUREG-0737.

2.0 Operations Support Center (OSC)

2.1 Physical Facilities

2.1.1 Design

2.1.1.1 Location and 2.1.1.2 Alternate Location

The OSC is located on the 767 ft. level of the Service Building in the operators' kitchen, Room 909. The OSC is in close proximity to the TSC. Licensee representatives informed the inspector that an alternate OSC location has been provided in the rear of the Control Room in the event the primary OSC becomes uninhabitable.

2.1.1.3 Size, Layout, and Environment

The McGuire OSC is essentially a square room approximating 360 square feet. It appears to be minimally adequate for use as a staging and briefing area for the six to ten staff personnel expected. The environmental conditions are acceptable under normal conditions. Under a loss of offsite power, however, lighting would be completely lost, since there are no provisions for emergency lighting.

Improvement Item

Provisions should be made for emergency lighting in the OSC (IFI 50-369/85-29-31, 50-370/85-28-31). The four flashlights in the emergency supply kit are insufficient to provide appropriate lighting for briefing the OSC response teams. The above item was discussed with cognizant licensee representatives who acknowledged the recommendation.

2.1.1.4 Display Interface

The OSC is provided with two types of displays, namely, the status board, and plant mimic diagrams. The status board provides space for updating plant status, emergency status, supervisor log-in, and required comments. The plant mimic diagrams are plastic laminated 8x10 inch reproductions of simple line drawings. Each elevation of the plant is depicted. Radiation monitors were identified by a coordinate system. All radiation monitors and their coordinate locations were listed on the back of each diagram. It was observed, however, that the

mimics did not include phone locations and numbers, and air supply headers as noted the in Catawba mimics.

Improvement Item

The quality of the drawings (mimics) should be improved to include phone locations, phone numbers, air supply headers, etc. (IFI 50-369/85-29-32, 50-370/85-28-32). This item was discussed with cognizant licensee representatives who acknowleged the recommendation.

2.1.2 Radiological Equipment and Supplies

2.1.2.1 Radiation Monitoring, 2.1.2.2 Personnel Dosimeters, and 2.1.2.3 Protective Supplies

The OSC does not have any special shielding or radiologically protected ventilation system for minimizing radiation exposure; therefore, personnel in this area may be evacuated under certain conditions. Should evacuation become necessary, personnel required for emergency response would be relocated to the back of the Control Room.

The OSC has a supply of dedicated emergency equipment and supplies including respiratory protection protective clothing, radiation monitoring instruments, potassium iodide and personnel dosimetry. Additional equipment is available from the S&C Laboratory, Dosimetry Control Point, Dosimetry Office and the warehouse. The radiological equipment available provides the capability to measure anticipated dose rates under accident conditions.

2.1.3 Nonradiological Equipment and Supplies

2.1.3.1 Communications

The communication equipment in the OSC consists of plant telephone and a PA speaker. The inspectors were informed by licensee representatives that direction and control of the support staff assigned to the OSC comes from the control room or TSC via plant phone. Communications in the OSC were reviewed during an October 1984 exercise and determined to be adequate (Inspection Report Nos. 50-369/84-31, 50-370/84-28).

2.1.3.2 Support Supplies

An emergency kit located in the OSC, contained both radiological and nonradiological supplies specified by an inventory list defined in the emergency plan. Immediately available warehouse supplies would be used to augment those items during an emergency. The appraisal disclosed that supplies were adequate to support the intended functions of the OSC.

2.2 Functional Capabilities and Walkthroughs

2.2.1 Operation

2.2.1.1 Staffing, 2.2.1.2 Activation, and 2.2.1.3 Onsite Interface

The functional capability of the OSC was evaluated by presenting an NRC developed, hypothetical accident scenario to the OSC staff. Licensee personnel responded to the postulated circumstances by describing the actions that would be taken, and how the equipment and supplies necessary for OSC function would be obtained and used. The OSC is activated at the Alert level. At this time, operations, health physics, instrument and control, chemistry and maintenance personnel report to an OSC Coordinator. On shift operators and security personnel provide fire and first aid functions, respectively. The OSC Coordinator and alternate are pre-designated operations personnel. Procedures are available for activation of the OSC. During the October 1984 exercise, the OSC was observed to have been promptly staffed and activated (Inspection Report Nos. 50-369/85-31, 50-370/84-28). OSC interfaces with the Control Room and TSC are identified in the McGuire Emergency Plan, Station Directives, and Emergency Procedures.

