MAY 12 1988

Docket No. 50-483

Union Electric Company
ATTN: Mr. Donald F. Schnell
Vice President - Nuclear
Post Office Box 149 - Mail Code 400
St. Louis, MO 63166

Gentlemen:

This is to formally transmit to you a copy of Revision A of NRC Draft Inspection Procedure 82412, "Emergency Response Facilities Evaluation," which will be utilized by the inspection team evaluating your emergency facilities on June 6-9, 1988. This inspection will be conducted in addition to our evaluation of your annual exercise which is scheduled for June 6, 1988. This document was previously provided to Mr. A. White of your emergency response organization.

It is important that the documentation referred to in Appendix 3 of the procedure be readily available for review by the team so that they can complete their evaluations within the allotted time. We will not be performing the portions of the procedure related to meteorological information. Therefore, documentation related to meteorology will not be required.

If you have any questions concerning this letter, please contact Mr. J. Patterson of my staff at (312) 790-5536.

Sincerely,

"Original signed by W.D. Shafer"

W. D. Shafer, Chief
Emergency Preparedness and
Radiological Protection Branch

Enclosure: As stated

See Attached Distribution

IE31

RIII	RIII	RIII	RIII
Patterson/jaw 5/10/88	Snell 5/11/88	DeFayette 5/11/88	Shafer

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INSPECTION PROCEDURE 82412

EMERGENCY RESPONSE FACILITIES EVALUATION

PROGRAM APPLICABILITY 2515

This inspection procedure is applicable to evaluation of emergency response facilities required for licensed nuclear power plants.

82412-01 INSPECTION OBJECTIVE

To determine if the Emergency Response Facilities (ERFs) at licensed nuclear power plants meet the requirements of 10 CFR 50.47(b), Appendix E, Paragraph IV.E, 8 of 10 CFR Part 50 and the orders and license conditions issued to implement Supplement 1 to NUREG-0737 Requirements: 6.1 b (2nd paragraph), 6.1 c, 6.1 d, 8.2.1 a, 8.2.1 f, 8.2.1 h, 8.4.1 a, 8.4.1 b and 8.4.1 g.

82412-02 INSPECTION REQUIREMENTS

02.01 General. Perform an onsite inspection of the licensee's ERFs, including the data and information systems and equipment in the Technical Support Center (TSC) and the Emergency Operations Facility (EOF) to determine if these facilities provide adequate and reliable support to the principal emergency managers during radiological accidents. This inspection shall be conducted during the licensee's annual emergency preparedness exercise by a special team of NRC and contractor personnel.

02.02 Assessment of Radioactive Releases. Evaluate whether the ERFs are adequately equipped to determine the magnitude of and for continuously assessing the impact of a release of radioactive material to the environment.

02.03 Meteorology. Determine if the meteorological measurements provide a reliable indication of the meteorological variables (wind direction, wind speed and atmospheric stability) specified in RG 1.97 (Rev. 2) for site

meteorology. Evaluate whether the data system and any appropriate modeling provide a reliable indication of these variables that are representative of meteorological conditions in the vicinity (up to about 10 miles) of the plant site. Determine if information on meteorological conditions for the region in which the site is located are available via communications with the National Weather Service or equivalent meteorological service organization.

02.04 TSC Data Availability. Determine if the RG 1.97 (Rev. 2 or 3) Type A, B, C, D and E variables that are essential for the TSC managers to perform their functions are available in the TSC. Principally those data must be available that would enable the TSC managers to evaluate incident sequence, determine mitigating actions, evaluate damage, estimate actual and potential radioactive releases and determine plant status as well as the meteorological data and systems as described in 02.03 above.

02.05 TSC Functions. During periods of activation, determine if the TSC will operate uninterrupted to provide TSC and plant managers with the capability to technically support plant operations personnel and relieve them of peripheral duties and communications not directly related to reactor systems manipulations. Determine whether the TSC is equipped to provide the TSC managers with the capability to perform the EOF functions during Alert, Site Area Emergency and General Emergency classifications until the EOF becomes functional.

02.06 TSC Habitability. Determine whether the TSC is equipped to assure that the radiation exposure to any person working in it would not exceed 5 rem whole-body dose, or its equivalent to any part of the body, for the duration of an accident.

02.07 TSC Data Systems. Determine whether the data systems in the TSC will provide the TSC managers with reliable data collection, storage, analysis, display and communications sufficient to determine plant site and regional status and forecast status to take appropriate actions.

02.08 EOF Functions. When the EOF is activated, determine if it is equipped to provide the EOF managers with the capability for management of the overall

licensee emergency response, coordination of radiological and environmental assessments, development of recommendations for public protective actions and coordination of emergency response activities with Federal, State and local agencies.

02.09 EOF Data Availability. Determine if the primary indicators needed for the EOF managers to monitor containment conditions and releases of radioactivity from the plant are available in the EOF. Acquisition, display and evaluation of the radiological data, meteorological information (including the data and systems described in 02.03 above) and containment condition parameters must be adequate to evaluate the magnitude and effects of actual or potential radioactive releases from the plant and to determine projected dose onsite and offsite. Determine if these data are adequate for the EOF managers to make proper protective action determinations and recommendations.

02.10 EOF Locations And Habitability. Determine if the EOF location and habitability meet the requirements of Table 1 of Supplement 1 to NUREG-0737.

02.11 EOF Data Systems. Determine whether the data systems in the EOF will provide the EOF managers with reliable data collection, storage, analysis, display and communications sufficient to determine plant site and regional status and forecast status to take appropriate actions.

