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7/02/03

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July 3, 2003

Mr. Scott F. Newberry
Director, Division of Risk Analysis and Applications
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

SUBJECT: Request for review of Integrated Industry Initiating Event Indicator Report

Dear Mr. Newberry:

In your letter dated May 6, 2003, you requested our review of the draft report, "Development of an Integrated Industry Initiating Event Indicator," dated March 13, 2003. The enclosure to this letter provides answers to the technical questions listed in Section 6 of the report.

We believe that the NRC, industry and other external stakeholders should continue our efforts to risk-inform the Reactor Oversight Process and the body of regulations. Significant progress has been made in the use of risk technology and performance data in informing the inspection, enforcement and assessment processes for operating reactors. Similarly, we are moving forward in determining how risk insights can inform technical specifications, license amendments and the regulations themselves.

The Integrated Industry Initiating Event Indicator (IIIEI) represents work by the NRC to bring risk technology to the data assembled for the Industry Trends Program (ITP). It builds on the work performed by NRC Research to assess the potential for risk-based performance indicators, and the ongoing effort to develop the Mitigating System Performance Index (MSPI) to replace the current ROP performance indicator, Safety System Unavailability. We believe the MSPI will greatly improve the NRC's ability to assess equipment performance and will reduce unnecessary

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burden to licensees in reporting data to NRC and WANO and in collecting data for the maintenance rule.

We believe the concept of the IIIEI – assessing initiating events based on their risk worth (or Birnbaum in the draft report) – is appropriate and believe that this approach should be applied in developing a plant specific performance indicator to replace the current “Scrams with Loss of Normal Heat Removal.”

However, we believe the use of this approach for assessing industry performance is not appropriate. While one can derive an equation which provides an industry average initiating event core damage frequency, it is not clear what this number really represents and it is clearly not an “actionable” measure. For example, one can look at trends in numbers of scrams per unit, or types of initiating events, and then investigate a potentially declining trend by assessing operations or maintenance throughout industry. These measures already exist, and in fact, if the IIIEI were to show a declining trend, one would look to these already existing indicators, and others, anyway. Thus the IIIEI seems to merely add an additional level of assessment which appears to be of relatively low value, and may be difficult to explain to stakeholders. It is not clear what an average industry “core damage frequency” means in practical terms and what industry action would be appropriate solely on its value crossing some threshold. (This vagueness is in contrast to an individual plant crossing a threshold on a particular system, or exceeding a threshold for risk significant initiating events at a plant and having a specific target for investigation and correction.)

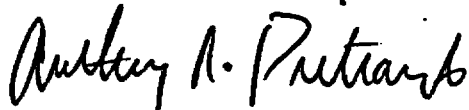
We do not agree with your statement: “An overall indicator can provide a better representation of the overall risk from initiating events than multiple individual indicators of initiating events with varying degrees of risk significance.” Rather, we believe that the current body of indicators and inspection findings provide a very robust measure of industry performance. Any individual indicator may be blind to a particular issue or trend, and therefore we believe greater reliance should be placed on that mixture of indicators rather than trying to derive one to attempt to integrate all information.

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We recommend that NRC continue to interact with industry and other stakeholders to assess the potential of the IIIEI methodology in developing a replacement for the "Scrams with Loss of Normal Heat Removal" plant specific indicator.

If you have any questions regarding these comments, please contact Mr. Thomas C. Houghton (202-739-8107, tch@nei.org) of my staff.

Sincerely,

A handwritten signature in black ink, appearing to read "Anthony R. Pietrangelo". The signature is fluid and cursive, with the first name "Anthony" being more prominent.

Anthony R. Pietrangelo

Enclosure

RESPONSE TO SECTION 6. QUESTIONS FOR REVIEWERS

As this document is reviewed, the following questions/issues should be addressed:

- ♦ Is Equation 5 (Section 3.3) rather than Equation 2 or 3 most appropriate for quantifying the IIIEI?

Equation 5 is sufficient for quantifying the IIIEI. More complex formulations would have limited value for the generation of an industry average performance indicator.

- ♦ Is the method for determining baseline performance adequate (Section 3.4)?

The method described appears to satisfy the desirable characteristics outlined in section 3.4. The decision rules in section 3.4 do take some time to understand and may not be transparent enough to allow them to be easily understood by the public.

- ♦ Is the proposed method for calculating current frequencies for the initiating events (Bayes update with three years of data) appropriate (Section 3.5)?

There were not enough sensitivity studies performed to determine the answer to this question. The information recorded in section 4.4 did not include the inferred number of events beyond the baseline that correspond to the 95% and 99% prediction limits. It is important to know this to assess the sensitivity of the indicator to rare, but risk significant, events.

- ♦ Should CDF or Δ CDF be used as the measure for the IIIEI (Section 3.7)?

CDF should be used for the measure for the IIIEI.

- ♦ Given the characteristics of the IIIEI (as discussed in Section 4) and the simulation results, what might be appropriate CDF and Δ CDF action thresholds?

It is difficult to discuss industry wide action thresholds without any context that defines what the actions may be. This question cannot be adequately addressed without this context. A simplistic response is that the surrogate safety goal of $1.0e-04$ is the appropriate action limit. It is generally recognized that this goal is a conservative reflection of the actual safety goals.

- ♦ Should the industry-average Birnbaum importances be obtained from the SPAR models or from industry risk models?

The industry average Birnbaum importance values should be obtained from the SPAR models. However, recent benchmark efforts performed through the ROP-MSPI pilot project clearly show that the existing benchmarks performed on the SPAR 3i models were not sufficient to assure the SPAR models accurately reflect the as built configurations of the current set of nuclear stations. The more extensive benchmarks performed for the MSPI pilot plants demonstrated that additional benchmarks are necessary before the SPAR models could produce Birnbaum importance values that are representative of the actual plant configurations. Given that

these benchmarks are performed, using a single set of PRA's that are all developed to similar guidelines (SPAR models) would allow an understanding of any inherent bias introduced in the indicator through modeling methods. This understanding could not be developed with data provided by individual plants. An additional consideration is the variation in the specific definitions of initiators in the plant PRA's. These would have to be resolved before data from plant PRA's could be used to ensure consistency in the data provided. This may not be a practical exercise. This also raises the question of the ongoing fidelity of the SPAR models and how they will be maintained on a continuing basis.

- ◆ If the Birnbaum importance measures are obtained from the industry, how will the differences between the two models (industry and SPAR) be addressed?

Differences in the models must be addressed for the indicator to have any integrity no matter which set of models is used to supply the importance measures.

- ◆ How often should initiating event baseline performance be updated?

If CDF is used as the metric (as opposed to Δ CDF), it is not clear what the purpose of the baseline is. The answer to this question should be reflective of the purpose of the baseline. If the baseline is used to provide the early warning threshold, then it should be updated as often as necessary to be reflective of current industry performance. This is best established through an update of the trend analysis on the initiator frequencies, and an assessment of the impact on the early warning threshold.

- ◆ How often should the Birnbaum importance measures be updated?

When the plant designs and operating methods change, on a continuous basis.

- ◆ Is the treatment of uncertainties adequate (Section 4 and Appendix E)?

NO, model uncertainties must be addressed.

- ◆ Should the thresholds be set so that no one event in a three year period would cause the threshold to be exceeded?

If one event in a three year period could cause a threshold to be exceeded, then the method is fundamentally flawed. It would indicate the three year period is not sufficient. It may be that the sample period should be a function of the expected frequency of the event. Less frequent events that have a dominant impact on the indicator (SLOCA in PWRs for example) may need to be monitored over a longer period than 3 years.