2.2.2 OSC Functions

2.2.2.1 Coordination, Assignment, Proficiency, and Walkthroughs

The functional capability of the OSC was evaluated by presenting the OSC staff with an NRC developed, hypothetical accident scenario of a LOCA outside of containment. Licensee personnel were requested to explain and demonstrate OSC activation, and describe their actions, use of procedures, equipment, and supplies in responding to a TSC request to investigate and correct the situation. The evaluation confirmed that the OSC, as structured, was adequately staffed and capable of performing its intended functions. Other areas of this report amplify these findings and provide details of other investigative work.

2.2.3 Conclusion

Based on these findings, this portion of the licensee's program met the requirements of Supplement 1 to NUREG-0737.

3.0 Catawba/McGuire Crisis Management Center (CMC)

3.1 Physical Facilities

3.1.1 Design

3.1.1.1 Size

The size of each of the rooms in the licensee's Crisis Management Center (CMC) is sufficient to accommodate the pre-designated Federal, State, local, and utility personnel, and all necessary equipment. The rooms involved are listed below, and identified by function size, and staff complement.

WC 2390 - Health Physics, Rad Waste, Chemistry
370 sq. ft., 10-15 people

WC 1722 - Operations Data Room:
240 sq. ft., 3 people and
mobile computer

WC 1704 - Nuclear Engineering:
625 sq. ft., 8-12 people

WC 1488 - NRC:
440 sq. ft., 6-10 people

WC 1222 - Offsite Radiation:
560 sq. ft., 11 people and
mobile computer

WC 1010 - Recovery Manager:
770 sq. ft., 15-25 people

WC 925 - Administration and Logistics:
200 sq. ft., 8-9 people.

3.1.1.2 Layout

The layout of each room appeared to be adequate; however, the layout of the entire center (seven main rooms plus two support rooms located on six floors, and in three different buildings) made interaction very difficult. The licensee has completed plans to consolidate the CMC on one floor of the addition to the power building. Construction of the facility is in progress. This finding will be tracked as an open item and will be reviewed during subsequent inspections (50-369/85-29-33, 50-370/85-28-33).

3.1.1.3 Location and 3.1.1.4 Structure

The Catawba/McGuire CMC is a designated facility within the Duke Power Company's General Office in Charlotte, North Carolina. The CMC is approximately 18 miles from Catawba Nuclear Station and approximately 17 miles from McGuire Nuclear Station. The location of this facility meets the criteria of Option 1 of Table 1 in Supplement 1 to NUREG-0737, and is, therefore, acceptable. The CMC consists of areas on several floors in the Wachovia Center (staffed by the Recovery Manager (RM) and support staff), the Duke Power Electric Center (Crisis News Center), and the Power Building (Design and Construction Group).

The Wachovia Center has been constructed to meet the City of Charlotte and State of North Carolina Building Codes. Because of the distance from the sites, there are no special requirements for habitability or for a backup Catawba/McGuire CMC. Two separate lines provide electrical power to the Wachovia Center and an emergency diesel is available for backup power, emergency lighting, and elevators. The inspector expressed a concern over the layout of the CMC, namely the separation of the Recovery Manager and key support staff groups, e.g., Offsite Radiological Support. The inspectors noted that the functioning of the CMC would be vastly improved if the key groups were closer to the Recovery Manager and their individual group managers. This concern was also expressed by the licensee as previously stated. Mitigation of this concern is discussed in Section 3.1.1.2, above.

3.1.1.5 Habitability/Evironment

Because of the distance from the site, the CMC has not been designed to be habitable under accident conditions. It should be noted therefore, that radiation survey instruments are not available within the facility.

3.1.1.6 Display Interface

1. The CMC was provided with the same displays as the Catawba TSC and OSC with the exceptions and additions listed below.

2. Operator Aid Computer Displays - The CMC is provided with a terminal and printer that interface only with the VAX not the OAC; no cathode ray tube displays are available to display OAC data.

3. Maps - Site and zone maps showing the emergency planning zones were available for the Catawba site but not for McGuire.

4. Emergency Status - The CMC was provided with a status board showing emergency level, zones sheltered, zones evacuated, and units affected.

5. Mimics - The CMC was provided with additional mimics of liquid and gaseous waste storage tanks, showing capacities and sources of input.