82412-03 INSPECTION GUIDANCE

03.01 Inspection Procedure. The inspection shall be conducted at the licensee's plant site after the final physical facilities, data acquisition and other equipment systems, software programs, and procedures for the ERFs have been developed and installed. The inspection procedures and techniques to be used are as follows:

a. The inspection shall be conducted using a team consisting of the following individuals:

1. Regional Team Leader
2. Reactor Systems Engineer
3. Meteorologist
4. Dose Assessment Specialist
5. Computer Systems Specialist (only when a computerized data acquisition is used in the ERFS).

b. The inspection shall be conducted during the licensee's annual exercise using this procedure rather than Inspection Procedure 82301. The usual observation of the licensee's activities will not be performed under this procedure. The NRC Regions may determine that the licensee's exercise must be observed using Inspection Procedure 82301 if special circumstances justify its observation (e.g., significant deficiencies or open items from previous exercise). In this case the ERF evaluation may be deferred until the next annual exercise or performed separately during scheduled drills involving the ERFs. If the exercise is a full participation exercise to be conducted in conjunction with offsite authorities, the Federal Emergency Management Agency should be advised that an NRC critique of its exercise observations will not be provided. The exercise must be scheduled to take place between Monday afternoon and Wednesday evening to ensure that the inspection team has adequate time to gain entrance to the site, observe the annual exercise and evaluate the capability of the licensee's ERFs to support the emergency managers and prepare a summary of findings to be used by the Regional team leader during his exit meeting with the licensee. It is anticipated that this inspection can be conducted during a four day period onsite.

c. During the inspection the team will evaluate the licensee's ERFs by observing the functioning of the ERFs during the exercise, by reviewing ERF systems and by interviewing key personnel. The following areas will be reviewed during the inspection; the hardware and software design of the emergency data acquisition system, the models and techniques use to determine the source term, transport, and dispersion of radioactive

materials releases to the environment. The inspectors will also interview the engineering and design personnel that developed the systems, procedures and techniques. During the exercise the inspectors will observe the capabilities of these facilities and their supporting data and equipment systems to meet the needs of emergency managers. The licensee should be requested to operate data acquisition systems, run computer models, demonstrate software designs and operate emergency ventilation and lighting equipment for the inspection team to verify compliance with the requirements and commitments for these systems.

d. A matrix recommending the inspection assignments of each team member is provided in Appendix 1 of this procedure. A blank assignment matrix is also provided for use by the Regional team leader. Assignments for the various team members provide specific areas to be inspected on an independent basis. Although the procedure provides guidance for conducting the evaluation, reasonable flexibility will be allowed each member to account for the plant specific character of the ERF design. At the discretion of the team leader, an indepth review greater than defined by the scope of the guidance may be pursued for areas where weaknesses are suspected. Each onsite inspection will be preceded by dedicated advanced preparation and familiarization of site-specifics such as plant design and layout, final ERF conceptual design, and emergency preparedness appraisal findings. During this period a major portion of the review of the structures, equipment, models, hardware design, and emergency procedures for the ERFs should be performed.

e. Upon completion of the inspection of the final ERFs, a formal inspection report will be written by the NRC Region. This report will be developed from the individual written inputs from the team members assigned to the various areas to be evaluated. Discussions and coordination of the report findings may necessitate the team leader conferring with the team members. The team members are responsible for providing a written evaluation and findings for each inspection item assigned. It should be noted that some of these items or inspection areas are assigned to more than one

team member. However, the team member responsible for preparing the evaluation is designated in the assignment matrix with the other team members providing supporting inputs on an observed or requested basis depending on the team leader's judgement and the needs of the team member responsible for evaluating the item for the report. Should any supporting or other team member observe any potential problem area(s) warranting further evaluation by the team member responsible for preparing the applicable portion of the report, the item should be discussed with the responsible team member. Should team members responsible for preparing specific sections of the report find they may not be able to complete all assigned sections, the team leader will be alerted.

f. Team members will coordinate their activities to minimize the need for the licensee to operate or demonstrate the same equipment or process more than once (e.g., demonstrations of data acquisition systems, and dose assessment systems, and discussions of complex programs or documents.) See item 03.01.d. above.

g. The inspection findings shall specify if there is reasonable assurance that the licensee's ERFs, including the data and information systems and equipment provide adequate and reliable support to the principal emergency managers during radiological accidents. Identified violations of requirements must be related directly to Supplement 1 to NUREG-0737, to the standards of 10 CFR 50.47(b) and 10 CFR Part 50, Appendix E, or the ability to perform intended functions. Deviations must be referenced to specific commitments by the licensee in the FSAR or other documentation. Open items shall include incomplete systems or areas where the licensee agrees to make changes prior to the issuance of the inspection report. Although the ERF Evaluation Report may recommend improvements in the ERFs to enhance their operational capabilities, only violations, deviations, and open items shall be included in the report findings. Deviations, and open items will be handled in accordance with regional policy and violations will be handled under normal inspection and enforcement procedures.

h. The following schedule should be adhered to in initiating the ERF Evaluation Inspection:

1. The team leader should provide the following to the licensee approximately six weeks prior to the scheduled inspection:
   (a) Appendix 2 of this procedure which provides a form to be completed by the licensee that will provide the team with the names, organization and telephone numbers of persons to be contacted and reference documentation for each area to be evaluated. The licensee should assure the availability of these individuals during the last three days of the onsite inspection in order for the team to complete its evaluation within the allotted inspection period.

   (b) Appendix 3 of this procedure which provides a list of various documents and other information that are needed to conduct the inspection and should be provided to the team when it arrives onsite.

2. At least 15 working days prior to the projected onsite inspection, the team leader will contact plant management and the Resident Inspector to arrange for team access and workspace. This will be confirmed in writing by the Region, including detailing the schedule for inspection activities, team composition (by name, affiliation and assignment) and other appropriate logistical details. A form is provided in Appendix 1C to assist in transmitting the names and assignments of team members.

3. A meeting of the inspection team should be scheduled prior to the inspection to familiarize them with the site specific conditions. This meeting should be scheduled in the geographical location of the plant site. The specific time and place of the meeting should be set at the discretion of the team leader. The information covered during this meeting should include the following:

(a) discussion of the licensee's management and emergency organization.

