

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-458/94-04

Operating License: NPF-47

Licensee: Entergy Operations, Inc.
P.O. Box 220
St. Francisville, Louisiana 70775

Facility Name: River Bend Station

Inspection At: St Francisville, Louisiana

Inspection Conducted: February 21-25, 1994

Inspectors: Wesley Holley, Senior Radiation Specialist (Team Leader)
Rich Emch, Branch Chief, Emergency Preparedness Branch, NRR
Paula Goldberg, Reactor Inspector, Region IV
Ron Kopriva, Cooper Nuclear Station Senior Resident Inspector
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Accompanied by: Mark Morgan, Battelle PN Laboratories

Approved: Blaine Murray
Blaine Murray, Chief, Facilities Inspection
Programs Branch

3/15/94
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of the licensee's performance and capabilities during an annual exercise of the emergency plan and implementing procedures. The inspection team observed activities in the Control Room (simulator), Technical Support Center, Operational Support Center, and the Emergency Operations Facility.

Results:

- The Control Room performed well during the exercise to detect and classify the emergency conditions. Command and control activities were good and the notifications to off-site authorities were prompt. Good team work between all operators was observed. Some concerns were identified concerning briefings for the Control Room staff (Section 3.1).
- The Technical Support Center demonstrated good command and control. Technical assessments and planning of accident mitigation activities

were effective. Improvement is needed in the areas of communications and coordination (Section 4.1).

- The Operational Support Center functioned in an effective manner during the exercise. The facility was staffed and activated promptly. Emergency response and damage control teams were well briefed and demonstrated a good understanding of assigned tasks (Section 5.1).
- The Emergency Operations Facility was activated promptly and performed well during the exercise. Notification messages were timely, and offsite radiological assessment and protective action recommendations were appropriate (Section 6.1).
- The exercise scenario was comprehensive and included the necessary information to allow an effective evaluation of the licensee's emergency response capabilities (Section 7.1).
- The licensee's exercise critique demonstrated that the licensee was capable of identifying and properly characterizing their own exercise performance (Section 8.1).

Summary of Inspection Findings:

- Exercise Weakness 458/9301-01 was closed (Section 9.1).
- Exercise Weakness 458/9301-04 was closed (Section 9.2).

Attachment:

- Persons Contacted and Exit Meeting

DETAILS

1 PLANT STATUS

The licensee was operating River Bend Station at a power level of 100 per cent on February 23, 1994, the day of this emergency preparedness exercise.

2 PROGRAM AREAS INSPECTED (82301)

The licensee's annual emergency preparedness exercise began at 8 a.m. on February 23, 1994. The exercise included full participation by state and county response organizations and was evaluated by the Federal Emergency Management Administration. The exercise scenario was run using the Control Room simulator in the static mode, and the controllers passed hard copy information to the specific players as dictated by the scenario time-line.

The exercise scenario began with the plant operating at 60 percent of rated power. Power recently had been reduced in anticipation of performing tests on the reactor recirculating pump runback circuitry. Operations was also aware that some of the fuel pins had started to leak. The plant operators received indication that main steam line and offgas pretreatment radiation levels were increasing as the fuel leaks increased. Even though the operators reduced reactor power to mitigate the effects of the increased fuel leakage, the offgas pretreatment radiation levels continued to increase prompting the Shift Supervisor to declare a Notification of Unusual Event. As the operators continued to reduce reactor power, a leak developed in the offgas system allowing radioactive gases to escape into the offgas building and radiation levels increased to 1000 times normal in this area. Based on this information, the Shift Supervisor declared an Alert.

The reactor operators continued a rapid shutdown of the reactor due to the high radiation and hydrogen levels in the offgas system which resulted in a control rod pull sheet mistake allowing a stuck rod condition to occur. This rod dropped resulting in a rod drop accident with power and pressure spikes. The power spike resulted in severe damage in a localized region of the core with severe clad damage and fuel melt and dispersion into the core. The pressure transient should have but did not cause a reactor scram. However, the main steam isolation valves did close due to high radiation levels in the main steam lines. The Anticipated Transient Without a Scram resulted in the declaration of a Site Area Emergency. Since the reactor was operating at 18 percent power at this point with the main steam isolation valves closed, the reactor energy was released through the safety relief valves into the suppression pool. The reactor operators began to shut down the reactor which included the injection of boron to bring the reactor subcritical. The plant was still blowing down into the suppression pool increasing the radiation levels and energy levels in the drywell and containment. After reactor power had been reduced to zero, but before the plant was depressurized, a break occurred in a small line connected to the reactor recirculation loop. When the reading from the Containment High-Range area radiation monitor rose to 10,000 R/hr, the Recovery Manager declared a General Emergency. Containment pressure began to increase and subsequently a failure of electrical penetration O-rings occurred. The radioactive atmosphere within containment

