August 15, 2000

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FROM: Farouk Eltawila, Acting Director ***/RA/***
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

SUBJECT: FINAL REPORT, "REGULATORY EFFECTIVENESS OF THE STATION BLACKOUT RULE"

Attached for your information and use is the final report, "Regulatory Effectiveness of the Station Blackout Rule." This report evaluates the effectiveness of the station blackout (SBO) rule by comparing regulatory expectations to outcomes in the areas of coping capability, risk reduction, emergency diesel generator (EDG) reliability, and value-impact. The report concludes that although some regulatory documents may require clarification consistent with the Principles of Good Regulation, the SBO rule is effective and the industry and the NRC costs to implement the SBO rule were reasonable considering the outcome. The report also concludes that resolution of the generic issue of SBO was effective, as no additional generic actions are warranted, and no new generic safety issues have been identified.

As a result of this report, RES and the Office of Nuclear Reactor Regulation (NRR) plan to review regulatory documents related to SBO to eliminate identified inconsistencies in the definition of reliability. RES plans to: (a) clarify that EDG unavailability during maintenance or test with the reactor at power should be included in the reliability calculation, (b) clarify that licensees should balance increased EDG reliability against the increased EDG unavailability to maintain the minimum individual EDG target reliabilities, (c) clarify that the EDG system boundary used in the reliability calculation should include the load sequencer and the bus between the EDG and the loads, and (d) establish common EDG start and load-run criteria for guidance. We understand that NRR plans to revise the relevant inspection procedure guidance to discontinue acceptance of licensee use of EDG trigger values.

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In addition, RES plans to re-evaluate Regulatory Guide 1.93, “Availability of Electric Power Sources,” December 1974 (the basis for technical specifications in the area of ac onsite and offsite power supply availability), that provides for shutdown of the reactor following extended ac power supply unavailability. Plant shutdown with one or more offsite or onsite power supplies unavailable could exacerbate the grid condition or remove redundant sources to operate decay heat removal systems, increasing the likelihood of an SBO. Additional practical guidance may minimize the likelihood of an SBO.

The report identifies where NRC inspection procedures could be modified in the future to better factor in the conditions and experiences gained from operating experience. The report also identifies lessons learned for future regulations as follows: (a) to the extent that the NRC staff revises existing regulatory documents to be more risk-informed and performance-based, they may need to be modified to ensure consistent interpretation and use of terms, goals, criteria, and measurements and (b) new regulations or the accompanying regulatory documents should include quantitative objectives to facilitate evaluation of its regulatory effectiveness.

Earlier drafts of this report were provided to NRR, the regions, and other RES divisions, to obtain comments regarding the reasonableness of the approach and the appropriateness of the conclusions, and other regulatory documents that should be assessed to make the NRC’s activities more effective, efficient, and realistic. The comments from the internal review were addressed in the final draft that was sent for external review on April 14, 2000.

External comments were received from the Union of Concerned Scientists (UCS), the Nuclear Energy Institute (NEI), the Institute of Nuclear Power Operations (INPO), the Advisory Committee on Reactor Safeguards (ACRS), and the Electric Power Research Institute (EPRI). These organizations generally agreed on the approach and conclusions but not without comment. Comments were directed primarily to three concerns: (1) the validity of the probalistic risk assessments (PRAs) in licensee individual Plant Evaluations (IPEs) on which the findings are based; (2) the conclusion that selected SBO regulatory documents should be revised to be consistent with the Principles of Good Regulation; and (3) the conclusion that the emergency diesel generator (EDG) failure trigger values to determine compliance with EDG reliability commitments should be discontinued. None of the reviewers identified other regulatory documents that should be assessed; however, the ACRS stated that selected review of the rules was valuable and should continue. Each of the comments is restated and addressed in the final report, Appendix G, “Resolution of External Comments.”

The report is consistent with the NRC strategic performance goals in the areas of making NRC activities more effective, efficient, and realistic; maintaining safety; increasing public confidence; and reducing unnecessary regulatory burden as follows:

Making NRC activities more effective, efficient, and realistic – The report: (a) compared the regulatory expectations to the outcomes to identify discrepancies to improve predictability and consistency of agency decisions; (b) based its conclusions on technically sound and realistic information such as operating experience and NRC EDG reliability studies of actual safety performance; (c) applied the Principles of Good Regulation of clarity and reliability by concluding that three regulatory guides that use the EDG reliability terms, criteria, and measurements may need to be revised in a coherent manner; (d) concluded that revision of

specific inspection documents should improve the predictability and consistency of agency decisions in the area of EDG reliability; and (e) proposed revisions to the regulatory guides to maintain the quality of the technical basis of the SBO rule.

Reducing unnecessary regulatory burden – The report concluded that potential revision of a specific regulatory document that addresses shutdown of the plant following extended onsite or offsite power unavailability may decrease the risk and increase the availability of the plant.

Maintaining safety – This report contributes to the NRC goal of maintaining safety by documenting the conclusion that the intended outcome of the SBO rule – reduced risk to plants due to loss of AC power events – has been achieved. The report: (a) used operating experience and the results of licensee and NRC risk assessments to evaluate safety implications; (b) evaluated the resolution of the safety issue of SBO; (c) used risk information and equipment reliability performance to propose revisions to related regulatory guides and inspection procedures; (d) re-evaluated the safety issue of SBO and proposed revisions to the related regulatory documents consistent with the SBO technical basis, to ensure high levels of EDG reliability, and to maintain the risk benefits obtained from implementing the SBO rule; and (e) quantified the risk reduction from implementation of the SBO rule that could be used to quantify the man-rem averted for operating reactors over their remaining life.

Public confidence – Earlier drafts of the report: (a) were publicly available through the public document room; (b) invited comments from the stakeholders as external reviewers; and (c) were the subject of a June 7, 2000 public meeting with the ACRS. In addition, the final report openly restated and addressed stakeholders comments in Appendix G.

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Template= RES-006 **Accession Number** ML003742086 **RES File Code** RES-7D-1