(b) coordination of the team inspection assignments including the preparation of the written evaluations and findings for the various portions of the inspection report.

(c) relationship of the emergency functions among the various ERFs for the specific site.

(d) site specific aspects of the licensee's Emergency Plan and EPIPs.

(e) time phasing of the accident scenario for the exercise.

(f) work space and arrangements provided for the team by the licensee.

(g) review past or existing facility related problem areas.

4. A meeting between the team members and the personnel listed by the licensee in Appendix 2 should be scheduled at the earliest time available after the team arrives onsite. This meeting will offer the team members an early opportunity to meet their primary licensee contacts, schedule interviews and identify additional personnel or resources needed for information.

i. Preparation of the Inspection Report

1. The inspection team will provide the Regional team leader with a summary of their findings before the exit meeting scheduled prior to the team leaving the site. No later than ten working days after leaving the site all team members will provide a final evaluation

and findings report to the Regional team leader and the NRC Headquarters technical coordinator evaluating the areas assigned and should include a list of licensee personnel with whom they had contact by name and title. The findings must provide the facts to justify any violation, deviation or open item. These reports shall be used by the team leader to prepare the final ERF evaluation report.

2. No later than ten working days after receiving the last report from the individual team members, the Region will provide the final ERF evaluation report to the Chief, Emergency Preparedness Branch, Division of Radiological Protection and Emergency Preparedness, Office of Nuclear Reactor Regulation (PEPB/NRR) for review and concurrence. The Chief, PEPB/NRR will provide a concurrence by telephone to the Region within five working days after receipt of the ERF evaluation report.

3. No later than 30 working days after leaving the site or within 20 working days after receiving the last report from the team members, the Region will provide the final ERF evaluation report to the licensee signed by the appropriate Regional management and the team leader. If the report contains identified violations or deviations that require the licensee to remove or rip out ERFs or equipment that had been installed in good faith to meet previous guidance in order to meet the requirements of Supplement 1 to NUREG-0737, the concurrence of the Director, Office of Nuclear Reactor Regulation (NRR) will be obtained prior to the issuance of the report.

4. The inspection report will follow standards and guidelines given in Manual Chapter No. 0610, "Inspection Reports - Format and Content." The report will clearly identify all violations, deviations, and open items observed during the ERF evaluation in the findings. These items and any other items which the licensee has agreed to correct anytime prior to the issuance of the final ERF Evaluation

Report will be tracked for correction within a schedule to be negotiated between the licensee or applicant, Regional management and the Project Manager, NRR. When corrections cannot be agreed to, recommendations for possible further regulatory action will be forwarded to the Director of the appropriate project division of NRR. If the correction of any violation or deviation requires the licensee to remove or rip out ERFs or equipment that were installed in good faith to meet previous guidance in order to meet the requirements of Supplement 1 to NUREG-0737, the approval of any such orders will be obtained from the Director, NRR.

5. The exercise report should be prepared and issued in accordance with current inspection guidance and Regional policy.

03.02 Assessment of Radiological Releases. Evaluate whether the ERFs are adequately equipped to determine the magnitude of and for continuously assessing the impact of a release of radioactive material to the environment using the guidance to determine adequacy in this area as presented below. This guidance is applicable to both the TSC and EOF unless otherwise noted.

a. Evaluate methods available for determining radioactive release rates (source term) to the environment in an accident situation.

1. Review precalculated relationships of variables to accident conditions. Typical relationships to review include:

(a) Containment radiation exposure rates, coolant radioactivity concentrations, and coolant chemistry to core conditions

(b) Hydrogen concentration in containment to containment and fuel clad failure

(c) Area radiation monitor readings outside containment to containment high radiation monitor readings

(d) Letdown line and main steam line process radiation monitor readings to coolant radioactivity concentration

(e) Affect on stack monitor readings of gamma radiation shine from containment.

2. Evaluate the variables available and the calculation methods used to determine source terms for all potential release pathways (e.g., effluent monitors, containment monitors, containment leak rate, fuel damage monitors, real time environmental monitoring, post-accident sampling results, in-plant radiological monitoring). Evaluate methods for dealing with inoperable or offscale monitoring instruments.

b. Determine whether the dose assessment method(s) used are adequate for calculating thyroid inhalation dose commitment and whole body dose for applicable release pathways (both ground level and elevated releases) in the plume exposure pathway.

1. Evaluate the capability of the primary dose assessment model to make timely dose projections for variable release durations, variable distances in the plume EPZ, variable meteorological conditions, and for variable and/or multiple source term(s).

2. Review the dose assessment model(s) capability for calculating current dose rates, integrated doses, and projected doses for periods up to 24 hours for specific points in the plume EPZ.

3. Evaluate the adequacy of source term information entered into the model.

(a) Determine the adequacy of any default isotopic mixes used in the model (e.g., consideration of isotopic mix changes based on the time after shutdown, appropriate use of dose equivalent values).

(b) If individual radionuclide concentrations (e.g., from effluent grab sample results or post-accident sampling results) can be input into the model, evaluate the adequacy of the radionuclides which the model will accept.

4. Evaluate the capability for entering meteorological and source term data into the model.

(a) Determine the adequacy of the primary method for obtaining meteorological and source term data to input into the dose model in the ERFs.

(b) Assure that a backup capability exists for obtaining source term and meteorological data if this data is automatically entered into the model.

5. Determine whether the sensitivity and uncertainty inherent in dose assessment have been established and factored into the dose projections.

6. Review the systematic validation and verification analysis performed by the licensee or a contractor on the dose assessment model.

(a) Review any comparisons the licensee has made with other documented dose assessment models.

(b) If comparisons to other models are not available, compare the licensee's model to the extent practical to a straight line Gaussian plume projection model.