All displays were ledgible and understandable. Since data are corrected/inserted at the TSC before release to the CMC, the data sheets provided meaningful information and were not characterized by the listing of asterisks seen in the TSC (See Section 1.1.1.6).

The CMC is directly affected by the same lack of real-time data as the TSC. Because all data in the CMC comes from the VAX computer, it is delayed by the manual transfer of data from the OAC to the VAX. The lack of real-time data may result in unnecessary calls to the Control Room or TSC from the CMC in it's request for more recent data.

Improvement Items

- Site emergency planning zone maps for the McGuire station should be provided (IFI 50-369/85-29-34, 50-370/85-28-34).
- The CMC should be provided with a continuous data stream at, or near, real-time (IFI 50-369/85-29-35, 50-370/85-28-35).

3.1.2 Radiological Equipment and Supplies

Radiological equipment and supplies, with the exception of some protective clothing, are not maintained at the CMC because of the following: (1) the CMC is located sufficiently far from the plant such that habitability monitoring is not required, and (2) environmental monitoring teams are routinely dispatched from the site, and all equipment and supplies are located there. Teams are directed from the CMC once that facility is activated.

3.1.3 Nonradiological Equipment and Supplies

3.1.3.1 Communications

The Catawba/McGuire CMC utilizes the same communications systems previously discussed for Catawba in Section 1.1.3 above. In addition, the facility has similar reliable communication links with the McGuire Nuclear Station (MNS) and its offsite agencies. The telephone system at the CMC in the Wachovia Center has out-of-building power and the radios are provided with battery pack backup. Periodic tests are conducted in conformance with the testing frequency recommended by NUREG-0654, Rev. 1.

3.1.3.2 Records/Drawings, 3.1.3.3 Support Supplies

As configured in the non-emergency mode, the CMC has prepositioned documents and procedures in the recovery manager's (WC-1010) area only. All other satellite support areas that become activated are provided

with required documents and procedures by arriving emergency staff personnel. In general, the satellite areas are strategically located within the area that is normally occupied by the staffing personnel. This arrangement contributes to familiarity with the area, and easy access to support materials that cannot be readily moved to central, designated emergency response areas. For example, nuclear engineering service locates to Room WC-1704, a large conference room on the design engineers' floor. Checklists in the CMC implementing procedures designate the person responsible and material that each discipline brings to their area. Computers on this floor are the daily-use machines of the engineers staffing the emergency area. In addition, several satellite libraries and a central plant library are located in the CMC area to provide any additional documents necessary. Documents brought to the nuclear engineering services area of the CMC during the walk-through were observed to be updated controlled documents appropriate for the accident scenario proposed. Pre-positioned material in the recovery manager's area was appropriate for the CMC to perform its intended function.

3.2 Information Management Systems

3.2.1 Variables Provided

3.2.1.1 Regulatory Guide 1.97, Rev. 2 - Variables

Section 1.2.1.1 addresses the current status of Regulatory Guide 1.97 variables. The Crisis Management Center (CMC) has access to the VAX computer via a terminal identical to that located in the TSC. This terminal is located in the Offsite Radiation area of the CMC (Rm 1222). Both the CMC and the TSC terminals can initiate a VAX calculation, and provide the results to the other terminal. Accordingly, any parameter/variable or calculation available to the TSC via the OAC is also available to the CMC.

3.2.1.2 Other Variables

All Regulatory Guide 1.97 variables which are available in the TSC are also available in the CMC, as discussed in Section 1.2.1.2. Similar to the TSC, the CMC has access to the National Weather Service and the NOAA radio weather service. Additionally, the CMC has access to weather forecasting information. A recommendation to provide a teletype terminal in the CMC is provided elsewhere in this report.

The CMC also has ready access to emergency medical and vendor information and assistance via telephone. Comprehensive lists of pertinent telephone numbers are maintained for immediate reference and use.

Evacuation time estimates are tabulated in the CMC Implementing Procedure CMIP-1, Copies of the procedure are readily available.

Offsite monitoring information is available to the CMC from licensee field monitoring teams. Additionally, the U.S. Department of Energy, the NRC, and State agencies can be expected to conduct offsite monitoring. This data can also be provided to the CMC.