began leaking through the penetration into the annulus where it was drawn through the standby gas treatment system and released through the plant vent. This resulted in a small, but measurable, radioactive release. The release was stopped by depressurizing the reactor and reducing containment pressure to zero.

The inspectors identified concerns during the course of the exercise, none of which were of the significance of a deficiency as defined in 10 CFR 50.54(s)(2)(ii). The identified concerns were characterized as areas recommended for improvement as no exercise weaknesses were identified by the inspectors. The licensee identified an exercise weakness during this emergency exercise (See Section 8.). An exercise weakness is a finding that a licensee's demonstrated level of preparedness could have precluded effective implementation of the emergency plan in the event of an actual emergency. It is a finding that needs licensee's corrective action. Other observations such as improvement items are documented which did not have a significant negative impact on overall performance during the exercise but still should be evaluated and corrected as appropriate by the licensee.

3 CONTROL ROOM (82301-03.02.b.1)

The inspectors observed and evaluated the control room staff as they performed tasks in response to the exercise. These tasks included detection and classification of events, analysis of plant conditions, implementation of corrective measures, notifications of offsite authorities, and adherence to the emergency plan and implementing procedures.

3.1 Discussion

The control room simulator was used for the exercise but only in the static mode (i.e., dynamic simulation of scenario events was not used).

The inspectors observed that the Control Room personnel performed their duties in a professional manner. The control room supervisors identified and made prompt classifications of the Notice of Unusual Event and also for the Alert. The notifications to offsite authorities were performed efficiently and in a timely manner.

The inspectors observed that the Control Room personnel used appropriate Emergency Operating Procedures, abnormal procedures, flow charts, and emergency implementing procedures throughout the exercise. The operators were attentive and cognizant of the plant conditions and overall plant status. The operators were effective in the operational and technical assessments of plant conditions.

The inspectors noted that the Control Room Supervisors maintained very good command and control throughout the entire exercise. Good communications and repeat backs by all control room personnel were noted by the inspection team. The entire crew worked as a team analyzing the events and activities, and all personnel contributed to possible corrective actions to mitigate or correct the concerns and problems encountered. The inspectors noted that the

supervisor's use of the Control Room communicator was more effective during the exercise than had been previously identified.

The Control Room personnel generally were astute in their assessments of plant conditions and took appropriate actions to correct the problems and concerns. The exercise controllers intervened with the control operator actions so as not to jeopardize the exercise scenario objectives. On two separate occasions, the Control Room operators were prepared to scram (trip) the reactor but were instructed not to by the controllers. During the later part of the exercise when the operators were instructed to commence standby liquid control system injection, the operators did not immediately identify that the standby liquid control pump was not injecting into the reactor. This resulted in a delay of the reactor shut down from the injected boron by use of the standby liquid control system.

The inspectors identified two items which the Control Room supervisors could improve. The first was that throughout the entire exercise the Control Room supervisors never held any periodic plant status briefings. The briefings would not have been too important when the Control Room had command and control but, when they relinquished command and control the Control Room was not informed regarding the status of numerous repair teams being dispatched. The Control Room personnel did appear to be cognizant of the activities taking place throughout the plant, but and periodic briefings could have enhanced the Control Room staff's knowledge of plant and personnel activities, thus providing the operators a better overall understanding for which they could formulate mitigating or corrective actions.

The second item identified was that once command and control was transferred from the Control Room, the Control Room supervisors did not provide any announcements to the Control Room personnel when the emergency classifications were upgraded to Site Area Emergency and General Emergencies. The information could have been beneficial, especially if the reasoning for the different classifications had been addressed. The announcements could have potentially enhanced the operators in their decisions and actions.