(c) Determine the adequacy of whole body and thyroid dose conversion factors used in the licensee's model.

7. Review how field monitoring data is used to correct or modify the dose projections (e.g., the use of the dose assessment model to backcalculate from field readings to release rate, how differences are interpreted if field readings and model estimates are not the same).

8. Determine the adequacy of the backup dose calculation method which would be used if the primary method where unavailable in the TSC or EOF.

9. If dose projections are used in decisionmaking (e.g., EAL determination), evaluate the adequacy of the rapid dose projection capability on-shift, in either the Control Room or the TSC.

03.03 Meteorological Information. The inspection shall determine if the meteorological information available in the Control Room, TSC and EOF is adequate for continuously assessing the impact of the release of radioactive material to the environment. In making this determination, the inspector shall:

a. Determine if recorded indications of wind direction, wind speed, and atmospheric stability are provided in the Control Room.

b. Determine if the indications of wind direction, wind speed and atmospheric stability provided in the ERFs are representative of the meteorological conditions in the vicinity of the plant site. In making this determination, consider factors such as: the exposure of the

sensors, their location relative to topographic features, and their location relative to potential release points (e.g., ground-level or elevated). If the site-specific indications of wind direction, wind speed, and atmospheric stability provided are not representative of the conditions in the vicinity of the plant site, determine if other reliable meteorological information is provided that is representative of conditions in the vicinity of the plant site.

Determine if the meteorological system provides reliable indications of wind direction, wind speed and atmospheric stability. The following steps should be followed in establishing reliability:

1. Evaluate historical records of the availability of wind direction, wind speed, and atmospheric stability information (e.g., approximately 0.90 availability).

2. Determine if the instrumentation used to make the wind direction, wind speed, and atmospheric stability measurements meet the specifications set forth in RG 1.97.

3. Determine if instrument inspection, maintenance, and calibration procedures exist and are adequate.

4. Determine if the meteorological instrumentation has been designed to facilitate the recognition, location, and repair, replacement or adjustment of malfunctioning modules.

5. Determine if the instruments and their signal processing modules are in administratively controlled areas.

6. Other factors that have a bearing on the reliability of the indications provided should be considered (e.g., redundant sensors, backup systems and data from other locations).

d. Determine what other site-specific meteorological information is provided that might be used in assessing the impacts of the release of radioactive material (e.g., wind direction variability, precipitation, solar radiation, humidity).

e. Determine if a method of voice communications has been established with the National Weather Service (or equivalent meteorological service) to obtain information on regional meteorological conditions and forecast capability.

f. Determine if adequate facilities exist in the ERFs for the acquisition, display, and evaluation of meteorological data for determining protective measures.

g. Determine if the ERFs have the capability to store, analyze, display sufficient meteorological information to determine changes in status, forecast status, and take appropriate actions. In determining if sufficient meteorological information is available, the data requirements of all ERF functions should be considered. For example, data on meteorological variables, such as precipitation, that might affect protective action recommendations should be available, as well as all data needed by the dose assessment model. In addition, there should be provision for obtaining meteorological data for use in dose assessment in the event that the data are unavailable from the primary data sources. The alternate sources of information may include backup meteorological systems and default values. If default values are provided, the basis of the values should be determined.

h. Determine if the methods of collecting, storing, analyzing, displaying and communicating meteorological information in the ERFs are reliable.

03.04 TSC Variable Availability. The variables available in the TSC (by computer system display, status board or other means) are to be reviewed to

determine their adequacy for allowing the TSC managers to perform their function. The inspection procedures and techniques to be used are as follows:

a. Obtain copies of documentation submitted by the licensee to NRC concerning commitments and progress on meeting the requirements of RG 1.97 (e.g., FSAR commitments and Safety Analysis Reports).

b. Determine which of the RG 1.97 variables are available in the TSC. After determining which RG 1.97 variables are available and which are missing, determine if the TSC variable set provided is sufficient to allow the TSC managers to perform their designated functions. The variables provided should be sufficient to allow determination of the following plant and environmental status:

   1. The continuous removal of heat from the core and associated cooling systems (e.g., RHR, component cooling water, emergency service water and auxiliary feedwater system status).

   2. The threat to or actual degradation of the fuel and fuel cladding (e.g., as indicated by subcooling margin, radioactivity in reactor coolant and core exit thermocouple data).

   3. The integrity of the reactor coolant system (e.g., as indicated by pressurizer level, reactor vessel level, relief valve position and PWR steamline radioactivity).

   4. The integrity of the containment structure (e.g., as indicated by isolation valve status or by threats to containment such as increased hydrogen concentrations, temperature and pressure).

   5. The status and integrity of the liquid, solid and gaseous rad waste systems (e.g., radiation monitors and alarms associated with waste gas holdup tanks, liquid effluent lines, etc.).

6. Indications of damage resulting from a fueling or fuel pool accident (e.g., alarms and monitors associated with fuel pool water level, and fuel handling area radiation levels).

c. If a computer based data acquisition system is used to transmit and display variables in the TSC, a complete computer point list should be obtained from the licensee and used to verify the availability of RG 1.97 variables.

d. If telephones (or radios) and status boards are used as the primary means of obtaining any RG 1.97 variables, the adequacy of the status boards as well as the qualification, numbers and assignment of communicators, and quality of the communication link to the Control Room must be verified. Where a video data transmission system is used, the system capability to accurately obtain Control Room RG 1.97 instrument data must be verified.

e. The data determined to be available in item b above, is reviewed for its adequacy to evaluate the existing and projected status of the core, coolant system and containment to support adequate determination of proper protective action recommendations (e.g., as in NUREG-0654, Appendix 1, General Emergency example initiating condition No. 4).

