U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-483/88009(DRSS)

Docket No. 50-483 License No. NPF-30

Licensee: Union Electric Company
P.O. Box 149 - Mail Code 400
St. Louis, MO 63166

Facility Name: Callaway Plant

Inspection At: Callaway Site, Reform, Missouri

Inspection Conducted: June 6-9, 1988

Inspector: J. P. Patterson
J. P. Patterson
Team Leader

July 12, 1988
Date

Accompanying: G. Martin
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Approved By: J. E. Foster for
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Emergency Preparedness Section

7/12/88
Date

Inspection Summary

Inspection on June 6-9, 1988 (Report No. 50-483/88009(DRSS))
Areas Inspected: Special announced inspection of the following areas of the Callaway Plant emergency preparedness program: Emergency Response Facility Appraisal; review of radioactive release assessment and reviews of the design and operation of the Technical Support Center and Emergency Operations Facility (IP 82412). The inspection involved one NRC inspector and three contractor personnel. Section 6.0 of this report provides an updated summary on the status of all emergency preparedness related SIMS items.
Results: The Emergency Response Facilities of the licensee were found to be adequate with the exception of two Open Items. No violations, deficiencies, or deviations were identified.

DETAILS

1. Persons Contacted

*M. Stiller, Manager, Nuclear Safety and Emergency Preparedness (NS&EP)
*J. Gearhart, Superintendent, Quality Assurance, Operations Support (QAOS)
*G. Hughes, Supervisory Engineer, NS&EP
*S. Crawford, Administrator, Nuclear Affairs, NS&EP
*A. White, Supervisor, Emergency Preparedeness, NS&EP
*T. Stotlar, Supervisory Engineer, QAOS
*E. Thornton, Engineering Evaluator, QAOS
*S. Meyer, Systems Engineer, Nuclear Engineering
*R. Wink, Systems Engineer, Nuclear Engineering
*D. Young, Superintendent, Maintenance Department
*W. Hinchie, Assistant Engineer, Emergency Preparedness, NS&EP
*D. Slafer, Supervising Engineer, Licersing
*J. Dampf, Emergency Response Coordinator, Emergency Preparedness, NS&EP
*L. Beaty, Systems Engineer, Instruments and Controls (I&C)
*R. Baker, Supervisory Engineer I&C
D. Hug, Senior Document Control Clerk
D. Jones, Instrument and Control Engineer
B. Holderness, Corporate Health Physicist
M. McLachlan, Electrical Engineer
R. McCann, Qualtiy Assurance Auditor
G. Stuhlman, Record Management System Supervisor - General Services

*Denotes those personnel listed above who attended the exit interview on June 9, 1988.

2.0 Assessment of Radiological Releases

2.1 Source Term

Monitored release points consist of the Radwaste Building Vent, Main Plant Vent, Auxiliary Feedwater Turbine discharge, and Power Operated Relief Valves (PORVs). Unmonitored release pathways consist of containment leakage and blow out panels on the auxiliary building roof. Dose assessment methodologies provide for the calculation of doses from all potential release pathways. The radionuclide mixes used in the dose assessment methods are taken from the plant Final Safety Analysis Report (FSAR), Chapter 15. The most severe accidents described in the FSAR result in only minor fuel damage and therefore the nuclides accounted for consist only of noble gases and iodines. Generally accidents considered for emergency preparedness purposes cover a wider range than those considered in a plant FSAR, with the most severe resulting in major fuel damage. For severe accidents resulting in a release through an unfiltered pathway, such as a loss of coolant accident in the steam space (zone 5) with corresponding release through the auxiliary building roof blow-out panels, the release nuclide mix would contain noble gases, iodines and particulates. None of the methods employed provides a default nuclide mix that consider the presence of particulates.

Procedures are in place to calculate source term information for releases via all monitored and unmonitored release pathways. In addition, procedures provide for calculating source term information from portable instrument readings, post accident sample results, and field sample results. Other source term information can be generated from the output of the Post Accident Sampling System (PASS). The following represent some of the analytical capabilities possessed by PASS: isotopic analysis of reactor coolant, containment atmosphere and containment recirculation sumps; dissolved hydrogen concentration of reactor coolant and recirculation sumps; and percent oxygen in containment. PASS is also capable of obtaining both diluted and undiluted grab samples of reactor coolant, containment atmosphere, and containment recirculation sumps.

