



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 26 1991

MEMORANDUM FOR: Daryl Hood, NRR
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Mark Cunningham, RES
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FROM: R. Lee Spessard, Director
Division of Operational Assessment
Office for Analysis and Evaluation
of Operational Data

SUBJECT: ACRS BRIEFING ON STATUS OF STAFF FOLLOWUP ACTIONS
RESULTING FROM THE INVESTIGATION OF THE MARCH 20, 1990
INCIDENT AT VOGTLE UNIT 1 (NUREG-1410)

On August 9-11, 1990, the results of the Vogtle Incident Investigation Team (IIT) investigation were presented to the ACRS by the Vogtle IIT leader. During this meeting, AEOD committed to provide a future followup briefing to the Committee on the status of the staff actions resulting from the Vogtle IIT investigation. The purpose of this memorandum is to request your assistance in coordinating this followup meeting.

The briefing on the status of the resolution of the Executive Director for Operations (EDO) assigned staff actions has been scheduled for the morning of April 11, 1991, and is expected to last approximately 1-1/2 hours. AEOD management will lead the briefing, however, it is requested the those individuals most knowledgeable of the resolution and/or status of each staff action attend the briefing and be prepared to field any detailed questions that may arise. It is requested that you confirm the availability and coordinate the attendance of these individuals.

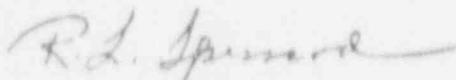
Enclosed is a status description for each of the staff action items that were assigned by the EDO to the various NRC offices associated with the Vogtle IIT report. Information contained in the enclosure was primarily based on the most current NRC office status reports prepared in response to the June 21, 1990 EDO memorandum that assigned office responsibility for those actions. This enclosure will be updated as requested and transmitted to the Committee by March 22, 1991, and will form the basis for the briefing at the April 11 ACRS meeting. It is intended that the enclosure reflect the current status of actions that have been taken and planned by the staff. Therefore, any comments on the accuracy and/or changes to the status of staff actions should be provided to Ronald Lloyd no later than March 18, 1991, so that it may be finalized for transmittal to the ACRS.

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Copies of the meeting agenda and final briefing material will be developed in the coming weeks with your assistance and will be provided to you and the ACRS by March 22 for information prior to the meeting. AEOD staff will prepare a final report after completion of all Vogtle III staff action items.

If you have any questions, or require any additional information, please contact either Ronald Lloyd (492-4149) or Robert Freeman (492-7613) of my staff.



R. Lee Spessard, Director
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Enclosure:
As stated

cc w/o enclosure:
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PLANS AND STATUS FOR RESOLUTION OF
VOGTLE IIT STAFF ACTION ITEMS

1. Issue: Adequacy of Shutdown Risk Management
(References: Sections 3, 7, 8 and 9
Findings 10.1, 10.3, 10.5 and 10.8,
and Appendices F, G, and K)

Discussion: During plant shutdown, maintenance and surveillance activities can result in opening of the primary and/or containment systems, stoppage of the shutdown cooling system, disabling electrical systems and movement of heavy equipment within the plant. Hundreds of plant workers, including contractors, are generally involved. Since there is an economic incentive for the utility to complete the outage work in an expeditious manner, many tasks are performed simultaneously. There is also a need to comply with applicable license conditions, including technical specifications. All of these activities may be referred to as the outage activities. There is limited NRC guidance on allowable plant configurations other than the license conditions and technical specification requirements.

Based on Vogtle and other recent events, there appears to be a need to develop further regulatory guidance to ensure adequate risk management during shutdown conditions. This regulatory concept recognizes the need to operate from time to time during shutdown with less than the usual barriers and safety systems. However, with proper licensee planning, it is believed that the outage should strive to conduct the otherwise more risk significant activities (e.g., mid-loop) at a time when more barriers and systems are in place or operable. Such shutdown risk management does not currently appear to be practiced. While licensees should be responsible for shutdown risk management programs and their implementation, the NRC should develop some generally applicable safety principles.

Action 1a: Review existing regulatory guidance related to shutdown risk control and issue such new guidance as may be needed. Include in the assessment of shutdown risk management: normal and standby electrical systems and sources including switchyard equipment; normal and alternate cooling systems; special alternate plans for

loss of forced circulation; fission product barriers including primary and containment systems, and special activities such as movement of heavy loads or construction activities.

Responsible Office: NRR/SRIB

Status: Ongoing. The staff integrated this action into its continuing inter-office evaluation of safety risks during shutdown and low power operation.

The staff is conducting the following assessments of shutdown risk: review of completed shutdown probabilistic risk assessments (PRAs), performance of new shutdown PRAs, evaluation of potential accident precursors, evaluation of alternate methods for decay heat removal, and field studies of shutdown operations and activities. This work should be completed by late 1991.

