U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-483/86009(DRSS)

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

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

Facility Name: Callaway Nuclear Power Plant

Inspection At: Callaway Plant, Reform, MO

Inspection Conducted: March 24-28, 1986

Inspectors: T. Rhodi for J. Patterson, Team Leader — Date 4/14/86

T. Rhodi for J. Foster — Date 4/14/86

T. Rhodi for M. Smith — Date 4/14/86

T. Rhodi for W. Snell, Chief, Emergency Preparedness Section — Date 4/14/86

Approved By:

Inspection Summary

Inspection on March 24-28, 1986 (Report No. 50-483/86009(DRSS))
Areas Inspected: Routine, unannounced inspection of the following areas of the Callaway Nuclear Power Plant emergency preparedness program: activations of the licensee's emergency plan; emergency detection and classification; protective action decisionmaking, notifications and communications; changes to the emergency preparedness program; shift staffing and augmentation; knowledge and performance of duties (training); licensee audits. The inspection was conducted by three NRC inspectors and two consultants.
Results: No violations, deficiencies, or deviations were identified. However, five Open Items were identified during the inspection.

DETAILS

1. Persons Contacted

D. Schnell, Vice President, Nuclear
*A. White, Supervisor, Emergency Preparedness
*M. Stiller, Manager, Nuclear Safety and Emergency Preparedness
*S. Miltenberger, Manager, Callaway Plant
*A. Neuhalfen, Manager, QA
G. Hughes, Supervisor, Independent Safety Engineering Group
*M. Evans, Senior Training Supervisor
M. Faulkner, Administrator, Nuclear Affairs
*G. Nevels, Training Supervisor
*W. Norton, QA Engineer
L. Kanuckel, Supervisory Engineer, QA Program
R. McAleenan, Manager, Nuclear Information
*J. Gearhart, Supervising Engineer, Quality Assurance
*H. Bono, Engineer, Quality Assurance
G. Poteat, Nuclear Scientist
W. Hinchic, Assistant Engineer, Emergency Preparedness
S. Harvey, Administrator, Nuclear Affairs
S. Leach, Rad/Chem Foreman
P. Bell, Chemist
D. Heinlin, Assistant Plant Superintendent
B. Schoenbach, Operating Supervisor
N. Barnet, Operating Supervisor
R. Hamblen, Shift Technical Advisor
S. Rutthoff, Shift Supervisor
W. Lacefield, Operations Supervisor
T. Moser, Shift Technical Advisor
P. Hobbs, Operations Supervisor
D. Neil, Operations Supervisor
L. Rippy, Shift Technical Advisor
L. Auman, Health Physics Foreman
C. Graham, Health Physics Supervisor
S. Halvorsen, Senior Training Supervisor, Simulator
R. Burris, Senior Training Supervisor, I&C, Maintenance and Quality Control
J. Hogg, Supervisory Engineer, Operations
R. Gunderstrom, Rad/Chem Foreman

*Denotes those attending the exit interview on March 28, 1986.

2. Activations of the Licensee's Emergency Plan

(Closed) Open Item Nos. 483/85001-XX, 483/85002-XX. Two activations of the Callaway Radiological Emergency Response Plan (RERP) were identified as having occurred since the last inspection. The first event, which occurred during plant startup on February 22, 1985, was due to a reactor trip initiated by a loss of power to the reactor coolant pumps (caused by a power failure to the startup transformer). The second event, on March 30, 1985, was due to a Safety Injection System activation for 5-10 minutes due to a low steamline pressure signal during plant cooldown.

Both event classifications were based on the correct Emergency Action Level (EAL) and each was correctly classified as a Notice of Unusual Event. Also, the inspector verified that notifications to State and local governmental agencies and the NRC Operations Center were made within the required times. The addition of a ring-down telephone, which reaches all support agencies at one time, has reduced notification times from those noted in the previous inspection.

3. Emergency Detection and Classification

A thorough review of procedure EIP-ZZ-00101 "Classification of Emergencies" was conducted. The procedure is now in Revision 5, dated February 14, 1986. Individual Emergency Action Level criteria were compared to the guidance in Appendix 1 of NUREG-0654, 10 CFR 50, the Callaway Technical Specifications, Callaway drawings, FSAR, and other procedures. Problems identified were reviewed with licensee personnel responsible for EAL development to ensure that related plant system performance and procedures were understood by the reviewer. The basic categories of problems in the present EAL scheme are listed below. Detailed examples of EAL problems are provided as a separate attachment (Attachment 1).