Procedure EDP-ZZ-00005, Assessing Core Damage, contains precalculated relationships between various plant parameters and percent fuel damage. The procedure allows for the estimate of core damage using containment hydrogen concentration, core exit thermocouple readings, reactor vessel water level, and containment high range radiation monitor readings.

Based upon the above findings, this portion of the licensee's program is adequate. However, the following item is suggested for program improvement.

- Determine whether default nuclide mixes taken from the FSAR are truly representative for all credible accident types and release pathways. If not, develop the appropriate nuclide mix for use in the dose assessment models. For example, the nuclide mix representing an accident resulting in an unfiltered release to the atmosphere, such as from the steam enclosure space, should include particulates as well as noble gases and iodines.

2.2 Dose Assessment

The Radiological Release Information System (RRIS) contains the dose assessment models which are designated as the primary means of obtaining dose projections during an emergency. RRIS contains a straight line gaussian model, a segmented gaussian model, and a puff release model. The backup dose assessment model is contained in procedure EIP-ZZ-01211, Back-Up Method For Initial Dose Assessment. The backup model is also a straight line gaussian model and has been implemented on an IBM PC. The dosimetric portions of all models examined employed appropriate means for calculating whole body and child thyroid doses. Based upon observations made during the exercise and through discussions with personnel it was discovered that although the RRIS is by procedure the primary dose assessment method, the personal computer version of the back-up method has become the first choice of dose assessment personnel. It would appear that this is a result of lack of familiarity on the part of dose assessment personnel and due to awkwardness of operation and shortcomings in

model output on the part of RRIS. The fact that RRIS is highly automated and will automatically acquire data and start calculations based on indications of a release has made it difficult to use during drills and exercises. The result is that the back-up method on the PC is used during drills and exercises making it more familiar to dose assessment personnel.

For the manual or dose projection mode, caution statements in Procedure EIP-ZZ-01210, RRIS Operation, warns the user that the procedure may not be capable of providing a dose projection within 15 minutes of the declaration of an initial emergency classification. Another caution points out that the tabular output does not provide the peak centerline dose or dose rate levels used for protective action decision making. In the notes the user is reminded that hard copy output for the TSC is available only in the BOP computer room which is a three to four minute walk from the TSC. Hardcopy output is available in the EOF by a camera system which takes pictures of the terminal screen. While Procedure EIP-ZZ-01211 represents an adequate backup method for RRIS and for quick on-shift calculations prior to the activation of the TSC, it is not adequate as a primary means of performing dose assessment.

A review was conducted of the validation and verification documentation for the RRIS dose assessment models. Documentation for a factory acceptance test conducted by the contractor and for a site acceptance test conducted by the licensee was reviewed and appeared adequate. No documentation to validate and verify the PC version of the back-up dose assessment model computer code was found. Procedure APA-ZZ-00685, Control of Computer Software and Operator Interfaces, provides administrative controls for the software comprising RRIS and Procedure EDP-ZZ-04011, Computer Software Controls, provides for the control of the PC version of the core damage estimate procedure. No procedure exists to provide administrative control for the PC version of the back-up dose assessment method.

Some limited calculational comparisons between licensee dose assessment methods and NRC and State methods have been performed by the licensee. However, no fully documented comprehensive comparison between all models has been performed. Documentation resulting from such a study should include a description of the methodology employed, a listing of the test cases, quantitative results, and a discussion which relates the differences identified to the methodologies of each model.

Based on the above findings, this portion of the licensee's program is adequate. However, the following items are suggested for program improvement.

- Alter the use and operation of RRIS such that the dose assessment models that it contains will be used as the primary (i.e., first choice) method of performing dose projections as specified by procedure. For example, consider the following changes; provide an exercise mode so that RRIS could be run more realistically during drills and exercises, streamline operation so that it will run in a more timely fashion, and redesign the output to better meet the needs of dose assessment personnel and protective action decision makers.