Action 1b: Continue to develop shutdown risk methodology and review the effectiveness of alternate cooling methods for loss of forced circulation. Issue new guidance as appropriate.

Responsible Office: RES/PRAB/RPBB

Status: Ongoing. Research is continuing to develop risk methods for non-full power operating modes, including the shutdown mode. Demonstration of the application of these methods will be performed for two plants: Surry and Grand Gulf. The set of initiating events to be considered include those internal events normally considered in risk analyses (e.g., pipe ruptures) as well as events special to low power and shutdown conditions. Fires and floods initiated within the plant are included in the set. Screening analyses will be performed first to rank plant events according to importance to core damage frequency and risk. A detailed study of the most important events will then be performed. This work is being performed in coordination with NRR's plan for shutdown risk management analysis.

NUREG-1410 proposes two alternate methods for continued core cooling, after loss of RHR during mid-loop operations. The first method is to use gravity feed of water from the refueling water storage tank into the reactor vessel. The staff has determined that research is not required to confirm this method, as long as a continuous flow can be assured. The other method, reflux

cooling in the presence of non-condensable gases, is a cooling mode that has not been studied extensively and is not completely understood. Research planning efforts will be concentrated on this method.

The staff is currently collecting and evaluating experimental and analytical data applicable to the thermal-hydraulic processes involved in loss of RHR during mid-loop operation. These data are being studied to evaluate (a) the potential plant conditions which may result and the cooling methods which may exist; (b) the controlling thermal-hydraulic phenomena associated with these conditions as well as a determination of relevant existing data; and (c) the conditions and phenomena requiring additional research to provide a valid basis for regulatory actions. The schedule for completion of the above actions are as follows: (1) complete screening analyses and develop perspectives (with NRR support) by 5/91, (2) complete detailed risk analysis of the most important event by 3/92, (3) complete analysis of other important events by 12/92, and (4) complete analyses on the effectiveness of alternate cooling methods by 6/91.

Action 1c: Review the present regulatory requirements such as standard technical specifications for shutdown conditions and revise as needed, based on the results of Action 1a above. Develop guidance regarding revision of documents such as EOPs, accident management procedures and plant technical specifications as necessary.

Responsible Office: NRR/SRIB

Status: Ongoing. The staff will analyze the results of work conducted under Action 1a above and will determine the need for and develop, as appropriate, proposed new guidance and/or requirements regarding shutdown risk management (Action 1a), proposed new or revised standard technical specifications, and/or guidelines for emergency operating procedures. This work should be completed by 9/91.

2. Issue: Adequacy of Control Over Switchyard Activities
(References: Section 5.3 and Finding 10.2)

Discussion: Switchyard maintenance activities require movement of equipment into and through the switchyard. In some cases, these activities may require storage of equipment in the switchyard. At Vogtle, equipment requiring servicing was stored in the switchyard. A fuel and lubricant truck servicing this equipment initiated the Vogtle incident. Administrative control of activities in the switchyard was not adequate to prevent the Vogtle

incident. Based on operating events, some industry guidance has been issued regarding events caused by lack of control of activities in switchyards.

Movement of the truck through the switchyard presented an additional hazard because some of the truck's contents were flammable. The Vogtle event potentially could have been more severe had an explosion of the flammable material on the truck occurred. Such an explosion could have caused a loss of nonsafety power further complicating event recovery.

Action 2a: Evaluate the adequacy of existing regulatory guidance and requirements for the control of activities and hazardous materials in switchyards and protected areas. Issue new guidance as necessary.

Responsible Office: NRR/EMCB

Status: Ongoing. The staff has determined that, with the exception of safeguards control, little, if any, regulatory guidance and requirements currently exist for the control of activities and hazardous materials in switchyards and protected areas. After conducting consultations between cognizant staff personnel, we have concluded that issuance of a supplement to Information Notice (IN) 90-25, "Loss of Vital AC Power with Subsequent Reactor Coolant System Heat-Up," would adequately notify licensees of concerns regarding switchyard controls that resulted from the Vogtle event to enable corrective actions to be considered as appropriate. Specifically, the IN 90-25 supplement would discuss the lack of effective controls preceding the event, the corrective actions taken by Georgia Power following the event, and two previous events involving inadequate controls on switchyard activities and having strong similarities to the Vogtle event. The staff will issue the supplement to IN 90-25 by March 15, 1991.

Action 2b: Evaluate the corrective actions taken at Vogtle to ensure adequate control of activities and hazardous materials in the switchyard.

Responsible Office: Region II

Status: Closed on 1/10/91. Five specific action items were identified as needing to be completed to ensure that the corrective actions were adequate and complete.