The extensive use of confirmatory grab sample analysis to verify various process radiation monitor alarms introduces unnecessary delays of approximately 45 minutes to two hours in meeting several EAL detection criteria.

The sets of indicators used to detect certain events and equipment failures are not consistent among different EALs which contain the same failures as part of the decisionmaking criteria. The sets of indications used to detect the occurrence of a Steam Generator tube failure are the most inconsistent.

The EALs often rely on alarms and confirmatory sample results from systems which would be automatically or manually isolated within a few seconds of initiation of a transient. Therefore, it is unlikely that the sample would be representative of the system it was meant to sample.

At least one EAL, "Loss of RHR Cooldown", does not consider the functional capability of the system to be lost until virtually all system components are lost, when in fact, loss of either RHR flow or the system heat sink would remove RHR capability.

The Callaway EAL scheme is very complete in considering the applicability of EALs to limited sets of plant operating modes. The use of numerous instrument numbers and setpoints is in keeping with the intent of 10 CFR 50, Appendix E, Part IV.B. The various revisions to the EAL scheme have produced an extremely complex set of AND/OR logic statements which may impede Emergency Response personnel in their attempt to properly classify an accident situation. In reviewing the detailed examples of potential EAL problems (see Attachment 1), licensee personnel should not rely upon the general prudential statements of "Shift Supervisor or Emergency Coordinator Opinion" as the basis for decisionmaking when revision of the technical statements in the EALs is warranted.

Walkthroughs and interviews were conducted with three Shift Technical Advisors, five Shift Operations Supervisors, and a Shift Supervisor, using scenarios prepared by the inspector which required demonstration of event detection and classification. Details of the walkthroughs are discussed in other sections of this report, except as noted below.

Personnel interviewed were able to adequately use Procedure EIP-ZZ-00101, Revision 5, "Classification of Emergencies", to classify emergencies. However, all found the procedure to be cumbersome due to the extensive use of multiple initiating conditions combined with the various and/or logic and paragraph/subparagraph numbering. This problem was compounded in that the various Emergency Action Level (EAL) combinations for a given condition were spread over multiple pages as well as overlaps existing in the titles of various groups. Examples include Group 7 (Hazards to Station Operations) and Group 3 (Natural Events). The overlap in this case is that most significant natural events are also hazards to station operations. A Group 1 Primary System Event (Safety Injection initiation) is also a safety system function (Group 3). Such overlaps can cause confusion in locating the proper EAL. One group of control room personnel interviewed had not located the loss of RHR cooldown capability EAL after 3-4 minutes of searching through the EALs.

Licensee personnel indicated they would review EIP-ZZ-00101, Revision 5, "Classification of Emergencies," against the findings in this section and Attachment 1 of this report. This review will consider changes to technical content, format, groupings, and group titles which will facilitate classification of emergencies. This will be tracked as Open Item No. 483/86009-01(DRSS).

4. Protective Action Decisionmaking

Walkthroughs were conducted with control room personnel using scenarios which required demonstration of protective action decisionmaking. Protective action recommendations made by personnel interviewed were correct and timely except as noted below.

All control room personnel interviewed did not consider a two mile precautionary evacuation after declaring a General Emergency due to a "loss of physical control of the facility." Upon review of EIP-ZZ-0212, "Protective Action Recommendations," Revision 6, it was noted that the above guidance, found in NUREG-0654, Page 1-17, Paragraph 3, was not incorporated into the procedure.

Based on the above findings, this portion of the licensee's program is acceptable; however, the following item should be considered for improvement:

Incorporate the guidance of NUREG 0654 Page 1-17, Paragraph 3 into procedure EIP-ZZ-0212, "Protective Action Recommendations."