3.2.1.3 Relationship To Functional Needs

Unlike the Technical Support Center, the Crisis Management Center does not have an Operator Aid Computer (OAC) terminal. (See discussion in paragraph 1.2.1.3). Plant data, status, and operating parameters are stored in the OAC and transferred to the VAX. Usually, daily 15 minute interval selected values (about 70) are transferred to a floppy disk. This floppy disk is off-loaded to the MDS/21 data entry system for the transfer to the station computer (VAX). After this data is verified as accurate in the TSC, it is available for "release" to other, selected users such as the State/counties, the NRC, and the CMC which are on the general office (ESS) VAX. This "builds in" a delay of approximately fifteen minutes or more before users outside the Control Room have data in hand. A review of the standard format of parameters available indicates that data typically transmitted to the CMC from the Catawba and McGuire Nuclear Station differ. Further, both of the formats may not include some of the Reg. Guide 1.97 parameters such as subcooled margin, core thermocouple output, and reactor vessel level indication. Note, however, if a user such as the CMC, requires parameters in addition to those normally transmitted, a request is made of the operator transferring data from the OAC to the disc referred to above. Virtually any parameter or plant status data observed in the Control Room can be monitored in the CMC (as in the TSC). The inspector also observed that the data transmitted to the CMC may run as much as thirty minutes late, since it is not real time data. Compared to the TSC, real time data is not available in the CMC since the CMC does not have an OAC console.

3.2.2 Data Acquisition

The Honeywell data acquisition system was described in Section 1.2.2

3.2.2.1 Isolation

Since no direct connections are made to plant equipment by the data acquisition systems of the CMC, isolation is guaranteed.

3.2.3 Data Communications

Data transfer mechanisms from the Honeywell 4400 to the VAX 11-78 0 systems were described in Section 1.2.3. Crisis Management Center (CMC) exercises were conducted using dial-up communications lines. To assure communications the licensee should establish dedicated communication lines between the CMC and VAX computers, and use dial-up as back-up. This finding was discussed with licensee representatives who stated that direct linkage of the two computer systems is planned.

This finding will be tracked as an open item to assure its correction. This item will be reviewed during subsequent inspections (50-413/85-39-36, 50-414/85-36-36).

3.2.4 Data Analysis

3.2.4.1 Dose Assessment

Section 1.2.4.2 addresses the availability of adequate information required to determine source terms for all potential release pathways.

The Crisis Management Center (CMC) has access to the VAX computer via an identical terminal to the one located in the TSC for dose projection calculations. The CMC terminal is located in the Offiste Radiation group area of the CMC (Rm 1222). Both the CMC and the TSC terminals can initiate a VAX calculation and provide the results to the other terminals. Therefore, any parameter, variable, or calculation available to the TSC via the current OAC - floppy disc - VAX route is also available to the CMC.

Complementing the offsite group under Nuclear Technical Services is the Technical Services Support group which is composed of health physics, chemistry and radwaste engineers. This group provides current and predicted calculations of actual or potential radioactive releases from potential sources via possible pathways. Source term methods used in the CMC parallel those used in the TSC. The discussion presented in Section 1.2.4.2 is equally applicable to the CMC.

3.2.4.2 Reactor Technical Support

The CMC is able to actively participate in accident analysis and support of the TSC because of the normal daily responsibilities of the General Office, i.e., management of design and construction of the new plants, and continued management of the operating plants. The combination of experience and material resources in the General Office can be enhanced by continuous access to real time data and status of the operating plants.

3.2.4.3 Dose Assessment at the Crisis Management Center (CMC)

All dose assessment capabilities that are available in the TSC are also available in the CMC through the "Class A Model" computer capabilities and manual methods. As indicated in 1.2.7.1, the dose assessment model is not the same as models used by the State or the NRC. However, individuals from the offsite organizations to whom dose assessment results are available, are present in the CMC dose assessment area.

The procedures for obtaining and using meteorological information in the CMC are identical to those described for the TSC, and are subject to the same concerns discussed in Section 1.2.4.2 (A). The CMC will be staffed by a licensee Meteorologist, which enhances interpretation of

real-time and forecast meteorological information. However, weather products (e.g., surface and upper air charts, radar reports, and forecast maps) produced by the NWS are not directly available in the CMC. To obtain these products, the meteorologist must leave the CMC for approximately one hour. This action degrades the capability of the CMC. Access to NWS products for use by the meteorologist should be available in the CMC for activation during an emergency situation.