- Conduct and document a comprehensive calculational comparison between all Union Electric dose assessment models and those of the State and NRC. The resulting documentation should include a description of the methodology employed, a listing of the test cases, quantitative results, and a discussion which relates the differences identified to the methodologies of each model.

- Develop and implement a procedure which provides administrative controls for the software comprising the PC version of the back-up dose assessment model contained in Procedure EIP-ZZ-01211. The procedure should establish criteria for the initial documentation, verification, approval and implementation of the software. It should also provide for documentation of modifications, verification of modifications, periodic verification, and software security.

3.0 Meteorological Information

A review was performed of documentation associated with the pre-operational appraisal of the meteorological system, observations of the system, and documentation from licensee submittals to the NRC. Documentation reviewed in making this determination included:

a. Callaway SER, Conformance to Regulatory Guide 1.97, April 1985 based on applicants submittal of August 1984, Table 7A-3, Data Sheet 17.5.

b. Callaway Emergency Preparedness Implementation Appraisal (EPIA), March 1984, Improvement Items No. 24-31.

c. Letter from Licensee to NRC, Region III with responses to EPIA Improvement Items No. 24-31.

This review indicated that the system meets NRC requirements for adequacy, representativeness, and reliability.

Therefore, this portion of the inspection procedure was not conducted during this ERF appraisal.

4.0 Technical Support Center (TSC)

4.1 Location and Habitability

The TSC is located within the protected area, adjacent to the Service Building. The TSC has adequate shielding and ventilation to ensure habitability during Design Basis Accidents.

The plant FSAR states in Chapter 18 that the TSC is constructed of reinforced concrete walls 10 inches thick and has a reinforced concrete roof 6 inches thick. A review of Bechtel shielding calculation No. TSC-M-2, TSC Doses-Post LOCA, indicates that an appropriate radiation protection factor will be provided by the structure. Radiation monitoring in the TSC consists of one area radiation monitor in the main work area, with a range of 1 to 10,000 mr/hr, and a radioiodine monitor which will detect radioiodine in concentrations as low as 1E-07 microcuries/cc. The radioiodine detector will monitor TSC inlet air in either the emergency or normal mode of ventilation system operation.

The major components making up the TSC ventilation system are an air handling unit with an associated chiller unit, an exhaust fan, a filter absorber unit and a filtration unit fan. In the normal mode of operation the system draws 500 CFM of makeup air from outside the TSC and combines the makeup air with the air being recirculated through the air handling unit. Approximately 300 CFM of air is exhausted from the building.

When the TSC is activated, the ventilation system is manually shifted to the recirculation mode. In this mode three dampers are repositioned to divert the 500 CFM makeup air through the filter absorber unit and the filter unit fan prior to being recirculated through the air handling unit. In the recirculation mode, the exhaust damper is closed. Shifting to the recirculation mode is accomplished by manual operation.

In observing several tests of the system the inspector noted the following items:

(1) When shifting to the recirculation mode, the operator is required to verify that dampers D-1 and D-2 close while damper D-3 opens. Since the damper positions are not marked, the operator can not verify the extent of the change of that damper, and has no way of knowing if the damper has reached the intended position. Since this procedure (OTN-22-00001) is used for the initial recirculation lineup when performing surveillances, the validity of those surveillances which have been performed on the system to date are questionable.

(2) There was no physical indication or quantitative instrumentation available to determine if a positive pressure is maintained in the TSC. Information on how the ventilation system was designed to operate could not be found. The TSC building specifications did not contain a description of how the system operated. The information in Section 18.3.2.2 of the FSAR stated that "the HVAC system for the TSC supplies outside air appropriately cooled or heated and has provisions to isolate inlet air and to operate in a filtered recirculation mode if radiation levels are high." This information adds confusion since the installed ventilation system does not operate as described in the FSAR (inlet air is not isolated). In reviewing conceptual design documentation and shielding calculations, reference was made to a pressurized ventilation system for the TSC and EOF. Shielding calculations for both the TSC and EOF appear to have been made assuming a pressurized and filtered ventilation system. However, it could not be determined how much of a differential pressure should exist between the inside and outside of the TSC, nor are there any installed differential pressure gauges that could be used to measure such a differential pressure. When the system is in emergency mode there is no evidence of a positive pressure in the building when opening an outside door.