03.05 TSC Functional Capabilities. Determine if during periods of activation the TSC will operate uninterrupted and whether the TSC is equipped to provide the TSC managers with the capability to perform EOF functions until the EOF becomes functional. In order to make this determination the inspector should evaluate the following areas:

a. Determine whether the power supplies will assure that the TSC will function without interruption during an emergency (i.e., normal power, UPS systems, emergency diesel, emergency battery supplies, and alternate sources of offsite power). Individual systems and components for which reliable power is important include telephones, radios, data acquisition

systems, data display systems, computerized dose assessment systems, facility lighting, ventilation systems, microfiech card readers, and radiation monitoring systems.

b. Determine if data analysis is adequate to support the TSC functions by evaluating the following areas:

1. Determine whether current system status is available (e.g., valve position, equipment operation, pump status).

2. Determine whether data analysis will facilitate determination of reactor status past, present, and future. For example, evaluate trending capability to determine if trends of the following parameters are maintained versus time: containment pressure, containment temperature, containment radiation exposure rates, containment hydrogen concentrations, primary coolant temperature, offgas radioactivity, primary coolant pressure, primary coolant inventory, power level, plant radiation exposure rates and concentrations, and makeup water inventory.

3. Determine whether precalculated relationships of variables to accident conditions have been established (e.g., Containment radiation levels vs fuel damage, containment pressure to containment failure).

4. Determine whether data analysis is performed in a manner easily related to EAL criteria (i.e., data displays should contain the parameters and relationships required to allow a clear association with EAL criteria).

03.06 TSC Habitability. Evaluate the habitability of the TSC to determine if the radiological protection provided is adequate to ensure that any person working in the TSC would not receive a radiation exposure in excess of 5 rem whole body or its equivalent (e.g., 25 rem to the thyroid) for the duration of

an accident. Severe accident conditions where the control room would not be habitable, should not be used to evaluate TSC habitability (see GDC 19). The evaluation should include the TSC gamma radiation shielding and the emergency ventilation system (i.e., ventilation filtration, positive pressure isolation, acceptance/ surveillance/maintenance records). In addition the bases for determining the adequacy of TSC habitability should also be examined (i.e., design basis, documentation of calculations and measurements).

03.07 TSC Data Collection, Storage, Analysis and Display. Careful reviews of licensee documentation and corresponding system hardware are required to establish whether TSC data systems will provide the TSC managers with reliable data collection, storage, display and communications such that correct plant site and regional status can be determined in time to take appropriate actions.

a. The inspector should perform a review of the TSC systems:

1. Methods for data collection will need to be established. Data acquisition may be done using, digital/analog instrumentation, voice communication, etc. Once it is established how data are gathered, evaluate if the methods used will provide timely plant status information.

2. Identify and characterize the use of data displays in the TSC. Typical displays would include: analog and digital meters; cathode ray tubes (crt's); hard copy devices; chart recorders; status boards; and other manual displays. After identifying display devices determine: 1) if displayed data are appropriately labeled, legible, updated in a timely manner, and properly organized; 2) if TSC displays are adequate in number, easily updated, and facilitate user access; 3) if trending displays support the intended functions of the TSC; and 4) if user documentation is readily available to explain the use of displays.

3. Ascertain the time resolution of the data to determine if plant parameter changes can be detected and reported without the loss of significant information (e.g., pressure spike in containment due to a hydrogen burn).

4. Review signal isolation effects of installed systems. Specifically, review the system interface design and any system isolation verification/validation documentation to assure that significant signal degradation of installed systems is not occurring and that interference, degradation or damage to any element of the safety system is prevented (see GDC 24).

5. Established whether: 1) the data communications capacity of the data acquisition system(s) is sufficient to access all data to be transmitted to the TSC; 2) the time resolution for data transmission of each of the variables is adequate to assure that no significant data are lost; 3) the data transmission is accurate; and 4) the means of transmission are technically adequate.

6. Determine if the processing system capacity of the central processor is adequate to support data acquisition analysis, display, and storage requirements for the TSC. Other computational requirements will need to be identified along with total projected processor resources utilized at peak loads to identify probable system degradation during an accident situation. If the central processor is using multitasking, it will need to be established whether essential TSC tasks would be degraded by concurrent tasks supporting other non-TSC functions.

7. Data storage capacity will require review. This will include: 1) determining if data storage is adequate to support necessary data handling such as trending and analytical requirements; and 2) determining if data storage is adequate to allow analytical review of the plant response to transients for TSC management.

8. Model and system reliability and validity will need to be reviewed to find out how the verification was done and whether the verification was an independent effort.

9. The reliability of computer systems supporting TSC functions should be established by reviewing unavailability records, maintenance logs, vendor technical specifications, similar system comparison, or end-to-end tests. The system should exceed an overall availability of 0.95 to be considered reliable.

10. Manual systems need to be identified and reviewed to assure that any data gathered, processed, or displayed in the TSC are reliable. Checks to support this review may include: independent sources of information; crosschecks; confirmation between source and destination; and use of formal procedures or checklists.

11. Specifications of environmental control systems (i.e., air conditioning and humidity control systems) need to be reviewed to determine if they meet the requirements of vendor supplied computers and peripherals used in the TSC.

b. As a part of evaluating the information management and data acquisition system for the TSC and the EOF, the availability of the report on the implementation of RG 1.97 should be determined. This report is required for each site by Supplement 1 of NUREG-0737 and must be submitted by the licensee describing how the requirements are to be met. Deviations from the guidance are explicitly shown and a supporting justification or alternatives are presented in this report. The NRC Headquarters Technical Coordinator will determine the availability of this report or any other SER or NRC evaluations of the licensee's submittal. Copies will be provided to the individuals performing reactor operations, dose assessment, meteorology evaluations, and regional team leader to assist them in evaluating the adequacy of the TSC and EOF database.