5. Dose Calculation and Assessment

Review of Dose Calculation and Assessment capabilities included a review of procedures EIP-ZZ-01210 "Radiological Release Information System Operation," EIP-ZZ-01211 "Initial and Intermediate Dose Assessment," EIP-ZZ-01212 "Contingency Release Rate Determination," and EIP-ZZ-02211 "Long Term Dose Assessment." Two Dose Assessment Coordinators were interviewed and various sample problems were analyzed, partially using the Radiological Release Information System (RRIS). Problems noted during these reviews and interviews are as follows:

a. The RRIS system is difficult to use as a predictive tool and therefore procedures direct Dose Assessment personnel to use a COMPAQ or HP-1000 computer for Dose Projection calculations. There was no COMPAQ computer available in the Technical Support Center (TSC) at the time of the inspection, and the TSC HP-1000 was in use elsewhere in the Power Block in support of the current plant outage. The licensee should evaluate the acceptability of using Emergency Equipment to support normal plant operations which would delay emergency availability.

b. During the interviews, one Dose Assessment Coordinator assumed that the RRIS displayed wind direction in the "toward" direction. Applying the 180 degree conversion in procedure EIP-ZZ-01211 then caused Dose Projections to be oriented 180 degrees in the wrong direction. This individual stated that he had not yet been formally trained on the use of the RRIS.

c. Wind speed displayed on the RRIS is in units of Kilometers/hour. All Dose calculation forms in EIP-ZZ-1211 use wind speed in meters/second. One Dose Assessment Coordinator was delayed in making calculations through not locating the proper form which contained the conversion factor for Km/hr to m/sec.

d. During scenario walkthrough, one individual would have classified a release of 2.5E+8 uci/sec as a Site Area Emergency, when it is properly a General Emergency.

e. The RRIS Dose Assessment Computer is designed as a real time analyzer using automated updates of all necessary input parameters. Procedures adequately warn users that the RRIS has limited usefullness as a predictive device. With the RRIS in the automatic mode, it has the following shortcomings:

f. Many of the top level displays do not alert the operator to the fact that some inputs (e.g. release rate, wind direction) may be in the manual insert mode. In manual insert mode, the input does not come from system monitors, as might be assumed by the operator.

g. The system does not directly display peak centerline doses for radiation plumes.

h. The isotope library has no explanation in the index for the type of accident associated with the release case.

i. Hard copies of RRIS displays and data are available only in the control room (the printer is in the BOP computer room), which is distant from the TSC. This could make hardcopy acquisition difficult during an actual emergency.

j. There is no direction on form CA-1014 of EIP-ZZ-01211 as to which of the three possible wind speeds available on RRIS is to be used for manual dose calculations.

It should be noted that many of the the above problems can be obviated through adequate training and procedure revisions. Licensee actions to address Items a through j above will be tracked as Open Item No. 483/86009-02(DRSS).

Attachment 13 to EIP-ZZ-01211 is the manual dose Projection form for a main steam line break. The form presently considers three potential monitored or calculated release paths. These are Containment leakage, Unit Vent Stack, and Auxiliary Feed Pump Turbine steam. A review of plant drawings indicates that Area 5 (Steam Tunnel), which contains the Main Steam Isolation Valves, Steam Generator safeties and dump valves, has blowout panels on the roof. A main steam line break in this area could result in an unmonitored release through these panels to the environment if accompanied by a Steam Generator tube break. Several personnel interviewed initially thought that all steam released to this area would vent to the Auxiliary and Turbine buildings and subsequently to the Unit Vent. Procedures should be developed to allow estimation of radiological releases in the event of a main steam line break in Area 5. This will be tracked as Open Item No. 483/86009-03(DRSS).

6. Notifications and Communications

(Closed) Open Item 483/85003-01: The licensee has revised procedure EIP-ZZ-0021 to require that all initial messages to State and county officials include information on the topics listed in NUREG 0654, Revision 1, Criterion E.3.

(Open) Open Item 483/85003-02: The licensee has revised the notification priorities in what is now Attachment 4 to EIP-ZZ-00201 to indicate that the on-call Recovery Manager and the NRC Operations Center will be notified of any emergency immediately after appropriate County and State organizations have been contacted. However, the revised notification sequence of Attachment 4, "Notification Checklist" does not also meet 10 CFR 50.72, which requires that the NRC Operations Center be called immediately after State and/or local officials. Sections 5.2.4, 5.2.5, and 5.2.5.3 will also require revision to be consistent with a revised checklist and current notification requirements.