3.2 Conclusions

The Control Room performed well during the exercise to detect and classify the emergency conditions for the given emergency scenario. Command and control were positive, and the notifications to offsite authorities were prompt. Good team work between all operators was observed. Improvements in periodic briefings should be considered.

4 TECHNICAL SUPPORT CENTER (82301-03.02.b.2)

The inspectors observed and evaluated the Technical Support Center staff as they performed tasks in response to the exercise scenario. These tasks included detection and classification of events, notification of Federal, State, and local response agencies, analysis of plant conditions, formulation of corrective action plans, briefing of repair teams, and protective action decisionmaking and implementation.

4.1 Discussion

The inspection team observed that the Technical Support Center staff worked well as an organization. Notification of events to State and local emergency response agencies were promptly ordered by the Emergency Director and implemented by the communicator. The Technical Support Center was activated in a timely and efficient manner. Minimum staffing was attained 25 minutes following the declaration of the ALERT and the center was operational within 41 minutes. The inspectors noted that Technical Support Center personnel activated the center in accordance with facility procedures and completed checklists as required.

The Emergency Director and Technical Support Center staff demonstrated a understanding of plant systems and properly used appropriate procedures to develop repair plans, set priorities, and implement corrective measures. Plant status briefings were conducted frequently, detailing plant conditions, and establishing mitigation strategies. Command and control and technical assessment in the Technical Support Center were effective. Close contact was maintained between the Emergency Director, Technical Support Center Manager, and the Control Room. The Emergency Director and Technical Support Center Manager consistently exchanged information to ensure that they were fully cognizant of plant information. They also had excellent discussions concerning potential mitigation strategies.

Information flow in the Technical Support Center was generally good, but communications were incomplete and confusing on several occasions for periods of time until corrected. Examples included confusion on the number of teams within the facility, confusion by support staff on strategy for restoration of Residual Heat Removal Pump B breaker, and incomplete reports during loss of containment cooling train. One communicator demonstrated inexperience or lack of training in using the computer to generate and transmit emergency messages. Another communicator was required to coach the individual through the process and later assumed the responsibility of performing these activities. Several difficulties were noted with performance of the status communicator where inconsistencies with the plant status board were observed; such as, the 11:09 a.m. entry stated plant status as being "Residual Heat Removal System A in Shutdown Cooling"; the 12:15 p.m. entry stated the "Reactor is still critical"; but at 11:52 a.m., it had been reported that hot shutdown weight Boron had been injected, there was a 20 minute delay between identification of an off-site release and posting the condition on the status board, and significant plants events such as the Loss of Coolant Accident were not noted on the General Message Board. The priority work activity status board was poorly maintained. During the Technical Support Center activation, an old board was being installed by the Electrical Engineering Coordinator until informed by a controller that a new board was available. The activity status board was not maintained up to date with priorities as established by the Emergency Director and Technical Support Center Manager. This status board was redundant to the information relayed to the Operational Support Center via the video communications link, but it creates confusion when they are not consistent. These communication problems were considered an area of potential improvement.

Technical Support Center personnel appeared very knowledgeable of plant logistical considerations, such as physical locations, alternate transit routes through the plant, and systems interrelations. The support personnel provided excellent recommendations on ALARA practices which included alternate routing for dose reduction, identification of physical shielding opportunities, knowledge of potential radiation sources based on contaminated areas and equipment, and excellent recommendations to radiation protection personnel on stay times, expected exposure rates, and clear direction concerning turnback dose rates and total dose. The Maintenance Support personnel provided excellent recommendations on alternate methods to restore inoperable equipment. Maintenance personnel were successful in restoring Residual Heat Removal System B and containment cooling. Technical Support Center personnel did an excellent job of identifying a potential evolution that would have resulted in an additional off-site release path. The evolution to be performed was a lowering of the suppression pool by pumping to radwaste. When the Technical Support Center was informed of the Control Room's intent to lower suppression pool level, support personnel quickly pointed out that the radwaste receiving tanks vent to the ventilation system and, since the pool was heavily contaminated with failed fuel, that an alternate release path would occur through the ventilation system. Engineering personnel made excellent recommendations on contacting the Institute of Nuclear Power Operations and related facilities for technical assistance.