In addition, if the licensee states that the Safety Parameter Display System (SPDS) is a part of the emergency data acquisition system for the TSC and/or the EOF, an evaluation will be performed of the SPDS as a part of this ERF inspection. This SPDS evaluation will be performed only for its adequacy as a part of the emergency data acquisition system for the use of TSC and/or the EOF and not as an operator aid in the Control Room. The adequacy of the SPDS as a part of the emergency data acquisition system will have no bearing on its acceptability as an operator aid (reference Supplement 1 to NUREG-0737, item 4).

03.08 EOF Location and Habitability. Determine if the EOF location and habitability meet the requirements of Table 1 of Supplement 1 to NUREG-0737. To make this determination the inspector should evaluate the following areas:

a. Determine if the EOF is located as described in Table 1 in Supplement 1 to NUREG-0737.

b. Identify which option as specified in the Supplement was chosen and determine if the EOF meets all the criteria for that option.

c. If the EOF is located within the 10 mile EPZ determine if the appropriate habitability requirements have been met. Evaluate the gamma protection factor (PF) for areas used for communications, dose assessment, and decisionmaking to ensure that it is at least a PF of 5 for 0.7 MeV gamma. The ventilation system HEPA filtration, facility isolation and the acceptance/surveillance/maintenance records should also be evaluated.

03.09 EOF Functional Capabilities. Determine if the EOF is equipped to provide the EOF managers with the capability for management of the overall licensee emergency response, coordination of radiological and environmental assessments, development of protective action recommendations and coordination of

emergency response activities with Federal, State, and local agencies. In order to make this determination the inspector should evaluate the following areas:

a. Determine if data analysis is adequate to support the EOF functions by evaluating the following areas:

1. Determine whether data analysis will facilitate determination of reactor status past, present, and future. For example, evaluate trending capability to determine if trends of the following parameters are maintained versus time: containment pressure, containment radiation exposure rates, containment temperature, containment hydrogen concentrations, offgas radioactivity, and plant radiation exposure rates.

2. Determine whether precalculated relationships of variables to accident conditions have been established (e.g., containment radiation levels vs fuel damage, containment pressure vs containment leakage).

3. Determine whether data analysis is performed in a manner easily related to EAL criteria (i.e., data displays should contain the parameters and relationships required to allow a clear association with classification and protective action decisionmaking criteria).

4. Determine if parameters are displayed in a manner that makes it easy to determine deviations in parameters from normal (e.g., superimposed curves, normal ranges also displayed, displayed in percent of normal).

b. If a backup EOF is provided determine if it is adequate to accept the transfer of the dose assessment, communications, and decisionmaking functions of the EOF if the primary EOF must be evacuated (e.g., communications capability, data availability).

c. If the licensee has a primary EOF within 10 miles of the plant site and a backup EOF outside of the 10 mile radius, a degree of reliability is provided by the redundant locations. EOF power supplies need only be evaluated if one of the following two situations is encountered: 1) there is a single EOF outside the 10 mile plant radius or 2) the primary and backup EOFs are on a common power grid which has a high probability of causing a power failure affecting both EOFs. If either situation exists, determine whether the power supplies will assure that the EOF will function reliability during an emergency using the same procedure described in item 03.05a. for the TSC.

03.10 EOF Variable Availability. The variables available in the EOF (by computer system display, status board or other means) are to be reviewed to determine their adequacy for allowing EOF managers to perform their function. In contrast to the more all inclusive set of variables expected to be available in the TSC, the set of variables required in the EOF are limited to those necessary to monitor actual or potential containment conditions and releases of radioactivity from the plant. The inspection procedures and techniques to be used are as follows:

a. Obtain copies of documentation submitted by the licensee the NRC concerning commitments and progress on meeting the requirements of RG 1.97 (e.g., FSAR commitments).

b. Determine which of the RG 1.97 variables are available in the EOF and which are missing. Determine if the EOF variable set provided is sufficient to allow the EOF managers to perform their designated functions. The variables provided should be sufficient to allow determination of the following containment, radiological and environmental status:

1. The integrity of the containment structure (e.g., as indicated by isolation valve status or by threats to containment such as increased hydrogen concentrations, temperature and pressure).

2. The release of radioactivity from the plant (e.g., as indicated by process radiation monitors on release points, building area and containment radiation monitors, and ventilation system flowrates).

3. Meteorological variables. (Note: meteorological variables are covered in Section 03.03 of this procedure).

c. If a computer based data acquisition system is used to transmit and display variables in the EOF, a complete computer point list should be obtained from the licensee and used to verify the availability of RG 1.97 variables.

d. If telephones (or radios) and status boards are used as the primary means of obtaining any RG 1.97 variables, the adequacy of the status boards as well as the qualification, numbers and assignment of communicators, and quality of the communication link to the EOF must be verified. Where a video data transmission system is used, the system capability to accurately obtain Control Room RG 1.97 instrument data must be verified.

e. The data determined to be available in item b above is reviewed for its adequacy to evaluate the existing and projected status of the containment and the actual or potential releases of radioactive material from the plant.

03.11 EOF Data Collection, Storage, Analysis and Display. In-depth reviews of licensee documentation and corresponding system hardware are required to establish whether data systems supporting the EOF will provide the EOF managers with reliable data collection, storage, display and communications such that correct plant site and regional status can be determined in time to

take appropriate actions. The review methods described in Section 03.07 for the TSC data acquisition system should be repeated in the evaluation of the EOF data acquisition system. The EOF evaluation should be considered from the perspective of the needs of the EOF managers. The necessity to complete a separate review or to repeat all the steps in the evalaution is dependent on whether these data systems use the same acquisition hardware, firmware and software as well as whether they use a common data base.