Procedure EIP-ZZ-A0023 has been revised to specify only months for the quarterly and annual emergency communication equipment tests rather than certain weeks of certain months. This was identified as an area of improvement during the 1985 routine inspection. A review of the monthly, quarterly and annual emergency communication tests performed from December 1984 through March 1986 indicated all tests were conducted in accordance with the revised procedure.

The inspector reviewed procedure EIP-ZZ-A0021, "Public Alert Maintenance System Procedures," and relevant correspondence, files and checklists. This review indicated that tests and maintenance procedures are satisfactorily conducted by licensee personnel in accordance with approved procedures. Also reviewed were records of periodic siren tests conducted by local officials. These records were adequately detailed, and indicated the licensee had taken timely actions to correct system deficiencies observed during testing. The inspector reviewed and discussed the licensee's provisions for siren system preventive maintenance and determined that they were adequate.

Provisions for distribution of tone alert radios were also contained in EIP-ZZ-A0021. The inspector reviewed documentation and discussed implementation of the tone alert radio system with licensee personnel, and determined there was an adequate program for identification of households requiring tone alert radios, distribution of radios and replacement batteries, radio testing and replacement.

7. Changes to the Emergency Preparedness Program

All revisions to the Radiological Emergency Response Plan (RERP) are made in accordance with new procedure NSEP-EP-00400, "Preparation, Review, and Approval of Revisions to the Radiological Emergency Response Plan." EIP revisions are prepared in accordance with procedure APA-ZZ-00101, "Preparation, Review, Approval, and Control of Plant Procedures." The inspector determined that procedures are in place to assure all changes to the plan and implementing procedures are reviewed and approved by licensee management, and any changes which might decrease the effectiveness of the plan are identified.

Revision 9 of the RERP was recently submitted to the NRC for review. Changes in notification methods for state and local agencies, updated EALs and changes in the company's organizational structure constituted the major changes in this revision. The licensee has removed the RERP from the FSAR, and converted it into a licensing document. This allows changes to the RERP without updating the FSAR for each change, and is an acceptable practice.

Administrative procedures contained in Emergency Implementing Procedures (EIPs) are presently being revised in accordance with procedure APA-ZZ-00101. A review of a draft copy of EIP-ZZ-A0020 (in the process of revision), and the review package, indicated adequate management review was being implemented to assure maintenance of plan effectiveness.

The licensee has an Action Item Tracking system for tracking items or issues generated by internal or external reviews. The inspector's review of Open Items 483/85003-01 and 483/85002-02 on the licensee's Action Item Tracking system verified that NRC or licensee-generated areas of concern are identified and monitored effectively by the EP staff.

The inspector reviewed the RERP, Revision 9, and EIP-ZZ-00241 and determined that the relocation of the Operations Support Center from the lunchroom to the maintenance office is reflected in the current revision of the plan and corresponding implementing procedures.

Distribution of changes to the RERP and Emergency Plan Implementing Procedures (EPIPs) were accomplished within 30 days as required by 10 CFR 50.54(q) and 10 CFR 50, Appendix E, Paragraph V.

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

8. Shift Staffing and Augmentation

(Closed) Open Item 483/85003-05: A successful drill of the augmentation of the on-site organization was conducted on December 2, 1985.

(Open) Open Item 483/85003-03: The single drill conducted to demonstrate the augmentation of the interim-EOF organization failed to meet time goals. A drill to test interim-EOF augmentation is tentatively scheduled for April, 1986. As interim-EOF augmentation has not been successfully demonstrated in a semiannual, off-hours drill, Open Item 483/85003-03 will remain open.

The inspector reviewed the procedures utilized to callout personnel to staff the on-site, interim-EOF, corporate, and public information emergency response organizations (procedures EIP-ZZ-00202, -00502, -C0020, and -PR010, respectively). Also reviewed were the February 1986 edition of the Emergency Telephone Directory, and records of five augmentation drills held between December 1985, and February 1986. Procedures and drill results were discussed with licensee personnel.

All five augmentation drills involved callout of the onsite emergency organization, with the early drills failing to meet time goals. A June 1985 drill also tested callout of the corporate and public information staff. The February drill tested augmentation of the interim-EOF organization.