In a letter dated April 9, 1990, the licensee described the immediate corrective actions which had been implemented to ensure that vehicular control in the low

voltage switchyard for the site was adequate enough to allow the restart of Unit 1. This included establishing a temporary barricade to the switchyard and the issuance of a site directive stipulating that ground guides were to be used for movement of all vehicles with restricted visibility over the size of a pickup truck. These items were confirmed by the Region and found to be acceptable.

The licensee has revised the security and administrative procedures applicable to vehicle and hazardous material control, with emphasis upon proper controls in high-risk areas (e.g., switchyards). These procedural revisions include the requirement to stage portable equipment at remote locations when not in actual use and the requirement to use ground guides. This latter requirement was in the site safety manual but has now been incorporated into site procedures. The implementation and adequacy of these actions was evaluated by the Region during normal inspections and during the recently completed outage for Unit 2 and found to be acceptable.

The General Employee Training curricula has incorporated the above described procedural changes. All personnel receiving their initial and requalification training will be instructed on the requirements concerning vehicle and hazardous materials controls. The training is on-going; completion will take another 12 months due to requalification frequency. The Region verified the training's comprehensiveness and adequacy during the conduct of a training inspection in December 1990.

3. Issue: Adequacy of Diesel Generator Instrumentation and Control Systems (References: Section 5.1 and Finding 10.4)

Discussion: Diesel generator operation depends on proper functioning of a number of components and on adequate coordination between these components. The Vogtle event clearly demonstrates the importance of proper operation of various control and protective devices like sensors, sequences, annunciator panels, and data printouts. At Vogtle, foreign material (i.e., pipe thread sealant compound and metal shavings) apparently prevented jacket water temperature sensor operation causing the unexpected diesel generator trips. The Vogtle design did not include provisions for recording diesel generator trip alarms. Additionally, numerous nuisance alarms were received contributing to operator confusion in identifying the cause of the trips. The training program and existing procedures did not provide adequate information to the operators to cope with the abnormal situation that occurred.

Action 3a: Evaluate the need for reexamination of emergency diesel generator annunciators and control panels including provisions for alarm printout. Consider the need for reexamination of local sequencer panels.

Responsible Office: NRR/SELB

Status: Ongoing. By the end of January, 1991, the Electrical Systems Branch, NRR will complete its recommendations regarding this action. Following this effort, NRR management will review the recommendations to determine what level of generic action, if any, is appropriate.

Action 3b: Evaluate the need for additional guidance and increased emphasis on procedures and training for emergency diesel and local sequencers including response to malfunctions.

Responsible Office: NRR/SELB

Status: Ongoing. Same as Action 3a above.

Action 3c: Evaluate Vogtle's procedures and training for emergency diesel generators and local sequencer panel operations including response to malfunctions.

Responsible Office: Region II

Status: Closed on 1/10/91. Four specific action items were identified which covered the licensee's immediate information feedback process to the plant's operating staff and the incorporation of the lessons learned from this issue into the ongoing initial and requalification training program.

On March 23, 1990, immediately after the incident, the control room shift briefing book was annotated with guidance as to the specific operator actions that were to be taken when a situation required a diesel generator load sequencer reset. Additionally, the applicable plant operating procedures were revised to include steps concerning proper acknowledgment and recording of annunciators prior to the resetting of those annunciators. The Region verified the completion of these actions.

The licensee's upgrading and revision of the surveillance procedures used for the Calcon temperature switches in place on the diesel jacket water header have been completed. The initial procedures were for generic temperature switch calibrations and were not specific to the anomalies of the Calcon switches. The peculiarities

operations. The resultant classification determinations may not convey the seriousness of the situation and the licensee, state and local, and NRC responses may not be sufficient for the risk involved. In addition, a sampling of 12 other sites showed that the classification of a similar event could range from "no classification" to a site area emergency. Also, it is not clear that NUREG-0654 guidance for evacuation and accountability of onsite personnel recognizes that significant numbers of maintenance personnel would be directed to continue to work in response to the emergency before going to the operations support center for purposes of personnel accountability. During the Vogtle event, the licensee did not meet the 15-minute notification requirement to offsite authorities due to the lack of power to the emergency notification network in the control room and due to training and procedural weaknesses. In addition, the Vogtle ENS phone circuit experienced a repeat of an earlier problem that had not been localized or corrected.

Action 4a: Evaluate and revise, as necessary, the guidance contained in NUREG-0654 to classify events that could occur in cold shutdown and loss of electrical power events. Evaluate the NRC guidance to licensees on classification procedures and revise as appropriate. Evaluate the guidance to licensees for personnel accountability during outages. Revise and follow-up as appropriate. Evaluate guidance to licensees regarding the availability of notification systems (and alternates) during a loss of power event. Consider the priorities and requirements for notifications to off-site authorities. Follow-up as appropriate.