82412-04 - INSPECTION RESOURCES

04.01 The estimated resources need to complete a typical ERF evaluation at a nuclear power plant site are:

a. The estimated manhours for each specialist team member:

1.	Preparation time for the inspection	= 16
2.	Travel time to and from the site	= 16
3.	Conducting the inspection onsite	= 32
4.	Writing a report of results and findings	= 40
5.	Total	104 Manhours

b. The estimated manhours for the Regional team leader:

1.	Preparation time for the inspection	= 20
2.	Travel time to and from the site	= 8
3.	Conducting the inspection onsite	= 32
4.	Writing and staffing the inspection report	= 48
5.	Total	108 Manhours

c. The total estimated resources needed for an ERF evaluation are (104 x 4 + 108 = 524) 524 Manhours.

82412-05 REFERENCES

U.S. Code of Federal Regulations (CFR). Title 10, Part 50, "Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," Criteria 19 and 24.

U.S. Code of Federal Regulations (CFR). Title 10, Part 50, "Licensing of Production and Utilization Facilities," Appendix E, "Emergency Plans for Production and Utilization Facilities."

U.S. Code of Federal Regulations (CFR). Title 10, Part 50.47, "Emergency Plans."

U.S. Nuclear Regulatory Commission (NRC). 1980. Criteria for Preparation and Evaluation of Radioliological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants. NUREG-0654, FEMA-REP-1, Rev. 1, Washington D.C.

U.S. Nuclear Regulatory Commission (NRC). 1983. Clarification of TMI Action Plan Requirements, NUREG-0737, Supplement No. 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1981. Functional Criteria for Emergency Response Facilities. NUREG-0696, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). Inspection and Enforcement Manual, IE Inspection Procedure 82301, "Evaluation of Exercise for Power Reactors."

U.S. Nuclear Regulatory Commission (NRC). Inspection and Enforcement Manual, Chapter 0601.

APPENDIX 1A

RECOMMENDED INSPECTION ASSIGNMENT MATRIX

Inspection Items		Technical Area Assigned				
		Reactor Operations	Dose Assessment	Meteorology	Computer Systems	Regional Team Leader
03.02	Assessment of Radiological Releases					
(a)	Source Term	X	•			
(b)	Dose Assessment		•	X	X	
03.03	Meteorological Information					
(a)	Control Room Information			•		
(b)	Representive Data			•		
(c)	Data Reliability			•		
(d)	Other Data Availability			•		
(e)	NWS Data Availability			•		
(f)	Data Adequacy			•		
(g)	Data Storage, Display, Analysis			•	X	
(h)	Data Handling Reliability			•	X	
03.04	TSC Variable Availability					
(a)	Documentation for Reg Guide 1.97 Variables	•				
(b)	Reg Guide 1.97 Variable Availability & Sufficiency	•	X		X	
(c)	Computer Data	•			X	
(d)	Manual Data	•				
(e)	Data adequacy	•	X			
03.05	TSC Functional Capabilites					
(a)	TSC Power Supplies	•				
(b)	TSC Data Analysis	•	X			

• - Responsible for write-up of item
X - Should provide input for item

Inspection Items		Technical Area Assigned				
		Reactor Operations	Dose Assessment	Meteorology	Computer Systems	Regional Team Leader
03.06	TSC Habitability		•			X
03.07	TSC Data Collection Storage, Analyses and Display					
(a)	Review TSC Systems	X			•	
(b)	Data Acquisition Systems	X	X	X	•	
03.08	EOF Variable Availability					
(a)	Documentation for Reg Guide 1.97 Variables	•				
(b)	Reg. Guide 1.97 Variable Availability and sufficiency	•	X		X	
(c)	Computer Data	•			X	
(d)	Manual Data	•				
(e)	Data Adequacy	•	X			
03.09	EOF Location and Habitability					
(a)	Location					•
(b)	Meets Criteria of Supp. 1					•
(c)	Habitability		•			X
03.10	EOF Functional Capabilities					
(a)	Data Analysis Adequacy	•	X			
(b)	Backup EOF	X	X	X		•
(c)	EOF Reliability	•				
03.11	EOF Data Collection, Storage, Analysis and Display	X			•	

• - Responsible for write-up of item
X - Should provide input for item

APPENDIX 1B

RECOMMENDED INSPECTION ASSIGNMENT MATRIX

Inspection Items		Technical Area Assigned				
		Reactor Operations	Dose Assessment	Meteorology	Computer Systems	Regional Team Leader
C3.02	Assessment of Radiological Releases					
(a)	Source Term					
(b)	Dose Assessment					
C3.03	Meteorological Information					
(a)	Control Room Information					
(b)	Representive Data					
(c)	Data Reliability					
(d)	Other Data Availability					
(e)	NWS Data Availability					
(f)	Data Adequacy					
(g)	Data Storage, Display, Analysis					
(h)	Data Handling Reliability					
C3.04	TSC Variable Availability					
(a)	Documentation for Reg Guide 1.97 Variables					
(b)	Reg Guide 1.97 Variable Availability & Sufficiency					
(c)	Computer Data					
(d)	Manual Data					
(e)	Data Adequacy					
C3.05	TSC Functional Capabilites					
(a)	TSC Power Supplies					
(b)	TSC Data Analysis					
C3.06	TSC Habitability					

Inspection Items		Technical Area Assigned				
		Reactor Operations	Dose Assessment	Meteorology	Computer Systems	Regional Team Leader
D3.07	TSC Data Collection Storage, Analyses and Display					
(a)	Review TSC Systems					
(b)	Data Acquisition Systems					
D3.08	EOF Variable Availability					
(a)	Documentation for Reg Guide 1.97 Variables					
(b)	Reg. Guide 1.97 Variable Availability and Sufficiency					
(c)	Computer Data					
(d)	Manual Data					
(e)	Data Adequacy					
D3.09	EOF Location and Habitability					
(a)	Location					
(b)	Meets Criteria of Supp. 1					
(c)	Habitability					
D3.10	EOF Functional Capabilities					
(a)	Data Analysis Adequacy					
(b)	Backup EOF					
(c)	EOF Reliability					
D3.11	EOF Data Collection, Storage, Analysis and Display					

APPENDIX 1C

Team Assignments

Team Member	ERF Assignment*	Exercise Assignment

* Specific appraisal assignments are as specified in Appendix 1A.