There is no instrumentation nor physical evidence available to indicate that in the emergency mode the TSC ventilation system is maintaining a positive pressure. Since the shielding calculations were performed assuming a positive pressure ventilation system it can not be verified that the TSC is capable of providing the stated protection factor. This was considered an Open Item (50-483/88009-01).

Based on the above findings with the exception of the open item, this portion of the licensee's program is adequate. however, the following item is suggested for program improvement:

- Develop an observable indication to allow operators to verify that ventilation dampers are in the correct position.

4.2 Functional Capabilities

4.2.1 Power Supplies

Electrical loads used in the TSC are powered from a 480V 3 phase normal supply or a 480V 3 phase alternate supply. The TSC normal supply originates at the 25KV Plant Main Generator and automatically shifts to offsite power on a generator trip. The TSC alternate supply comes from a manual start, 230 KW Diesel Generator which services only the TSC. The normal or alternate power source is selectable through a manual transfer switch

located in the TSC Mechanical and Electrical Equipment Room. A 30 KVA inverter provides uninterruptable power to the Emergency Response Facility Information System (ERFIS) computer and all TSC computer terminals as well as radio communications equipment. The normal power supply for the invertor comes from the normal TSC power supply with a 60 cell battery providing backup power. Routine surveillances are conducted on the TSC power supplies to ensure they are operational in an emergency.

In the event of a loss of power to the TSC, the only source of emergency lighting comes from wall mounted battery powered units.

The inspector observed tests of all the above TSC power systems and inspected their physical condition. The electrolyte levels in two of the three emergency lighting units was significantly below the minimum level for each cell. This condition is believed to have occurred because the TSC emergency lighting is not covered by a routine surveillance procedure.

Based on the above findings, this portion of the licensee's program is adequate. However, the following item is suggested for program improvement.

- Add the TSC battery powered emergency lighting units to the preventive maintenance schedule which covers similar units elsewhere on site.

4.2.2 Data Analysis

The ERFIS, SPDS and RRIS computer terminals and manually maintained status boards are the sources of data used by TSC managers. Trending capability is available from ERFIS, SPDS and manual displays. The ERFIS display data can be transferred to hard copy through a line printer. Trending of plant parameters is available by comparing current copies with previous copies.

Based on the above findings, this portion of the licensee's program is adequate.

4.3 Regulatory Guide (R.G.) 1.97 Variable Availability

Plant variables required by R.G. 1.97 are provide to the TSC and EOF using the Emergency Response Facility Information System (ERFIS) as the primary method for data transmission and display. ERFIS uses the Balance of Plant (BOP) computer as a data source and has the capability to receive data from other plant subsystems such as the Post Accident Sampling System (PASS), the Radioactive Release Information System (RRIS) and the Safety Parameter Display System

(SPDS). In addition to the ERFIS Cathode-Ray Tube (CRT) displays, there are CRT displays for the RRIS and the SPDS systems also located in the TSC and EOF.

Based on the above findings, this portion of the licensee's program is adequate.

4.3.1 Computer Data

As discussed in Sections 4.2.1 and 4.2.2 above, parameter availability via the ERFIS, RRIS and SPDS computer systems meets the requirements of R.G. 1.97.

4.3.2 Manual Data

The backup system to the computer transmitted variables to the TSC and the EOF is through dedicated telephone communicators. There are two basic telephone systems used for the exchange of data and information. The Kingdom Telephone Company (touch tone system) is one of the systems available and an independent dedicated ring down phone system comprises the other. The telephone systems are normally powered from a reliable off-site source through the safeguards transformers or power block bus PA 02. The touch tone system is provided with a redundant automatic switching unit and the system uses batteries and the Security Diesel Generator for backup power. The touch tone system backs up the dedicated ring down system. Status boards are used to display parameter data.

Based on the above findings, this portion of the licensee's program is adequate.

4.3.3 Data Adequacy

The combination of data available on the various computer terminals, via communicators and displayed on status boards meets all the TSC data requirements.

4.4 TSC Data Collection, Storage, Analysis and Display

Licensee system hardware and corresponding documentation was reviewed to determine whether Emergency Response Facility (ERF) functions would be adequately supported. Data collection, storage, display, and communications were found to be adequate.