Responsibility Office: NRR/PEPB

Status: Ongoing. The staff has integrated this action into its continuing interoffice evaluation of safety risks during shutdown and low power operation.

The staff is performing the following assessments of shutdown risk: review of completed shutdown PRAs, performance of new shutdown PRAs, evaluation of potential accident precursors, evaluation of alternate methods for decay heat removal, and field studies of shutdown operations and activities. The staff will complete this work by mid-1991. The staff will analyze the results of this work and will determine the need for and develop, as appropriate, proposed new or revised guidance pertaining to emergency preparedness (NUREG-0654).

Action 4b(1): Evaluate the policy and guidance to NRC managers for determining when the NRC will enter the standby mode. Initiate follow-up actions, as appropriate.

Responsible Office: AEOD/IRB

Status: Closed on 11/29/90. The current policy was reviewed, and after considering the Vogtle event and a number of past events, AEOD concluded that sufficient guidance exists for appropriately making a determination for the agency to go to the standby mode. The criteria and purpose for entering the standby mode were reemphasized in a memorandum from E. Jordan (dated 11/29/90) to the NRC's senior executives involved in decisions regarding the agency's response mode.

Action 4b(2): Identify and correct Vogtle's recent ENS problem.

Responsible Office: AEOD/IRB

Status: Closed on 8/8/90. An investigation was conducted to determine the cause of the communication problem. Repairs consisted of replacement of a component on the EOF portion of the main control card, installation of a new cable to the TSC phone, and swapping out Wescom circuit boards. A complete system test was conducted on July 26, 1990 and the system operated normally.

5. Issue: Adequacy of Operating Experience Feedback

Discussion: The findings of the Vogtle IIT indicated that there were shortcomings in the operating experience feedback program at Vogtle and raised questions about the adequacy of the industry-wide programs. The team indicated that there was a large number of precursor events that were fed back to licensees through various generic and other communications, but they did not focus specifically on the need for an adequate number of electric power sources for emergency busses during shutdown operations. They also found that a number of apparent problems with the Calcon sensors were not reported to the NPRDS. The team suggested that adequate information was available to Vogtle and if it had been considered and acted upon properly, might have eliminated the potential for this event.

This issue addresses the adequacy of Operating Experience Feedback systems including generic communications and other operating experience reports issued by the NRC. It also covers the ability of the NPRDS to capture and feedback component failure information to licensees and vendors.

Action 5ai Evaluate the procedures and practices for events analysis and feedback of lessons to industry and recommend appropriate improvements. Consideration should be given to: (a) past NRC reports not the subject of "generic communications," and (b) the development of the proper scope of generic action based on the individual events. Also, address the need for feedback regarding the Calcon sensor failures and calibration issues arising from the Vogtle event.

Responsible Office: NRR/OGCB

Status: Ongoing. The Generic Communications Branch has discussed this issue with the Events Assessment Branch of NRR and the Reactor Operations Analysis Branch of AEOD and will incorporate the appropriate recommendations for improvement into a forthcoming revision to NRC Inspection Manual Chapter 0720, "NRC Bulletins and Information Notices." The staff will issue the revised manual chapter in June 1991.

The staff did not issue an information notice because the information on Calcon sensor failures was only relevant to those licensees that have diesel generators supplied by Transamerica Delaval, Inc. (TDI). Rather, the staff forwarded the information to the TDI Owners Group by Carl H. Berlinger's memorandum of July 17, 1990.

Action 5bi Review the industry's NPRDS program regarding: (1) the need for improvements in reporting guidance or practices for diesel generator components, and (2) industry practice in providing NPRDS reported component failures to vendors or the level of vendor use of NPRDS. Interface with INPO as appropriate for action on this and the staff's overall evaluation of NPRDS to stimulate improvements.

Responsible Office: AEOD/TPAB

Status: Closed on 1/22/91. AEOD staff met with INPO to discuss these issues in August 1990 (See memorandum dated September 12, 1990, Summary of August 29, 1990, Meeting with INPO Regarding NPRDS Reporting). At the meeting, AEOD was informed that INPO would pursue the diesel-generator component failure reporting issue using an existing process established for dealing with NPRDS reporting inconsistencies. This would include involvement of the NPRDS Users Group in which NRC is a member. INPO's actions to date have had a discernible impact on improving the reporting of diesel-generator component failures. INPO has several programs for

interacting with vendors that include providing the vendors with NPRDS data. INPO also has several programs underway to improve NPRDS quality, completeness, and timeliness. Results of the above activities will be monitored through the staff's routine NPRDS activities (e.g., annual evaluations, special component studies, failure reporting trends). AEOD concluded that these actions are an acceptable approach to address this action item.

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