

September 12, 2006

MEMORANDUM TO: Charles A. Casto, Director
Division of Reactor Projects
Region II

FROM: Timothy McGinty, Deputy Director */RA/*
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: FINAL RESPONSE TO TASK INTERFACE AGREEMENT (TIA) 2004-04,
"ACCEPTABILITY OF PROCEDURALIZED DEPARTURES FROM
TECHNICAL SPECIFICATIONS (TSs) REQUIREMENTS AT THE
SURRY POWER STATION," (TAC NOS. MC4331 AND MC4332)

By memorandum dated August 26, 2004, Region II submitted TIA 2004-04 requesting assistance from the Office of Nuclear Reactor Regulation (NRR) to assess whether Virginia Electric and Power Company's Abnormal Procedure 13, "Turbine Building Flooding," and Fire Contingency Action 6.01, "Uncontrollable Turbine Building Flooding," for Surry Power Station, Unit Nos. 1 and 2 (Surry), constituted a noncompliance with NRC regulations, including TS 6.4. Specifically, Region II discovered that these abnormal procedures contained actions that preplanned an entry into Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.54(x), in order to justify a departure from the TSs, in the event of uncontrolled turbine building flooding. The TIA requested an NRR determination for the following two questions:

- (1) What, if any, are the conditions for which a licensee may pre-plan or proceduralize the use of 10 CFR 50.54(x)?
- (2) For the case of Surry, does the licensee's proceduralized use of 10 CFR 50.54(x) to depart from the TS requirements, without obtaining NRC approval, constitute a noncompliance with NRC regulations (i.e., noncompliance with TS 6.4)?

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By memorandum dated July 26, 2005, NRR provided a draft response to TIA 2004-04, and Region II provided its comments to the draft response by email on September 22, 2005. NRR's Division of Inspection and Regional Support, with assistance from the Division of Risk Assessment and the Division of Safety Systems, has reviewed the Region's comments and has completed an assessment of the above technical issues. The NRR staff's response is enclosed.

Docket Nos. 50-280 and 50-281

Enclosure: NRR's Response to TIA 2004-04

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OFFICE OF NUCLEAR REACTOR REGULATION

FINAL RESPONSE TO REGION II TASK INTERFACE AGREEMENT (TIA) 2004-04

SURRY POWER STATION, UNIT NOS. 1 AND 2 (SURRY)

PROCEDURALIZED DEPARTURES FROM THE TECHNICAL SPECIFICATIONS (TSs)

1. INTRODUCTION

During 2004, Region II conducted a safety system design and performance capability inspection that examined the equipment and operator actions necessary to mitigate turbine building flooding at Surry. The Region determined that two of Virginia Electric and Power Company's (VEPCO's) procedures for responding to uncontrolled turbine building flooding directed operators to take actions that deviated from the requirements of the TSs and the emergency operating procedures (EOPs). The Region identified these two procedures as Abnormal Procedure (AP) 13.0, "Turbine Building Flooding," and Fire Contingency Action (FCA) 6.01, "Uncontrollable Turbine Building Flooding." AP 13.0 and FCA 6.01 directed operators to perform the following actions:

1. Drain the elevated intake canal (ultimate heat sink) below the TS 3.14 limits and completely dry, in order to stop the flooding into the turbine building;
2. Rapidly cool down and depressurize both units simultaneously in excess of the limits of TS 2.1.A and in excess of the fastest cooldown in EOPs in order to reduce the potential for reactor coolant pump seal loss-of-coolant accident; and
3. De-energize all safety-related alternating current switchgear for both units, just before they become flooded.

In its memorandum dated August 26, 2004, Region II submitted TIA 2004-04 requesting the Office of Nuclear Reactor Regulation (NRR) to evaluate the following issues:

1. What, if any, are the conditions for which a licensee may pre-plan or proceduralize the use of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(x)?
2. For the case of Surry, does the licensee's proceduralized use of 10 CFR 50.54(x) to depart from the TS requirements, without obtaining NRC approval, constitute a noncompliance with the Nuclear Regulatory Commission (NRC) regulations (i.e., noncompliance with TS 6.4)?