4.4.1 Methods of Data Collection

Real-time data acquisition, display, and storage to support ERF functions are performed by a distributed computer system. The distributed system has been progressively added to during the

past 15 years based on changing requirements. Computers comprising the distributed system have been supplied by different vendors, and require hardware and software support from a variety of sources. The following lists the configurations and primary functions of the computers making up the distributed system:

Westinghouse NSSS (nuclear steam supply system)

Westinghouse
64 - kilobytes (KB) Random Access Memory (RAM)
1 - 2 MB hard disk unit
no tape drives
floppy disk unit

Function: Front end for the (Balance of Plant) BOP system for reactor coolant information.

Dual processor HONEYWELL 45000 Computers
256 kilowords (KW) - 24 bit words random access memory (RAM)
80 Megabyte (MB) hard drive
dual floppy unit
Large Core Storage (LCS) - 1.6 MB
2 Nine track tape drives

Function: Collects data from most of the plant sensors, computes calculated point data, and controls 4 CR (Control Room) display CRT's (cathode ray terminals) and 2 keyboards.

ERFIS (Emergency Response Facility Information System)

HONEYWELL 4400 computer
128 KW RAM (24 bit words)
1.6 MB memory in LCS
2 nine track tape drives
2 - 80 MB hard disk units
1 - dual floppy unit

Function: Provides BOP point data to personnel in the EOF and TSC. Controls 4 color displays in the TSC and 2 in the EOF. Mimics the BOP data base. Stores pre-event and post-event archival storage on tape and disk.

RRIS (Radioactive Release Information System)

dual DEC VAX 11-750's
4 MB RAM
1 - 128 MB hard disk
1 - nine track tape drive

Function: Collects meteorology, radiation, and air release data for dose assessment. Drives Safety Parameter Display System (SPDS) displays (1 display in the CR, 1 display in the TSC, 1 display in the EOF, 1 display in health physics access, and 1 display in the computer room).

CPS (Communications Processor System)

HONEYWELL 4500 computer
128 KB RAM (24 bit words)
80 MB hard disk unit
1.4 Megaword (MW) LCS

Function: This is the communications processor and serves the transparent function of interfacing between the BOP, the ERFIS, and the RRIS. The following is a list of analog (continuously variable) and digital (2 state) plant sensors routinely sampled and used to assess plant safety status:

	Analog Sensors	Digital Sensors	Plant Annunciator Points(also digital)
NSSS	271	286	0
BOP	896	1896	1400
Total	1167	2182	1400

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2 Data Displays

Data display cathode ray tubes (CRT's) supporting ERF functions are:

Control Room (CR)

4 - color CONREK (BOP) CRT's
2 - color CHROMATICS 7900's (RRIS) CRT's
2 - IDT 2200 color CRT's

TSC (Technical Support Center)

4 - color CONREK (BOP) CRT's
2 - color CHROMATICS 7900's (RRIS) CRT's
1 - IDT 2200 color CRT's

EOF (Emergency Operations Facility)

2 - color CONREK (BOP) CRT's
1 - IDT 2200 color CRT's

HP Access

1 - IDT 2200 color CRT

Computer Room

1 - color CONREK (BOP) CRT's

Display generation is done using three different types of color graphics CRT's for this ERF supporting system. Users are given the option of selecting displays by: (1) pressing function keys; (2) typing in display selection parameters on a keyboard; or (3) using a light pen to make selections.

Displays were generated on the CRT's in one to five seconds with no significant delays in response to display requests.

Based upon the above findings, this portion of the licensee's program is adequate. However, the following items are suggested for program improvement.

- Readability of the display CRT's in the TSC was impacted by screen flicker. This is probably due to either unregulated power sources or problems with the CRT or display generator power supplies. This problem should be corrected.

- The licensee should develop a practice of labeling or tagging synthetic (computer generated) data when such data is used to support testing or exercises.

4.4.2.1. Time Resolution

ERF supporting computers read, analyze, and store to hard disk data from 4749 analog and digital sensors. The sampling rate for data sets varies between two seconds and ten seconds for ERF

related plant sensors. Meteorology and radiation data are collected between every five seconds and every 60 seconds. The data sampling rate is considered low to moderate speed. Data acquisition tasks are assigned a high priority and are not delayed by other tasks.