Suggested areas for improvement are the same as those described in Section 1.2.4.2. of this report

3.2.5 Data Storage

See Section 1.2.5.

3.2.6 System Reliability

3.2.6.1 Verification

See Section 1.2.6.1.

3.2.6.2 Computer-Based Systems' Reliability

See Section 1.2.6.2.

3.2.6.3 Manual Systems

See Section 1.2.6.3.

3.2.7 Conclusion

Based on these findings, this portion of the licensee's program meets the requirements of Supplement 1 to NUREG-0737.

Improvement Items

- Standardize data sets McGuire Nuclear Stations to the CMC and include all Regulatory Guide 1.97 parameters in the standard format. If accident conditions warrant, depart from the standardized format (e.g., exclude some of the Reg. Guide 1.97 parameters) (IFI 50-369/85-29-37, 50-370/85-28-37).

- Improve method of data transmission to the CMC such that the data is real time or near real time data (see Section 3.1.1.6) (IFI 50-369/85-29-38, 50-370/85-28-38).

The above improvement items were discussed with cognizant licensee representatives. The licensee acknowledged the item which will be reviewed during subsequent inspections.

3.3 Functional Capabilities and Walk-Throughs

3.3.1 Operations

3.3.1.1 Organization; 3.3.1.2 Staffing; 3.3.1.3 Activation

An NRC developed accident scenario and walkthroughs were used to determine how the Catawba/McGuire CMC would function during an emergency. The availability and locations of key equipment, procedures, supplies and other necessary material were identified by CMC staff personnel in specific appraisal areas. Individuals in the CMC responded to the postulated circumstances by describing the actions that would be used. The notification of CMC response personnel is initiated by a telephone call from the Catawba or McGuire TSC, via the Duke Power Company Duty Engineer, to the Recovery Manager or his alternate. This call initiates a telephone call-out tree to notify the remaining CMC personnel. The inspector determined that the CMC support staff was consistent with that described in Section N of the CMC Plan.

Table 2 of Supplement 1 to NUREG-0737 addresses only one member of the CMC staff in its staffing and response time requirements. The senior manager of the CMC (Recovery Manager) is listed as necessary for response in 60 minutes from declaration of an emergency. As specified in the Catawba and McGuire Nuclear Stations plans and procedures, the Emergency Coordinator performs the role and functions of the Recovery Manager until the CMC is activated. Accordingly, the capability to manage the overall response effort and make protective action recommendations to offsite authorities is not compromised. The inspector determined that the CMC staffing level conforms to the criteria of Table 2 of Supplement 1 to NUREG-0737.

3.3.1.4 Communication Interfaces; 3.3.1.5 Offsite Interfaces; and 3.3.1.6 Transfer of Responsibilities

Communication and offsite interfaces are identified and described in the CMC Plan. CMC Plan implementing procedures (CMIP) provide instructions for effective communications with offsite authorities. CMIP-1 addresses the responsibilities of the Recovery Manager and immediate staff. These include initial actions and transfer of responsibilities from the TSC, emergency classification, protective action recommendations, communication with States, counties, and the TSC, and de-escalation and recovery.

3.3.2. TSC Support

3.3.2.1 Logistic Support

The CMC is tasked and capable of providing extensive logistic support to the licensee. An Administration and Logistics Section under the CMC organization functions to direct and coordinate this support. Such support includes, but is not limited to the following: (1) emergency

power sources available within the company can be relocated to the site if needed; (2) heavy equipment belonging to the company can be made available; (3) coordination of all aspects of information exchange and other cooperation with Federal, State, and local agencies; (4) lodging, meals, and transportation services can be arranged and provided.

3.3.2.2 Implementation of Mitigating Actions

The CMC is tasked and staffed to provide timely support to the TSC in assessing the offsite impacts of proposed mitigating actions. The Technical Services Support group develops expected concentrations and release rates. These data are used by the Offsite Radiological group to develop dose projections and assessments using the CMC terminal access to the VAX Class A Model. Manual computations parallel the computer calculations.

The Nuclear Engineering group can provide both independent recommendations for alternative mitigating actions and an assessment of proposed mitigating actions. Under the Recovery Manager, the CMC is tasked to coordinate mitigative actions with Federal, State and local agencies. The CMC coordinates radiological and other environmental assessment calculations with the licensee. Crisis Management Plan Section A.1.d clearly establishes responsibility for implementing mitigative actions. CMC Implementing Procedures adequately cover notification requirements in the event of containment venting or other planned releases. Adequate decisional aids are available to the CMC staff for planning venting of containment.