2. REGULATORY EVALUATION

The following regulatory guidance is applicable to this review:

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NUREG-0737, "Clarification of TMI [Three Mile Island] Action Plan Requirements," November 1980, clarified changes to EOPs as a result of the TMI Action Plan.

NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures - Resolution of Comments on NUREG-0799," August 1982, identified the attributes for developing and revising EOPs.

Generic Letter (GL) No. 82-33, "Supplement 1 to NUREG-0737 - Requirements for Emergency Response Capability," dated December 17, 1982.

Section 50.54(x) states that a licensee may take reasonable action that departs from a license condition or a TS in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and TSs, that can provide adequate or equivalent protection is immediately apparent.

Section 50.54(y) states that licensee action permitted by 10 CFR 50.54(x) shall be approved, as a minimum, by a licensed senior operator.

3. BACKGROUND

As indicated in the Updated Final Safety Analysis Report (UFSAR), Appendix 9C, the design-basis flood is a leak in the non-seismic piping which could be isolated by operator action or isolated by automatic closure of the Circulating Water (CW) inlet valves when the water level in the turbine building reaches a level of 9 inches. A loss of offsite power (LOOP) is assumed concurrent with this design-basis accident (DBA) flooding. In its letter dated November 26, 1991, VEPCO indicated that the design-basis flood for Surry assumes no failure of the seismic and safety-related portions of the CW and service water (SW) systems.

The Individual Plant Examination (IPE) identified a beyond-design-basis internal flood event caused by the failure of turbine building seismic piping or components. As described in the UFSAR, Appendix 9C.2, VEPCO has implemented hardware and procedural changes to address the internal flooding vulnerability. The beyond-design-basis internal flooding event can be isolated in 24 hours with stop logs at the upper intake structure for flood rates below the critical flood rate of 10,100 gallons per minute. Above the critical flood rate there is no mitigation credited by the IPE analysis. VEPCO utilizes a prevention program consisting of a CW and SW piping inspection, an expansion joint inspection program, maintenance measures to prevent leaks through maintenance activities, and measures to maintain the functional reliability and integrity of the isolation valves. The Surry station procedures provide guidance for a dual unit shutdown; rapid depressurization and cooldown of the reactor coolant system (RCS); and a draindown of the upper intake canal in the event of an IPE internal flood event.

4. NRR STAFF'S RESPONSE TO REGION II REQUEST

4.1 Question 1: What if any are the conditions for which a licensee may pre-plan or proceduralize the use 10 CFR 50.54(x)?

In its publication of the Final Rule for 50.54(x), the Commission discussed the general application and constraints of this regulation. Refer to "Applicability of License Conditions and

Technical Specifications in an Emergency,” 48 FR13966-13970, dated April 1, 1983. The Commission noted that the purpose of the 50.54(x) regulation was to provide flexibility in situations that could not be anticipated. Any effort to provide detailed standards, including deviation guidance, would unintentionally exclude a situation in which a deviation is necessary or appropriate. As such, the Commission determined that it was not feasible to provide detailed guidance or examples as to when deviations from the TSs and license conditions are permissible. This includes defining when a licensee may pre-plan the use of 50.54(x). However, the Final Rule did contain the following enforcement guidance to be used by the NRC staff in reviewing a licensee’s use of 50.54(x): (1) Did the licensee have to act immediately to avert possible adverse consequences to public health and safety? (2) Was adequate or equivalent protective action that is consistent with the license immediately apparent? (3) Was the licensee’s action reasonable, and based on information available at the time, did it serve to protect the public health and safety? Did the licensee deviate from its license only to the extent necessary to meet the emergency? (4) Did the NRC staff have time to approve a license amendment?

In a letter dated January 28, 1998, the NRC staff provided clarification on the use of 50.54(x). The NRC staff informed the Nuclear Energy Institute that a declaration of 50.54(x) and 50.54(y) can be performed at the licensee’s option upon entry into the Severe Accident Management Guidelines (SAMG). In this same letter, the NRC staff also stated that a licensee’s actions that are taken almost immediately upon entry into SAMG could also result in a departure from the licensing basis and the TSs. Such actions could require the licensee to immediately invoke 50.54(x) and 50.54(y). However, the NRC staff cautioned there may be SAMG-related hardware or procedures that are within the scope of 50.59, and such changes would require a licensee to perform a 50.59 evaluation.