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2.2 Signal Isolation

Block diagrams showing isolation devices and approach was supplied by the licensee for the RRIS, the BOP, and the Westinghouse computer systems. For the RRIS, Class 1E isolation boxes using photo-coupling were reported. Test results indicate that on the application of 1300 volts between input and output signals and between input terminals and grounds no electrical breakdown occurred. BOP isolation was tested by applying between 1500 volts and 2200 volts between contacts and relay cases as well as between open relay contacts. No electrical breakdown was reported. The isolation for the BOP Class 1E relay cabinets was accomplished using physical separation barriers (6 inches minimum) and photo-coupled isolation equipment. Westinghouse reported isolation testing on qualified isolation amplifiers.

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2.3 Data Communications

Data communications capabilities were reviewed. The following table shows the interfaces and the transmission rates:

Computer	Interface	Computer	Bits per Second
RRIS	serial link	CPS	9,600
BOP	shared LCS	CPS	disk access rate
NSSS	serial link	BOP	9,600
ERFIS	serial link	CPS	240,000
ERFIS	serial link	TSC Displays	9,600
ERFIS	serial link	EOF Displays	9,600

Licensee contacts reported error checking and error correcting or re-transmission on error detection capability for communications devices.

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2.6 Model and System Reliability and Validity

Examination of existing program documentation shows that it was poorly organized and not written in a manner that was easy to follow. Time available did not allow for rigorous verification of the programs in the system, however, based on the scope of the review that was conducted, no problems were identified.

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2.7 Reliability of Computer Systems

SPDS sensors were reported to be redundant and routine statistical checks were made by the computers to evaluate how well redundant sensor readings match. Computer system unavailability was documented by the utility from August 1985 through the current month. Some time period data showed that system downtime caused availability figures to be less than 90%. Specifically, ERFIS availability figures show 83.69% for 1986, 92.78% for 1987, and 98.56% so far for 1988.

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2.8 Environmental Control Systems

Temperature and humidity were monitored and controlled. Design criteria for heating and heat removal were based on vendor specifications for computer equipment supplied. The air conditioning units implemented were reported to control the temperature and humidity as follows:

Computer(s)	Temperature Range	Humidity Range
ERFIS	72 to 80 degrees F	45 to 50%
all others	60 to 72 degrees F	55 to 60%

Based upon the above findings, this portion of the licensee's program is adequate.

5.0 Emergency Operations Facility

5.1 Location and Habitability

The EOF is located offsite approximately one mile west of the plant. The plant FSAR Chapter 18 states that the EOF is constructed of concrete walls approximately ten inches thick and has a roof which consists of double-T pre-cast concrete sections with a minimum

4.4.2.4 Processing Capacities

Distributed system computers and peripheral computer systems were configured to support plant safety monitoring and reporting needs. Processing is based on multitasking to allow several software functions to be processed concurrently. Data acquisition and storage tasks are high priority tasks and execute before supporting tasks. Licensee contacts reported the following loads for normal operation:

Computer	Approximate Percent Loading
RRIS	80%
ERFIS	50%
BOP	60 - 70%
CPS	20%
NSSS	50%

Based upon the above findings, this portion of the licensee's program is adequate.

4.4.2.5 Data Storage Capacity

Plant personnel reported historical data can be stored to disk as follows:

Computer	Data Storage
RRIS	7 days of 15 minute interval data in rotary file (file where current data overwrites oldest data when a filesize limitation is reached) 7 days historical data 2 weeks (On an event or at user option) historical data can be stored on a 9 track magnetic tape.
ERFIS	2 hours pre-event and 12 hours post event data storage. Also, can store data to magnetic tape for up to 2 weeks.
NSSS	No storage.
BOP	Saves a database subset on an event.
CPS	None

Based upon the above findings, this portion of the licensee's program is adequate.

concrete thickness of approximately six inches. It further states that the structure provides radiation shielding equivalent to a protection factor greater than five. A review of Bechtel calculation No. 7.6.5-34, Post LOCA Doses at EOF, indicate that the structure will provide appropriate radiation shielding. Radiation monitoring is the same as described for the TSC. If the EOF becomes uninhabitable, a backup EOF is located in Jefferson City, Missouri, about 25 miles southwest of the plant.