Improved coordination between the operating staff and Technical Support Center personnel would have enhanced the overall licensee response. As discussed in the previous paragraph, the pumping of the suppression pool to radwaste was identified by Technical Support Personnel as providing an alternate release path, and the operating crew was notified prior to performing the evolution. This potential problem could have been alleviated if there had been better coordination between the Technical Support Center and the Control Room. There was an attempt to restore reactor vessel level indication by the Control Room without coordination with the Technical Support Center. The operating shift attempted the activity but was unsuccessful and restored plant conditions. This action by the crew was unwarranted because:

- The plant was in a stable configuration with alternate shutdown cooling in progress.
- The actions necessary to perform this activity resulted in securing shutdown cooling which, besides cooling the reactor, was the only heat removal method available for the containment.
- It would require containment entry to perform the evolution which would have resulted in unnecessary radiological exposure.

Improved coordination between the Control Room and Technical Support Center personnel would have improved the overall licensee response to the events in progress. This is considered an area for improvement.

4.2 Conclusions

The Technical Support Center demonstrated good command and control. Technical assessments and planning of accident mitigation activities were effective. Improvement is needed in the areas of communications and coordination.

5 OPERATIONAL SUPPORT CENTER (82301-03.02.B.4)

The inspectors observed and evaluated the performance of the Operational Support Center staff as they performed tasks in response to the exercise to determine whether the Operational Support Center would be effective in providing emergency support to operations. These tasks included activation of the Operational Support Center; assembly of needed personnel; assignment of priorities; repair team selection, briefing, and debriefing; radiological control planning; protective action decisionmaking; periodic briefing of the Operational Support Center staff; documentation of activities; and communications by emergency response groups. The inspectors observed activities conducted by the Operational Support Center, and an inspector accompanied a repair field team dispatched from the Operational Support Center.

5.1 Discussion

The Operations Support Center was manned and activated less than 10 minutes after the declaration of an Alert. Indications of prestaging prior to activation were discussed with the licensee, and it was indicated personnel were aware of the exercise starting time.

Also, the scenario did not appear to challenge the Operational Support Center staff and allow them opportunities to train and exercise their response functions. This is a potential area for improvement.

- Only six in-plant teams were activated during the exercise, and two of those were simulated teams dispatched by the Control Room prior to activation of the Operational Support Center.
- No in-plant response teams were needed from about 1 p.m. until about 2:15 p.m.
- Two prior teams had been cancelled or put on hold due to scenario changes prompting high radiation levels.

The Operational Support Center was properly equipped to perform its functions. The managers were knowledgeable of their duties and responsibilities. They maintained current status of changing conditions in the plant and status of response to plant conditions. Communications and information flow between the Operational Support Center, the Technical Support Center, and the Control Room was effective. Operational Support Center personnel were able to hear the frequent public address system briefings from the Emergency Director in the Technical Support Center and additionally received updates from the Operational Support Center Coordinator.

A radiation control point was established at the entry to the Operational Support Center. At 9:55 a.m., personnel were issued self-reading dosimeters and instructed to read them at least every 30 minutes. Habitability of the Operational Support Center was established by a survey. Another periodic survey was conducted during the exercise at about 2:10 p.m. A Continuous Air Monitor was set up and activated in the Operational Support Center but was turned off at 10:21 a.m. and not restarted during the remainder of the exercise. A licensee controller indicated that this was a normal exercise response and was a conscious decision.

The Operational Support Center used a technique of displaying the Technical Support Center Response Team board on a Closed-Circuit Television Monitor in the Operational Support Center. This served a useful purpose in insuring that the team lists in both centers remained coordinated and accurate. On only one occasion, around 11:05 a.m., was it noted that the lists did not agree, but this was corrected within minutes.

Team briefings by the Assistant Operational Support Center Coordinator and the Radiation Protection Foreman were comprehensive and effective. The briefings included questions to insure that team members understood what was expected.

One inplant repair team was accompanied by an inspector who observed that the location, task, and exposures of the team were adequately monitored.