By letter dated October 6, 1998, Southern California Edison (SCE) requested the NRC staff’s opinion regarding SCE’s plans to install a cross-tie connection between two electrical systems. SCE had intended to use this system during a 50.54(x) condition. In its response to SCE dated, February 5, 1999, the NRC staff stated that the purpose of 50.54(x) was to provide flexibility to situations that could not be anticipated. Thus, any attempt to define in more detail the precise circumstances under which a deviation would be permissible was bound to exclude a circumstance where deviation might be entirely appropriate. The NRC staff stated this regulation was promulgated in its broadly worded form to acknowledge both the inability to define in advance all emergency circumstances under which departure from the requirements imposed by the Commission’s regulations or by the terms of a specific license or its associated TSs might be in the best interest of ensuring public health and safety, and to prescribe the types of specific actions that should be taken. Notwithstanding that this regulation thus anticipated that these matters would likely be decided at the time of need, prudent regulatory action by both the NRC and licensees has encouraged the development of pre-planned measures to the extent that situations can be predicted in accident procedures and guidelines. The NRC staff noted that while such actions may have been pre-planned, their implementation in the immediate aftermath of a specific accident would likely involve the invocation of 50.54(x). However, the NRC staff informed SCE that to the extent that such pre-planned measures may invoke current changes to a facility or procedures described in the UFSAR, it is incumbent upon a licensee to follow the provisions of 50.59, as described in the NRC staff’s letter dated January 28, 1998.

Based on the Final Rule (48 FR 13968) published on April 1, 1983, and the NRC staff’s letters dated January 28, 1998, and February 5, 1999, the NRR staff has determined that a licensee

may generally pre-plan or proceduralize the use of 10 CFR 50.54(x). However, it is incumbent upon a licensee to follow the provisions of 50.59 and the provisions contained in the Final Rule (48 FR 13968).

4.2 Question 2: For the case of Surry, does the licensee's proceduralized use of 10 CFR 50.54(x) to depart from the TS requirements, without obtaining NRC approval, constitute a noncompliance with NRC regulations (i.e., noncompliance with Surry TS 6.4)?

Note: Region II provided the following additional comments on September 22, 2005, to the NRR staff's draft response to the TIA. These comments are provided below followed by the NRR staff's response to these comments and the answer to question 2.

1. Your staff assessment did not address the NRC requirements of TMI Action Item I.C.1, "Guidance for the Evaluation and Development of Procedures for Transients and Accidents." The staff assessment states that "EOPs are procedures that cover events that are within the design basis." However, TMI Action Item I.C.1 required that EOPs also cover events that are outside of the design basis, including multiple and consequential failures. I.C.1 examples of outside design-basis events that must be addressed in EOPs included: failure of main and auxiliary feedwater, failure of high pressure reactor coolant makeup system, tube rupture in more than one steam generator, and operator errors of omission or commission.

One EOP specifically required by I.C.1 was 'Loss of all AC Power'. Surry had an EOP for 'Loss of all AC Power.' However, Surry's procedures for uncontrollable turbine building flooding involved a loss of all AC power but did not follow the actions or limits of the EOP for 'Loss of all AC Power.' Instead, Surry's procedures invoked 10 CFR 50.54(x) and then directed a rapid cooldown of the reactor coolant system (RCS), far exceeding the maximum cooldown rate allowed by the EOP. Surry's approval of the procedures for uncontrollable turbine building flooding included no technical evaluation of why such a rapid cooldown was safe or would serve to protect the public health and safety.

I.C.1 included more stringent quality requirements for EOPs than for other plant procedures. NRR reviewed guideline procedures for each type of power reactor, which each licensee was required to follow, and then specific NRC inspections were conducted to ensure the quality of EOPs at each licensed facility. I.C.1 included no provision for licensees to invoke 50.54(x) or to otherwise avoid the quality requirements for EOPs.

Region II requests that the NRR staff's assessment address the requirements of TMI Action Item I.C.1 and how they relate to the Surry procedures for uncontrollable turbine building flooding.