In general, improvements in notification timeframes were noted in the documentation of each successive drill, with a successful onsite augmentation drill being accomplished after a callout procedure change to utilize a telephone answering service for notifications.

All five augmentation drills were critiqued and well documented. Notification times had been added to commute times to arrive at an estimated total response time for each individual, completing an improvement item from the previous inspection. Drill critiques were

of differing formats, and it was recommended that each drill critique be of a standard format, containing drill results, problems noted, and recommendations. This would allow a direct comparison of results from drill to drill.

The inspector reviewed the February 7, 1986 Emergency Telephone Directory and determined that it listed name, home and work telephone numbers, pager number (if applicable) and commute time for each person listed. Listings were by position, with at least three individuals identified for each coordinator or manager position. Many positions have a symbol indicating the primary individual for the position, and all individuals for each position were listed by increasing commute times. If several individuals have equal commute times, they are listed alphabetically.

The Emergency Preparedness staff is responsible for issuing quarterly updates of the Emergency Telephone Directory, per procedure EIP-ZZ-A0020, and a new revision will be issued April 1, 1986. Procedure EIP-ZZ-A0020 is in the process of revision itself, to remove and place requirements pertaining to the EP staff in the EP staff procedures.

Licensee personnel indicated that individuals in the Emergency Telephone Directory have a fifteen month "disqualification period" after which they are removed from the Directory if they have not received retraining. A computerized list is utilized to track the disqualification date, and this list is provided to the Training Department. If an individual is disqualified, his name is not included in the quarterly update of the Emergency Telephone Directory submitted to the Document Control group for duplication and distribution.

In addition to the previous Open Item remaining open, the following item should be considered for improvement:

Augmentation drill critiques should be of a standard format, containing drill results, problems observed, and recommendations.

9. Knowledge and Performance of Duties (Training)

The NRC inspectors reviewed the licensee's Emergency Preparedness training Program. The review consisted of an examination of selected training records for key Emergency Response Personnel, lesson plans and governing procedures. The inspectors also reviewed the training objectives and the course matrix. Individuals whose records were to be reviewed were selected from the Callaway Emergency Telephone Directory which also specifies the individuals emergency response position.

Training records of 38 emergency positions out of 55 were reviewed and found to be current. These 38 positions included corporate level emergency positions plus those interviewed during the inspection.

EP training has now been incorporated into Simulator training for those Control Room personnel with emergency response functions. This integrated training of reactor operations personnel resulted partly from a recommendation in the previous inspection. To better define the

objectives and responsibilities of each emergency response position, a Job Task Analysis is being developed by the Training Department. Three lesson plans have been established for each of the 55 emergency response positions. The first includes a review of the RERP, the second includes the emergency plan implementing procedures, and the third emphasizes the practical, hands-on activities relating to the position. This approach should improve the integration of the training program with the emergency preparedness program, at both the corporate and site level.

The Emergency Preparedness Required Reading Procedure, EIP-ZZ-A024, has been revised as suggested in an improvement item from the previous inspection. This procedure is used to assure that emergency response personnel review and understand EIP revisions made between training sessions. The revised EIP-ZZ-A024 makes the supervisor accountable for assuring that the procedure is adhered to by the emergency response person under his supervision. A brief title or description of the change is now included on the cover sheet to aid the recipient. The supervisor of EP now determines whether the procedural change is significant enough to be assigned as required reading; if not, the revision is not included as required reading.

A Course Deficiency File has been developed by the Training Department to log and review critique findings, improvement items, procedural changes or other items that relate to Emergency Preparedness (EP). A change relating to actions on a callout or shift augmentation was traced by the inspector from initiation by the EP group to a review by training staff to determine whether this information was relevant. The item was ultimately removed from the Course Deficiency File and became a permanent part of the course content.

The inspector also observed two hours of a four hour offsite agencies training session given by a Training Department Supervisor. This course was presented to Callaway County emergency workers in Fulton, Missouri on March 25, 1986. The instructor was knowledgeable, and the course content was relevant in basic concepts and practical applications. The instructor encouraged questions and kept the class's attention. Additional Offsite support agency training, by EP or Training Department staff, was conducted during the week of the inspection.