3.3.3 CMC Functions

3.3.3.1 Notification/Communication and 3.3.3.2 Protective Action Decisionmaking

Notification and communication are addressed in Section 3.1.3.1, 3.3.1.3 and 3.3.1.5 above. Emergency classification and protective action decisionmaking are addressed in Section 3.3.1.6 above. In addition, through an interview with the Recovery Manager, the inspector determined that the licensee demonstrated clear understanding of emergency classification, notifying and making protective action recommendations to offsite authorities, and effective acceptance of all responsibilities transferred from the TSC to the CMC.

3.3.3.3 Dose Assessment

Based on observations of the walkthrough, in response to a mini-scenario which simulated a station blackout condition, it was concluded that adequate procedures exist to perform dose assessment operations in the Control Room, TSC, and CMC, including procedures for source term determination.

The VAX system utilizes a class A Model for dose rate assessment and projection. Additionally, the OAC contained a "Nuclear-23" program for rapid determination (in the Control Room) of a "Go-No-Go" decision with respect to protective action recommendations. Fallback manual procedures are used to parallel the VAX results for consistency checks.

During the walkthrough, it was observed that the Dose Assessment Report, Enclosure 5.5 to HP/0/B/1009/13 (Offsite Dose Projection-Uncontrolled Release of Gaseous Radioactive Material Through the Unit Vent), which was being filled out by the Dose Assessment group in the TSC, was left blank in the section under Source Term - "Corresponds To." Queries of personnel failed to yield an acceptable reason for this finding. Subsequent discussions with the CMC dose assessors confirmed its use as a "reasonableness check" and as an input to aid the Class A Model computation. It is recommended that the licensee review this particular Section of the form and ensure that its intended purpose is understood (50-369/85-29-39, 50-370/85-28-39).

The source term and dose assessment/projection computational systems and procedures used in the Control Room, TSC, and CMC are essentially identical.

3.3.4 Coordination of Radiological and Environmental Assessment

3.3.5 Walk-throughs

The functional capability of the CMC was evaluated by presenting the fully activated CMC staff with a hypothetical accident scenario. Persons normally assigned to the facility during an emergency staffed the CMC during the walk-through. Licensee personnel were expected to respond to the postulated events of a total loss of AC accompanied by a loss of auxiliary feedwater by describing their actions, and how procedures, equipment, and supplies in the CMC would be used. Evaluation determined that the CMC would be adequately staffed and capable of performing its intended function. Comments in other sections of this report amplify observations made during the walk-through and during subsequent investigative effort.

3.3.4 Conclusion

Based on these findings, this portion of the licensee's program appeared to meet the requirements of Supplement 1 to NUREG-0737.

4.0 Persons Contacted

Duke Power Company General Office

*G. Vaughan, General Manager, Nuclear
*M. D. McIntosh, General Manager, Nuclear Support
*K. E. Harris, System Emergency Planner

*S. Apple, Meteorologist
*L. Lewis, Offsite Radiation Manager
*R. D. Sharp, Nuclear Engineer Licensing
*G. Merritt, Crisis Management
*L. J. Parker, Technical Associate Licensing
*M. Greer, Assistant Engineer

Catawba Nuclear Station

*J. W. Hampton, Station Manager
*J. W. Cox, Technical Services Superintendent
*C. L. Hartzell, Compliance Engineer
*M. Bolch, Station Emergency Planner

McGuire Nuclear Station

*T. L. McConnel, Station Manager
*B. Hamilton, Superintendent, Technical Services
*R. Leonard, Station Emergency Planner
*N. McCraw, Compliance Engineer

Other licensee employees contacted included engineers, technicians, computer specialists, operators, mechanics, office and administrative personnel.

NRC Resident Inspectors

*P. Skinner, Senior Resident Inspector, Catawba Nuclear Station
*W. Orders, Senior Resident Inspector, McGuire Nuclear Station

*Attended exit interview.

5.0 Exit Interview

The appraisal scope and findings were summarized on September 11, 1985, with those persons indicated in paragraph 4, above. The team leader defined the specific areas evaluated and discussed in detail all findings and recommendations presented herein. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this appraisal.