2. Your NRR staff assessment did not clearly address how Surry's procedures for uncontrollable turbine building flooding satisfied some of the criteria for use of 10 CFR 50.54(x):

- The action must be needed to protect the public health and safety. Surry had no technical evaluation of how the actions of draining the intake canal or rapidly cooling down the RCS would protect the public health and safety.
- No action consistent with license conditions and TSs that can provide adequate or equivalent protection is apparent. Surry had no evaluation of why such actions identified by the licensee were not implemented in the procedures for uncontrollable turbine building flooding.
- TSs or license conditions can be amended by the NRC, and 10 CFR 50.54(x) is not intended to apply in circumstances where time allows this process to be followed. Surry had time to submit a license amendment request but did not do so.

Surry's procedures for uncontrollable turbine flooding were not SAMGs. SAMGs typically differ from plant procedures in several respects: SAMGs are entered when EOPs cannot prevent core damage; SAMGs are used by licensee management in the Technical Support Center while EOPs are used by operators in the plant; SAMGs give guidelines and do not require operators to take specific actions under specific circumstances; SAMGs involve the use of 50.54(x); SAMGs have no quality requirements; and SAMGs are not inspected by the NRC. The Surry procedures for uncontrollable turbine building flooding directed operators to take specific actions under specific circumstances. If the flooding was uncontrollable and could not be readily stopped, then the operators were directed to drain the intake canal and rapidly cool down the RCS.

Region II requests that the staff assessment address how the three criteria listed above apply to Surry's proceduralized use of 10 CFR 50.54(x) without technical safety evaluations or a license amendment request.

4.2.1 NRR's Response to Question 2 and Region II's Comments

During a 2004 inspection at Surry, the NRC staff discovered that VEPCO had revised procedures AP 13.0 and FCA 6.01 in order to mitigate the consequences of an uncontrolled turbine building flooding. AP 13.0 and FCA 6.01 directed operators to drain the elevated intake canal (ultimate heat sink) below the TS 3.14 limits, in order to stop the flooding into the turbine building; rapidly cool down and depressurize both units simultaneously in excess of TS 2.1.A limits and in excess of the fastest cooldown rate in EOPs in order to reduce the potential for reactor coolant pump seal loss-of-coolant accident; and de-energize all safety-related alternating current switchgear for both units, just before they become flooded.

Region II found that the rapid cooldown rate was at a faster rate than any cooldown allowed by the EOPs, which had been reviewed by the NRC staff. VEPCO's safety analysis for these two procedures did not evaluate whether these actions were safe to prevent core damage. Instead, this analysis focused on whether NRC staff review and approval was needed. VEPCO had concluded that NRC staff review and approval was not required because uncontrollable turbine building flooding was outside of the licensing basis for Surry and because 10 CFR 50.54(x) allowed for departure from the TSs in emergency conditions.

In November 1980, the NRC staff issued NUREG-0737. NUREG-0737 incorporated TMI-related action items that had been approved for implementation by the Commission. In this NUREG, the NRC staff reminded licensees that they had been required to prepare emergency procedure guidelines and upgrade existing emergency procedures in order to cope with transients and accidents analyzed. The NRC staff indicated that such procedures were to consider the occurrences of multiple and consequential failures, such as, failure of main and auxiliary feedwater, failure of high-pressure reactor coolant makeup system, multiple tube ruptures in a single steam generator and tube rupture in more than one steam generator, and operator errors of omission or commission. In general, the sequence of events for the transients and accidents and inadequate core cooling analyzed should postulate multiple failures such that, if the failures were unmitigated, conditions of inadequate core cooling would result. The licensees were to consider initiating events found in the UFSAR and natural phenomena including earthquakes, floods, and tornadoes.

Because NUREG-0737 presented a broad range of TMI-related action items, the NRC staff issued NUREG-0899 in August 1982. The NRC staff issued NUREG-0899 as a first step in the development of a plan to improve EOPs. The NRC staff identified the elements necessary for licensees to successfully prepare and implement EOPs to provide an operator with directions to mitigate the consequences of a broad range of accidents and multiple equipment failures. Furthermore, the NRC staff defined EOPs as plant procedures that direct operator actions necessary to mitigate the consequences of transients and accidents that have caused plant parameters to exceed reactor protection system setpoints or engineered safety-feature setpoints, or other established limits.