APPENDIX 2

Inspection Items	Licensee Contact Personnel			Reference/Comments
Item	Organization	Individual(s)	Phone No.	
03.02 Assessment of Radiological Releases				
(a) Source Term				
(b) Dose Assessment				
03.03 Meteorological Information				
(a) Control Room Information				
(b) Representive Data				
(c) Data Reliability				
(d) Other Data Availability				
(e) NWS Data Availability				
(f) Data Adequacy				
(g) Data Storage, Display, Analysis				
(h) EOF Data Handling Reliability				
03.04 TSC Variable Availability				
(a) Documentation for Reg Guide 1.97 Variables				
(b) Reg Guide 1.97 Variable Availability and Sufficiency				
(c) Computer Data				
(d) Manual Data				
(e) Data Adequacy				
03.05 TSC Functional Capabilities				
(a) TSC Power Supplies				
(b) TSC Data Analysis				
03.06 TSC Habitability				
03.07 TSC Data Collection Storage, Analyses and Display				
(a) Review TSC Systems				
(b) Data Acquisition Systems				
03.08 EOF Variable Availability				
(a) Documentation for Reg Guide 1.97 Variables				
(b) Reg. Guide 1.97 Variable Availability and Sufficiency				

APPENDIX 2

Inspection Items		Licensee Contact Personnel			Reference/Comments
Item		Organization	Individual(s)	Phone No.	
	(c) Computer Data				
	(d) Manual Data				
	(e) Data Adequacy				
03.09	EOF Location and Habitability				
	(a) Location				
	(b) Meets Criteria of Supp. 1				
	(c) Habitability				
03.10	EOF Functional Capabilities				
	(a) Data Anaysis Adequacy				
	(b) Backup EOF				
	(c) EOF Reliability				
03.11	EOF Data Collection, Storage, Analysis and Display				

APPENDIX 3

Documentation needed to conduct the ERF appraisal.

Documentation for all team members:

- Emergency Plan
- EPIPs
- FSAR
- Description and location of alternate ERFs
- Plant Systems Description Manuals
- Listing of types and quantities of equipment maintained in ERFs
  - protective clothing
  - dosimeters
  - survey instruments
  - SCBAs
  - procedures
  - reference material

Dose Assessment Documentation:

- Implementing procedures for both computerized and manual dose assessment.
- User's guide for computerized dose assessment model.
- Technical basis document for dose assessment model.
- Documentation of any comparative studies done between the licensee's model and the state model(s).
- Documentation of any verification studies done on the licensee's DA program.
- Maps of the area (10 and 50 mi radius).

Computer Systems Documentation:

- Computer configuration specification for Emergency Data Acquisition System, Plant Computer, and SPDS
- Description of data system operation (i.e., "user's guides")
- Records of system availability
- Documentation of computer code verification
- Examples of hard copy output for routine reports and graphical displays
- Block diagram of computer systems showing interfaces.

Reactor Operations Documentation:

- Electrical one line diagrams from off-site to the TSC, normal power, emergency power, lighting, phones, communication systems, station PBX, micro-wave, plant process computer, data acquisition systems. Same for EOF if near-site; if far-site, power feeds to the building.
- EPIPs covering classification, core-damage assessment, TSC Manager responsibility and EOF Manager responsibilities.
- Integrated, living schedule for all ERF related items, R.G. 1.97 items
- R. G. 1.97 submittal, EG&G review, final SER
- SAR by licensee on its Data Acquisition System and SPDS
- Plant Information Manual on Plant Process Computer, SPDS, Radiation Monitoring System, Electrical Distribution
- Inventory of TSC and EOF documents and references.

Meteorological Documentation:

- A block diagram of the meteorological system showing the path data takes from sensor to storage and display, identifying the main components in the system e.g., sensors, signal conditioning, data acquisition systems, data processing, data storage, and data displays and their locations.
- Technical specifications for system sensors and other system components, and a list of their special features, such as heaters for wind instruments.
- A detailed description of the tower and sensor mounts, and a plan-view drawing, preferably to scale.
- Description of power sources for the sensors, signal conditioning, data acquisition systems and recorders including power conditioning, lightning protection and backup sources of power.
- Environmental controls for areas in which signal conditioning, data acquisition systems, recorders and other critical system components are located.
- All written procedures for meteorological system operations, maintenance and calibration.
- Documentation on meteorological data availability.
- A copy of the most recent joint frequency distribution of wind direction, wind speed and atmospheric stability.

- A list of the locations where onsite meteorological data would be available during an emergency.
- A list of sources of regional meteorological data and forecasts noting formal agreements and contracts.
- Written procedures related to dose assessment and activation of the ERFs.
- A generic description of the methods used to evaluate transport, diffusion, deposition and other atmospheric processes in all ERFs.
- Listings of computer codes used in dose assessment.
- Supporting documentation for atmospheric models including those in the dose assessment codes, e.g., theoretical bases, code verifications, user's guides.
- Maps of the area (10 and 50 mi radius).

Source Term Documentation:

- One line drawings of plant's ventilation system showing the following:

  - vent flow rates
  - points monitored and description of monitors
  - fan and damper line-ups for normal and accident modes

- Any studies/evaluation made of potential unmonitored release paths.
- Effluent monitor calibration procedures and calibration data. Description of methods used to verify manufacturers primary calibration.
- Core damage estimate procedures.
- Description of plant radiation monitoring systems (process monitors, ARMs, and CAMs). One line drawing for these systems and a list of monitors powered from vital power.
- Description of the plants post accident monitoring system and its capabilities.
- Listing of and rational for nuclide library used by dose assessment procedures or computer programs.
- A description of the basic source term assumptions used for accident scenarios treated by manual and computerized dose assessment methods, and the rationale behind each.