The major components making up the EOF ventilation system are an air handling unit with an associated cooling unit, several air return fans, a HEPA filter and filter fan. During normal operations the HEPA filter and filter fan are isolated from the ventilation system. Placing the ventilation system in the "Filtration Mode", closes the normal makeup air intake damper and the exhaust damper. Outside air is now drawn into the ventilation system through the HEPA filter and filter fan. Shifting to the filtration mode is accomplished by manual operation.

In observing several tests of the system the inspector noted the following:

(1) There was no physical indication or quantitative instrumentation available to determine if a positive pressure is maintained in the EOF. Information on how the ventilation system was designed to operate could not be found. The information in Section 18.3.2.2 of the FSAR merely stated that "the HVAC system for the EOF is similar to that of the TSC, except it contained only HEPA and no charcoal filters" (charcoal filters are not required). Dose calculations indicate that the ventilation system in the filtration mode should operate with a positive pressure. There was no evidence of a positive pressure in the building when opening an outside door.

There is no instrumentation nor physical evidence available to indicate that in the emergency ventilation mode the EOF ventilation system is maintaining a positive pressure. Since the shielding calculations were performed assuming a pressurized ventilation system, it can not be verified that the EOF is capable of providing the stated protection factor. This was considered an open item (50-483/88009-02).

(2) During routine surveillance of the EOF ventilation system, the HEPA filters are not tested since there are no differential pressure gauges installed across the HEPA filters. It should be noted that this item has been identified in the facility's QA audit report AP88-006 dated May 18, 1988.

Based on the above findings with the exception of the open item listed above, this portion of the licensee's program is adequate. However, the following item is suggested for program improvement:

- Proper surveillance tests for the HEPA filters should be conducted.

5.2 Functional Capabilities

5.2.1 Data Analysis Adequacy

The EOF uses the same computer and manual systems for data acquisition as those used in the TSC. The EOF operation is significantly more oriented toward dose assessment with one entire room dedicated to operation of RRIS terminals and status boards.

Based on the above findings, this portion of the licensee's program is adequate.

5.2.2 Backup EOF

The backup EOF contains ample workspace and communications equipment and is supplied with reliable power.

Based upon the above finding, this portion of the licensee's program is adequate.

5.2.3 Reliability

The EOF, which is located about one mile west of the plant site, has a 480 V 3 phase normal power supply and an alternate power supply. The normal EOF power supply comes from the 12.47 KV "Callaway Electric Cooperative" line. The alternate supply comes from a manual start, 350 KW Diesel Generator which services the EOF only. The normal or alternate power supply is selectable through a manual transfer switch. A 15 KVA invertor, powered from the EOF normal power supply, provides uninterruptable power to computer terminals and communication equipment. A 60 cell battery backs up the 15 KVA invertor. Routine surveillances are conducted on the EOF power supplies.

Wall mounted battery powered lighting units are the only source of emergency lighting available in the EOF during loss of power to the building. Routine surveillance tests are conducted on these units.

The inspector observed tests of all the above EOF power systems and inspected their physical condition.

Based on the above findings, this portion of the licensee's program is adequate.

5.3. Regulatory Guide 1.97 Variable Availability

The data availability in the EOF is essentially the same as that in the TSC, with various computer systems and communicator/recorder personnel serving as the primary and backup sources of data. See Section 4.3.

5.4. Data Collection, Storage, Analysis and Display

The same computers supporting TSC ERF activities support the EOF. These systems and details of their functions have already been described.

Based upon the above findings, this portion of the licensee's program is adequate.