NUREG-0899 also provided a multi-step program that licensees would use to develop EOPs. One particular aspect of this process was the development of technical guidelines and the translation of these guidelines into EOPs. Technical guidelines were defined as a document that identifies the equipment or systems to be operated, and the list of steps necessary to mitigate the consequences of transients and accidents and restore safety functions. Technical guidelines represented the translation of engineering data that was derived from transient and accident analyses into information presented in such a manner that it can be used to write an EOP. As described in NUREG-0899, the NRC staff would review the analysis, such as technical guidelines, that would be used in the development of an EOP.

On December 17, 1982, the NRC staff issued GL 82-33, including Supplement 1 to NUREG-0737, to provide additional clarification on improving EOPs. In GL 82-33, licensees were requested to prepare technical guidelines, upgrade their EOPs to be consistent with these technical guidelines, provide training of operating personnel on the use of the upgraded EOPs, and implement the upgraded EOPs. In its response to GL 82-33 on April 15, 1983, VEPCO stated that it was using the Westinghouse Owners Group Emergency Response Guidelines to develop plant-specific EOPs at Surry. On July 1, 1983, VEPCO submitted a Procedures Generation Package that had been developed in accordance with NUREG-0737, Supplement 1. In its Procedures Generation Package, VEPCO developed a plan for developing, utilizing, and controlling EOPs.

By letter dated November 5, 1985, the NRC staff issued its safety evaluation for the EOP program at Surry. In its letter, the NRC staff stated that the review of the Procedures Generation Package was based on NUREG-0737, Supplement 1 and NUREG-0899.

The NRC staff found that VEPCO's Procedures Generation Package met the requirements of NUREG-0737, Supplement 1 and provided acceptable methods for meeting the objectives of NUREG-0899. The NRC staff concluded that VEPCO's program for preparing and implementing upgraded EOPs met the requirements of NUREG-0737, Supplement 1, and was therefore acceptable. VEPCO had provided reasonable assurance that the EOPs at Surry would provide adequate guidance for mitigating the consequences of a broad range of transients and accidents. The NRC staff also noted in its safety evaluation that any future changes to the Procedures Generation Package should be made in accordance with 10 CFR 50.59.

With regard to the 10 CFR 50.54(x) actions contained in procedures AP 13.0 and FCA 6.01 at Surry, the cooldown rate in the Surry EOPs is the approved cooldown rate, not the cooldown rate described in AP 13.0 and FCA 6.01. A change to the cooldown rate should have been submitted for NRC staff review to support the deviation from the Surry EOP cooldown rate. The NRR staff's findings are consistent with the NRC staff's safety evaluation dated November 5, 1985, NUREG-0737, Supplement 1, and NUREG-0899. Because the cooldown rates in the abnormal procedures are not consistent with the NRC staff-approved cooldown rates in the Surry EOP, entry into the abnormal procedures could result in a violation. Likewise, for the remaining actions that direct operators to drain the elevated intake canal below TS 3.14 limits, and de-energize all safety-related alternating current switchgear for both units, just before they become flooded, Region II is requested to review the Surry EOPs to ensure that a conflict does not exist between the EOPs and the two abnormal procedures.

Finally, Region II inquired as to whether VEPCO's abnormal procedures deviated from TS 6.4. TS 6.4.A.5. requires detailed written procedures with appropriate check-off lists and instructions for emergency conditions involving potential or actual release of radioactivity. Although AP 13.0 and FCA 6.01 contain a cooldown rate that deviates from the NRC staff-approved EOPs, the mere existence of these two abnormal procedures does not constitute a non-compliance with 10 CFR Part 50, Appendix B, Criterion V. Therefore, because the licensee has not yet entered into a 50.54(x) action statement contained in AP 13.0 and FCA 6.01, the NRR staff finds that AP 13.0 and FCA 6.01 do not deviate from TS 6.4. However, the NRR staff also notes that entrance into a 50.54(x) action could result in non-compliance with 10 CFR Part 50, Appendix B, Criterion V.

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