Walkthroughs were conducted with nine selected members of the Emergency Response Organization. Walkthroughs with Shift Supervisors, Shift Operations Supervisors, and Shift Technical Advisers were conducted to verify the adequacy of their training in detection, classification, notification, and protective action recommendations. Each control room group was prebriefed that all procedures should be used, health physics and chemistry support could be requested, and all plant information and indications requested would be supplied by the inspector. In addition to walking through various scenario situations, specific questions were posed to all groups concerning changes to the Emergency Preparedness Program, the required Reading Program and Emergency Plan training. Response to scenario problems and questions was adequate except as noted below.

All control room personnel interviewed were unaware of the requirement in 10 CFR 50.72(a)3 that the licensee shall notify the NRC Operations Center immediately after notification of State and local authorities. A review of the Emergency Plan Lesson Plan and discussions with licensee training staff indicated this requirement had not been incorporated into the training program. The licensee should incorporate the above requirement into Emergency Preparedness Training and train required emergency response personnel on the revised notification requirements. This is considered to be an Open Item 483/86009-04(DRSS).

10. Licensee Audits

The inspectors confirmed that independent audits of the Emergency Preparedness Program have been conducted by the licensee's Quality Assurance (QA) Department within the last twelve months. This annual audit consisted of two parts; one specifically related to the annual emergency exercise conducted from June 3-21, 1985; while the other was related to seven areas of the emergency preparedness program and was conducted between January 6-16, 1986. The first audit included the evaluation of the adequacy of the interface with State and local governments in conjunction with observing parts of the emergency exercise which demonstrated the interface with off-site agencies in the Joint Public Information Center and the Fulton County Emergency Operations Center. This requirement was also met by evaluations made in some of the seven areas audited in January 1986. Selected portions of the following seven areas constituted the scope of this second audit: Emergency Response; Support and Resources; Emergency Facilities and Equipment; Radiological Emergency Response Training; Exercises and Drills; Public Education and Information; Responsibility for the planning effort, development, periodic review and distribution of Emergency Plans, Supplementary Procedures and Diagrams; and Emergency Communications.

The June 1985 audit identified three Requests for Corrective Action (RCA) and the January 1986 audit identified five RCAs. Audit findings are categorized as Level 1, 2, 3, or 4, with level 1 being the most serious and level 4 the least important. The inspector reviewed the findings, their significance to the EP program, and followup actions. Through interviews with the EP staff and QA auditors, the inspector verified that adequate actions were taken to correct the findings within established timeframes.

The January 1986 audit verified that all required drills and exercises were conducted within the required frequency. This finding was verified by an independent check of EP records.

The audit records should add another specific area of review to the seven listed previously, namely, evaluation for adequacy of interfaces with State and local governments. As noted above, licensee personnel indicated that this item was covered in the audits, and discussion verified the review; however it was difficult to identify from other documented audit observations. It is a 10 CFR 50.54(t) requirement that the interface with State and local governments be audited, and the portion of the audit dealing with the interface made available to state and local agencies. This is an Open Item 483/86009-05(DRSS).

11. Public Information Program

The inspector reviewed the March 1986 revision of the Public Information brochure and determined that the emergency planning information contained in the publication is as specified in 10 CFR 50, Appendix E. Needs of residents who may require special assistance are addressed by use of a return form which is forwarded by the utility to the Area Emergency Management Director for use in emergency evacuations. Telephone numbers for local Emergency Management Directors, and the State Emergency Management Agency (SEMA) are listed as points of contact for information.

A special rumor control number, operated by SEMA during emergencies is also listed in the brochure.

Brochure distribution is accomplished by bulk mailing to residents of the Emergency Planning Zone and by hand delivery to public facilities.

The annual news media briefing is in the process of being scheduled for the week before the 1986 exercise.

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

12. Exit Interview

The NRC team leader discussed the scope and findings of the inspection. A considerable portion of the exit interview was devoted to discussion of the EAL review. Licensee personnel were receptive to the discussion, and indicated that they would make any needed changes to the present EAL system in the short term, and research a revised EAL scheme.

The inspectors also discussed the content of the report to determine if the licensee thought that any of the information was proprietary. The licensee responded that none of the information was proprietary.