An observation for improvements was identified regarding identifying inplant teams. Inplant response and onsite monitoring teams were identified by priority and task for which they were designated. They were given no distinctive identity such as a team number or other designation on boards in the Centers (i.e., Team 1, Team 2, etc.). While this appeared no problem in this exercise due to the small number of teams formed, it could become a management/communications problem in situations where numerous teams are dispatched.

5.2 Conclusion

The Operational Support Center was staffed and activated promptly. Emergency response and damage control teams were well briefed and demonstrated understanding of assigned tasks.

6 EMERGENCY OPERATIONS FACILITY (82301 - 03.04 & 03.07)

The inspectors observed the Emergency Operations Facility staff as they performed tasks in response to the exercise. These tasks included activation of the Emergency Operations Facility, accident assessment and classification, offsite dose assessment, protective action decisionmaking and implementation, notifications and communications, coordination of offsite field monitoring teams, and interaction with offsite officials.

6.1 Discussion

The inspectors observed that the Emergency Operations Facility was promptly activated within 1 hour after a Site Area Emergency was declared. The

facility was operated in an orderly manner. The leadership of the Recovery Manager was effective. The Recovery Manager held frequent (every 15-30 minutes) and effective briefings of the entire facility staff and provided prompt briefings when important changes in plant status occurred. Security and radiological entry controls were established and maintained. Low noise levels were generally maintained. All personnel were knowledgeable of their duties. Status boards were maintained in a timely and accurate manner. Radiological habitability of the facility was established initially and periodically checked. Dosimetry was provided to all personnel. There was generally adequate space to perform all activities. However, dose assessment and field team coordination was conducted by both the utility and the State in one small room. This room was crowded and noisy, but all activities were conducted effectively.

The inspectors observed that the Emergency Operations Facility staff continuously assessed reactor and plant conditions calculated projected doses, evaluated plant conditions and projected doses against the Emergency Action Levels. When the containment area radiation monitor reading reached 10,000 R/hour, the staff appropriately and promptly declared a General Emergency. The licensee quickly recommended the appropriate protective actions, and the Louisiana State personnel concurred in the recommendations. Notifications of the General Emergency and recommended protective actions were promptly made to offsite officials. As conditions changed, the utility and the State coordinated to quickly provide additional protective action recommendations.

The inspectors observed that the staff of the Emergency Operations Facility provided frequent, clear messages to the offsite officials using the primary computer-based communications system. The utility identified one problem with the system; at some receiver locations the computer transposed the values of the 2-mile and 5-mile projected doses. The utility quickly sent revised messages to correct the transposition. Upon arrival at the Emergency Operations Facility, the Louisiana State officials were promptly briefed by the licensee. The licensee kept the State personnel informed of changing conditions, and licensee and State personnel worked closely to keep protective action recommendations updated.

The inspectors observed that the licensee promptly dispatched two offsite field monitoring teams. Good communications were maintained with these teams. The licensee shared its field team data with the State field team coordinator. Generally the licensee coordinated with the State to make effective use of both utility and State teams; however, at the beginning of the release the near-field licensee and State teams were positioned very close to each other.

The inspectors identified three potential areas for improvement at the Emergency Operations Facility:

- The room where the licensee and State performed dose assessment and field monitoring team coordination was crowded and noisy. Additional space and sound barriers might be helpful.
- The licensee's computer-based message system transposed the values of the 2-mile and 5-mile projected doses in the message received at some of

the Parish Emergency Operation Centers. This error in the message system should be corrected.

- The near-field offsite monitoring teams from the licensee and the State were positioned very close to each other during the beginning of the release. Better coordination between the licensee and State might provide more complete coverage of the release plume.

6.2 Conclusions

The Emergency Operations Facility was activated promptly and performed well during the exercise. Notification messages were timely and offsite radiological assessment and protective action recommendations were appropriate.

7 SCENARIO AND EXERCISE CONDUCT (82301)

The inspection team made observations during the exercise to assess the challenge and realism of the scenario and to evaluate the conduct of the exercise.

7.1 Discussion

The inspectors attended a licensee briefing on February 22, 1994, and participated in the discussion of emergency response actions expected during various phases of the scenario. The licensee stated that controllers would intercede in exercise activities to prevent scenario deviation or disruption of normal plant operations.