6.0 TMI-Related (SIMS) Items

On October 31, 1980, the NRC issued NUREG-0737, which incorporated into one document all TMI-related items approved for implementation by the Commission at that time. On December 17, 1982, the NRC issued Supplement 1 to NUREG-0737 to provide additional clarification regarding Regulatory Guide 1.97 (Revision 2) - Application to Emergency Response Facilities, Emergency Response Facilities, and Meteorological Data, as well as other areas. The status of the completion of these TMI-related items are internally tracked by the NRC. The current status of each of these items related to emergency preparedness is as follows:

Item No.	Current Status	Comments
III.A	Not Listed	This item refers to implementation of Chapter 8 of Supplement 1 to NUREG-0737, and was reviewed in this report. This item should be added to the tracking system with a current status of open until the open items discussed in Sections 4.1 and 5.1 are closed.
III.A.1.1	Not Listed	This item involved short term improvements to the emergency preparedness program and was closed at the conclusion of the Emergency Preparedness Implementation Appraisal: Report No. 50-483/84-02(DRMSP) dated March 6, 1984. This item should be added to the tracking system with a current status of closed.
III.A.1.2.1	Closed	This item involved interim upgrades to the ERF's.

Item No.	Current Status	Comments
III.A.1.2.2	Not Listed	This item involved design criteria for upgraded ERF's, but was subsequently determined to be not applicable (N/A). This item should be added to the tracking system with a current status of N/A.
III.A.1.2.3	N/A	The current status of this item is incorrect. Because this item involved ERF modifications that were incorporated into MPA-F-63, 64 and 65, this item was closed at the conclusion of the Emergency Preparedness Implementation Appraisal: Report No. 50-483/84-02(DRMSP) dated March 6, 1984.
III.A.2.1	Not Listed	This item involved the submittal of upgraded emergency plans. This item was closed with the issuance of Supplement No. 3 to the SER dated May 1984 (NUREG-0830). This item should be added to the tracking system with a current status of closed.
III.A.2.2	Not Listed	This item involved the submittal of emergency procedures. This item was closed at the conclusion of the Emergency Preparedness Implementation Appraisal: Report No. 50-483/84-02(DRMSP) dated March 6, 1984. This item should be added to the tracking system with a current status of closed.
III.A.2.3	Not Listed	This item involved an acceptable interim meteorological program. This item was closed at the conclusion of the Emergency Preparedness Implementation Appraisal: Report No. 50-483/84-02(DRMSP) dated March 6, 1984. This item should be added to the tracking system with a current status of closed.
III.A.2.4	Not Listed	This item involves an acceptable final meteorological program and was addressed in this report. This item should be added to the tracking system with a current status of closed.
III.A.2.5	Not Listed	This item involves an acceptable Class A meteorological model and was addressed in this report. This item should be added to the tracking system with a current status of closed.

Item No.	Current Status	Comments
III.A.2.6	Not Listed	This item involves a licensee's review of their Class A meteorological model and was addressed in this report. This item should be added to the tracking system with a current status of closed.
III.A.2.7	Not Listed	This item required the licensee to provide a description of the Class B meteorological model to the NRC. Based on the current structure of the ERF Appraisal program, the NRC is not reviewing these submittals of the Class B model. Therefore, this item should be added to the tracking system with a current status of N/A.
III.A.2.8	Not Listed	This item involves an acceptable Class B meteorological model and was addressed in this report. This item should be added to the tracking system with a current status of closed.
MPA-F-63	Not Listed	This item involves a review of the TSC during the ERF Appraisal and was reviewed in this report. This item should be added to the tracking system with a current status of open until the open items discussed in Sections 4.1 is closed.
MPA-F-64	Not Listed	This item involved a review of the OSC, which was completed during the June 3, 1987 exercise: Reports No. 50-483/87017(DRSS); No. 50-265/87012(DRSS) dated June 30, 1987. This item should be added to the tracking system with a current status of closed.
MPA-F-65	Not Listed	This item involves a review of the EOF during the ERF Appraisal and was reviewed in this report. This item should be added to the tracking system with a current status of open until the open items discussed in Sections 5.1 is closed.
MPA-F-66	Not Listed	This item involved the Nuclear Data Link, which has been superceded by the Emergency Response Data System (ERDS). This item should be added to the tracking system with a current status of N/A.

7.0 Exit Meeting (30703)

The inspector and consultants met with the licensee representatives denoted in Section 1 on June 9, 1988. The inspector summarized the scope and results of the inspection and discussed the likely content of the inspection report. The licensee did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.