Attachment: Discussion of Emergency Action
Level (EAL) Problems

ATTACHMENT 1

DISCUSSION OF EMERGENCY ACTION LEVEL (EAL) PROBLEMS

In the following, each discussion is prefaced with the EAL group (GR) and Condition (C).

GR(1)-C(F): (Set 3) On pages 8 and 9 of 53, Steam Generator Tube Failure is combined with Cladding Failure as a basis for a General Emergency. All of the indicators used to detect the Steam Generator (S/G) tube rupture are keyed to alarms on process radiation monitors and a confirmatory grab sample analysis. Grab sample analysis taken to the point of computing a Dose Equivalent of I-131 concentration would typically take 45 minutes to two hours if sufficient personnel were available to obtain the sample and perform the analysis. There are several quicker, positive indications of a S/G tube rupture available including S/G differential pressure (with respect to the other, unruptured S/Gs), S/G level and the coincidence of two or more of the process radiation monitor alarms without need for a confirmatory laboratory analysis. The EAL authors have in fact used other, classic (thermal-hydraulic) indicators of a S/G tube rupture in other EALs.

GR(1)-C(F): (Set 2) Failure of Primary Coolant Boundary, does not allow for detection of an interfacing system Loss Of Coolant Accident (LOCA) outside of containment (e.g. injection, letdown or charging line break outside of containment) because of the AND statement requiring high containment radiation levels. If the break were outside of containment, radiation levels would not be expected to increase within containment.

GR(2)-C(D): Part d.1.e.1, Letdown System Activity, is a poor indicator for Core Degradation following a LOCA with ECCS failure. The letdown system would likely have isolated automatically or would have been manually isolated in the first few seconds of such a transient, thereby preventing the flow of high activity coolant to the Chemical and Volume Control System (CVCS). This EAL also precludes detection of a pipe break outside containment because of AND statements in C.1 and C.2, requiring high containment radiation OR pressure. This set of events could be caused by a small pipe break outside containment if ECCS failed.

GR(2)-C(F): This EAL, "Rapid Failure of Steam Generator Tubes," requires that either a high air ejector Process Radiation Monitor reading and backup sample or a high S/G water sample reading be obtained to detect the tube rupture. Neither of these conditions (both requiring a chemistry sample) could be met in less than 45 minutes. As in other EALs, there are several thermal-hydraulic indicators available which would allow an operator to quickly diagnose a tube rupture.

GR(2)-C(G): This is an example of inconsistency in EAL criteria. Step 1.a.1 of this EAL has a qualifier that there be "no indicated increase in containment pressure, temperature, or humidity". The same qualifier is not applied to GR(2)-C(F). EAL GR(2)-C(G) does not include instrument numbers for RCS pressure and pressurizer level, while the equivalent steps in GR(2)-C(F) do include instrument numbers.

Criteria 1.b.2 of this EAL implies that the S/G safety relief valve tailpipes are a monitored release point, while a review of plant instrumentation and discussion with Rad/Chem personnel indicates they are not monitored.

GR(3)-C(A): This is another example of inconsistency in EAL criteria. Criteria 1.b.2.c, under pressurizer power operated relief valve (PORV) failure, qualifies the degree of failure or leakage by requiring that the Pressurizer Relief Tank rupture disk be intact. It is not clear why this qualifier applies to the PORV, and not to the Pressurizer Safety valves, which discharge to the same tank.

GR(3)-C(E): This EAL contains two sets of criteria for detecting Losses of Functions Needed for Cold Shutdown (i.e. Steaming capability and Reactor Heat Removal [RHR] Cooldown). The set of criteria for detecting loss of RHR Cooldown capability basically requires that both RHR system flow and RHR heat exchanger heat sink be lost to declare a loss of the function. If either system flow (i.e. pumps or RHR piping restrictions) or heat exchanger heat sink (i.e. CCW, SW or ESW systems) are lost, then the system function is lost. This EAL condition is actually met by loss of either system flow or heat sink. The AND/OR statements in this EAL require modification to reflect this fact.

