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EPRI

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Division of Systems Analysis and Regulatory Effectiveness
Mail Stop: T-10 E32
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: NRC's DRAFT Station Blackout Report

Dear Mr. Rossi:

Pursuant to your request, EPRI has reviewed NRC's Draft Report entitled "Regulatory Effects of the Station Blackout Rule." We appreciate the opportunity to briefly comment on this document and make some general observations prior to its finalization.

EPRI and the industry carefully monitor losses of offsite power experienced at U.S. nuclear power plants, especially in regard to any significance it might have toward plant operational safety. This attention is evidenced by the continuing EPRI interest in loss of offsite power events, and ways to mitigate their consequences.

Regarding the NRC draft report, we agree that the Station Blackout Rule (SBO), along with other industry programs (e.g., INPO's trip reduction program, installation of risk meters, etc.), has contributed to improving safety at nuclear units, including greater tolerance of loss of offsite/onsite ac power. We also agree that the SBO reduction objectives have been exceeded, and as a consequence that major new programs are not needed. We do not feel, however, that some of the revisions to the associated reg. guides, as proposed in the report, would necessarily improve the safety of nuclear plants. At the current time, revisions probably could not be shown to be cost/beneficial, and concerning failure rate trigger values, may not be the preferred technical approach. Given the agreed effectiveness of the SBO Rule, the uncertain benefits for improving it, and the current direction of the NRC and industry toward Risk Informed Regulation, it may be better to maintain the current technical approach as is for the time being. The implementation of Configuration Risk Management Programs at many plants, which can help deal with degraded ac offsite/onsite power situations, further underscores this conclusion.

One particular reservation we have in reviewing the draft report concerns changing the failure rate triggers used in the SBO Rule. At the time of their adoption, extensive technical analyses, including Monte Carlo studies, were performed to justify their basis. These

analyses recognized that, when dealing with small statistical samples involving highly reliable machines, high levels of confidence are impossible to achieve, without creating large numbers of 'false negatives.' These would inadvertently involve utilities in costly and unnecessary remediation programs. When the current failure rate triggers were established, the technical people (including EPRI and NRC staff, and contractors) involved took into account the difficult problem of balancing the need for high confidence with the very large number of events needed to obtain this confidence. The report proposes to delete the NUMARC triggers but does not present an alternative. We encourage NRC to review this section of the report, and re-examine its technical basis in light of the amount of information necessary to make important regulatory decisions when data will be sparse. Further details are provided in Attachment A.

In conclusion, let me once again emphasize our point of agreement: the Station Blackout Rule has been effective in helping improve safety, and that major changes are not appropriate at this point in time.

Sincerely yours,

John J. Haugh

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Attachment A

EPRI Comments on Target Reliability and Trigger Values

Between 1988 and 1991, EPRI carried out the analytical work underlying the failure trigger rate methodology. NUMARC, NUGSBO and NRC subsequently adopted this methodology. Both industry and NRC would like a way of knowing that an EDG whose target reliability is 95% has a 95% confidence of being at or above the target value. Manifestly, if one had a sample of 1000 demands to evaluate, such assurance could be approached.

However the real situation is that EDG demands are accrued relatively slowly – as little as one per month. It may take almost two years to experience 20 demands, 4 years for 50 demands, and 8 years for 100 demands. Unfortunately, one cannot wait for 100 demands to determine whether an EDG's reliability is acceptable. Thus it was decided to also assess EDG acceptability based on much smaller samples, namely 50 and 20 demands.

When the sample size is small, and when one is dealing with target reliabilities at the very high end of the reliability range, it is statistically impossible (even with no observed failures) to provide high confidence that the actual reliability equals or exceeds the target reliability. For example, using a binomial distribution for a 20-demand sample illustrates the dilemma. Even if zero failures were permitted, one would know with 95% confidence that the underlying reliability is only greater than 83%. If one failure were permitted, one would only know with 95% confidence that the underlying reliability is greater than 75%. One would need close to 75 demands with zero failures in order to be able to be 95% confident that 95% reliability had been achieved.

Unfortunately, the above-described statistical limitations are not the most troublesome problem that derives from the need to use small samples to estimate reliability. The creation of statistical-variation-induced false alarms that accompanies high confidence that target reliabilities are met is real world and expensive. Each false alarm requires that an EDG enter a corrective remedial program. For example, if in order to achieve high confidence that target reliability is met, zero (or even one) failure in 20 demands is allowed, an EDG may end up in a perpetual reliability program --- due to perpetual false alarms. Large sample sizes would be of reduced importance because the EDGs would be 'false-alarmed-out.' There would be no value to these EDG remedial programs.