The inspectors found that the scenario provided for the evaluation of previously identified exercise weaknesses and, these weaknesses were closed during this inspection. The scenario contained sufficient challenges to exercise appropriate response activities to demonstrate effective implementation of the exercise objectives.

The following observations were identified as potential areas for improvement:

- The scenario did not challenge the Operations Support Center site team activities as discussed in Section 5.
- A scenario fidelity issue provided confusing or unrealistic information to personnel involved in the Technical Support Center. During the off-gas leak, Airborne Monitors RE 124 and RE 128 read normal values but should have been tracking upward in accordance with the leak rate. This discrepancy was identified by the Radiation Protection Coordinator and delayed the diagnosis of an off-gas leak.

7.2 Conclusions

The exercise scenario was effective to demonstrate proper implementation of the licensee's emergency response capabilities.

8 LICENSEE SELF-CRITIQUE (82301-03.02.b.12)

8.1 Discussion

The inspectors observed and evaluated the licensee's formal self-critique on February 25, 1994, to determine whether the licensee identified and characterized weak or deficient areas in need of corrective action.

The licensee critique process included input by exercise players, controllers, and evaluators. The licensee identified one exercise weakness not identified by the NRC inspection team. The exercise weakness involved Operations Support Center activities where chemistry technicians designated as members for repair/recovery team activities were not respirator qualified. Only 4 of 17 chemistry technicians were respirator qualified.

Eight improvement items were discussed as were several observations. Some of the improvement items and observations were similar to those identified by the NRC inspection team.

The licensee's critiques results were categorized consistent with NRC guidance documents.

8.2 Conclusions

The licensee's critique demonstrated that the licensee was capable of identifying and properly characterizing their own weaknesses with the intention of implementing corrective measures that would result in an enhanced program.

9 FOLLOWUP ON PREVIOUS INSPECTION FINDINGS

9.1 (Closed) Exercise Weakness (458/9301-01): Failure to take prompt action to mitigate a radiological release.

The licensee identified and took all appropriate actions necessary to mitigate the radiological release during this exercise.

9.2 (Closed) Exercise Weakness (458/9301-04): Failure to promptly notify offsite authorities of a significant change in plant conditions and the issuance of notification messages with conflicting information.

During this year's exercise, the inspectors noted that offsite authorities were promptly informed of significant changes in plant conditions and that notification messages did not include conflicting information.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

- *H. Keiser, Executive Vice President, Chief Operating Officer, Entergy Operations, Incorporated
- *J. R. McGaha, Vice President, River Bend Station
- *F. Titus, Vice President, Engineering, Entergy Operations, Incorporated
- *M. Sellman, Plant Manager, River Bend Station
- *W. J. Beck, Director, Nuclear Training
- *J. J. Fisicaro, Manager, Safety Assessment and Quality Verification
- *K. A. Garner, Licensing Engineer
- *R. R. Harvin, Nuclear Communications Specialist
- *R. K. Jobe, Emergency Planner
- *T. R. Leonard, Manager, Engineering and System Engineering
- D. N. Lorfing, Supervisor, Nuclear Licensing
- *R. L. Love, Entergy Operations, Incorporated
- *B. R. Ricketts, Emergency Planner
- *J. P. Schippert, Technical Assistant
- *W. M. Smith, Supervisor, Emergency Planning
- *M. A. Stein, Director, Plant Engineering
- *K. Y. Swanzy, Emergency Planner

1.2 Other Personnel

- *L. L. Broussard, Consultant, VECTRA
- *C. P. Crew, Consultant, VECTRA
- *W. L. Curran, Site Representative, Cajun Electric
- *C. S. Kudla, Consultant, VECTRA
- *V. T. Simpson, Consultant, VECTRA

1.3 NRC Personnel

- *C. E. Skinner, Resident Inspector
- *W. F. Smith, Senior Resident Inspector

The inspectors also held discussions with and observed the actions of other station and corporate personnel.

*Denotes those present at the exit interview.

2 EXIT MEETING

The inspection team met with the licensee representatives and other personnel indicated in Section 1 of this Attachment on February 25, 1994, and summarized the scope and findings of the inspection as presented in this report. The licensee did not identify as proprietary any of the materials provided to, or reviewed by, the inspection team during the inspection.