GR(3)-C(F, G, G): The Anticipated Transient Without Scram (ATWOS) event is covered in parts of all three of the EAL conditions F, G and H (f.1.a.1), G (all) and H (all). The criteria in EAL conditions F and H are apparently related to NUREG-0654, Appendix 1, Example Initiating Conditions: Alert (#9). Although it appears that EAL G was intended to correspond to NUREG-0654, Appendix 1, Examaple Initiating Conditions: Site Area Emergency (#11) it actually detects an ATWOS where both automatic and manual scrams are unsuccessful with power generation continuing. This effectively makes EAL G the same as EALs F and H. This leaves the EAL set with no EAL for the situation where the Reactor Protection System fails to initiate a scram, but operators successfully and quickly initiate a manual scram.

GR(3)-C(J): This EAL is for "Most of All Alarms (Annunciators) Lost". As worded, the EAL accepts the Station Computer (Plant Process Computer, a non-safety system) as an acceptable backup for the panel annunciators. All panel annunciator tiles could be failed and an Alert would not be declared as long as the Station Computer was functioning properly. This substitutes the line printer and CRT outputs of the computer for the flashing tiles and audible alarms of the annunciator system. The inspector indicated that this interpretation was not the intent of the guidance in NUREG-0654.

GR(3)-C(K): A similar problem to that described above in GR(3)-C(J) exists for the Site Area Emergency criteria (Loss of Annunciators with Plant Transient in Progress). If the Process Computer were still operational, with panel annunciators failed and a transient in progress, a Site Area Emergency would not be declared.

GR(4)-C(C): This EAL, "Loss of Offsite Power and Loss of All Onsite Power for More Than 15 Minutes" contains two OR statements directing the personnel in the control room to make the classification if the Shift Supervisor is absent or out of communication with the control room for 15 minutes while the loss of power problem is in effect. It is unclear why this EAL differs from others with respect to the remaining Control Room Senior Reactor Operator taking charge if the Shift Supervisor is absent.

GR(5)-C(C): This is a further example of EAL criteria inconsistency. This EAL "Steam line break with >50 GPM Primary to Secondary leakage and indication of Fuel Damage", does not contain a criteria for detecting the break inside containment using containment radiation levels as does EAL GR(5)-C(b) part 2.c.1. Criteria 2.b.1 and 3.a.1 would both require more than 45 minutes of sample and analysis time to confirm. The fact that part 3.a.1 (alarm on CVCS confirmatory sample analysis of >1000 uci/gm Dose Equivalent I-131) is an AND statement would probably preclude this EAL from being met for two reasons; (1) The time required to obtain a sample and (2) The fact that, in this transient, letdown would have isolated well before such activities reached the letdown line.

GR(5)-C(D): This EAL is for "Loss of Feedwater and Condensate Systems followed by a Failure of Auxiliary Feedwater for an Extended Period". Parts 2.c.2 and 2.a.2 (AFW not available in accordance with Technical Specification 3.7.1.2) are redundant. This EAL takes credit for primary system cooling using "feed and bleed" of the primary system. The EAL is only applicable in modes 1, 2, and 3 (power, startup and hot s[illegible]). There is no apparent reason why charging pumps and not Safety Injection pumps have been considered as a source of primary feed. It is also not clear why RHR pumps have been considered as a source of primary feed when the primary pressure is above the RHR pressure in modes 1, 2, and 3.

GR(6)-C(A and B): A potential problem exists for these EALs, which are intended to detect liquid and gaseous effluent releases exceeding Technical Specification limits in that they both require a confirmatory grab sample, the results of which "indicate greater than Limiting Condition for Operations (LCO)" for liquid and gaseous effluents. LCOs are written in terms of doses and dose rates off-site. Sample results are given in isotopic concentrations. Licensee personnel should verify that Chemistry and Health Physics Technicians can readily, by procedure, relate sample concentrations to quarterly and annual off-site doses using existing flowrates from the effluent points and any other factors affecting the determination. Many plants use alarm setpoints and predetermined sample gross or isotopic analysis values to determine such an LCO.

GR(6)-C(E): The > and < signs have been reversed between the condition and the indication (Area Radiation Levels or High Airborne Activity >1000 Times Normal). When the Emergency Plan EALs were checked for this typographical error, it was not found. This indicates that the Revision 9 EALs in the Emergency Plan may not be identical to the Revision 5 EALs in the Implementing Procedures. Licensee personnel should check for additional differences between the plan and the procedures.