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DOCKET NUMBER
PETITION RULE PRM 50-75
(67 FR 16654)

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Madam Secretary,

The Illinois Department of Nuclear Safety (IDNS) hereby submits public comments on the petition for rulemaking (PRM 50-75) published in the Federal Register on April 8, 2002. The Department appreciates the opportunity to submit comments on this proposed petition. We believe it is a proposal with the potential to alter, in a major way, how the Nuclear Regulatory Commission (NRC) does regulatory business. IDNS is on record in numerous previous comments that we favor a risk-informed and performance-based approach to regulation. That hasn't changed. However, at some point, there needs to be decisions made as to how much defense-in-depth and safety margin we are willing to sacrifice in the risk-informing approach. Additionally, IDNS see this petition as a test case for determining when the effects of deregulation (predominately cost reductions) unsatisfactorily impact the regulator, public safety and public confidence. IDNS foresees the potential for a major reduction in defense-in-depth and safety margins if this petition is approved.

The petitioner states that 2500 reactor years of operating and safety experience, increases in technical knowledge, NRC's commitment to risk-informed regulation, and a range of expected benefits, justify the changes. IDNS comments address each issue.

**2500 Years of Operating and Safety Experience**

IDNS counters with this line of reasoning. 2500 years of operating and safety experience shows that the present set of regulations and regulatory processes are proven effective. There is much to be said for defense-in-depth, and to reduce it will reduce safety margins. This is especially true if the improved technological knowledge contains large uncertainties. Therefore, given that risk-based processes will sacrifice some safety margins, cost/safety benefit analyses need to be considered carefully.

The petition seeks to amend the Emergency Core Cooling System (ECCS) regulations to allow use of a smaller pipe break size than the double-ended shear of the largest pipe attached

recyclable

Template = SECY-067

SECY-02

to the reactor, in the light water reactor (LWR) ECCS evaluation models. The petitioner notes that Appendix K, specifying required and acceptable features of ECCS evaluation models, was issued in the 1970's, and contained large amounts of conservatism because of a lack of data, *and large uncertainties*. The leak-before-break (Appendix A, GDC 4) concept was adopted in 1987, which modified some environmental and dynamic effects by excluding postulated piping ruptures. It was justified because the probability of a pipe break was small under design conditions, and some pipe whip restraints and jet impingement devices were deemed not necessary. NRC acknowledge back then that the amendment introduced some inconsistencies to the design basis regulations, by retaining the large pipe break for ECCS, containment cooling, and environmental qualification, but allowed exclusions for some dynamic effects. The petitioner contends that this petition is a logical extension of the leak-before-break methodologies. IDNS is not convinced it is, because of *large uncertainties* involved in risk analyses. There seems to be a trade-off of uncertainties at play in this petition, between those in the original rulemaking criteria, and those in the present risk-based technical knowledge techniques.

**Increases in Technical Knowledge**

IDNS believes that if leak-before-break and fracture mechanics methodologies are to be used to reduce the Emergency Core Cooling System (ECCS) acceptance criteria requirements, it seems to follow that these methodologies should be subject to standards for rigor and quality as a PRA is supposed to undergo. PRA standards now exist, but have yet to be unequivocally adopted by the NRC. The petitioner promises that if this petition is granted, then they will continue to develop the technical work to support alternate break sizes, and the industry will start work on specific applications to form the basis of industry and regulatory implementation guidelines. This doesn't make IDNS confident that the technical work to support this petition is sufficient to make rule changes at this time.

**NRC's Commitment to Risk-Informed Regulation**

The petitioner states that the NRC has used improvements in probability fracture mechanics to approve a more safety-focused approach to Section XI improving worker and public safety. IDNS agrees that reduced radiation exposures for workers doing Section XI tests are a good thing. We are not as convinced that reducing the design basis accident (DBA) pipe size improves public safety, or that state-of-the-art probability techniques are developed adequately enough to reliably predict piping failure rates. Probability risk assessments (PRA), fracture mechanics models, and leak-before-break analyses are highly complex engineering and statistical techniques that contain significant areas of uncertainty. We are not confident that uncertainty analytical techniques commonly used in PRA assessments are adequate for assessing piping failures.

The petitioner says the changes would focus design and operational procedures, resources, and practices on more likely safety-significant events. IDNS asks why not focus on both the existing design basis accident (DBA) and more likely events? PRA's show small risk from a large break loss of coolant accident (LBLOCA) because of the defense-in-depth built into the designs. The petitioner states the existing LBLOCA will still be included in the plant-specific PRA as a historical document, and that it will still be considered in LOCA analyses, and the plant will still maintain the capability to mitigate it because the mitigation equipment is needed anyway. So we wonder, why bother? Especially since the petitioner warns that the capability of the systems will be revised, presumably downward. How this resource/safety tradeoff will be accomplished worries us.

The issue raises several questions. How much more likely do these more risk significant scenarios have to be in order to justify safety margin reductions in the present ECCS criteria? How are the probabilities for piping failures determined and quantified? How reliable are the risk analyses used to predict piping failure rates? And finally, where would risk-based regulatory reductions stop? Reduced ECCS and containment capability, reduced emergency planning zone sizes, reduced need for emergency planning capability? All of these potentially affect public safety and confidence.

In the formula where risk equals probability of occurrence times the consequences, IDNS believes the consequences part of the equation receives less emphasis in safety margin reduction decisions. The probability for a LBLOCA might be small, but we believe the consequences are huge. And *the probability for a LBLOCA increases as plants age*. Going to a smaller break size in ECCS acceptance criteria also reduces the perceived consequences. The petitioner states that the approval of this petition will cause changes to containment analyses, including peak containment accident pressure, but it is not the intent of this petition to change containment structural integrity. IDNS is not only interested in containment structural integrity, but also in containment capability. What the petitioner seems to be proposing is that the containment structure won't be affected, but integrity testing will be done less often. This potentially affects the margins of safety of all three barriers to radioactive releases to the public, and will result in a reduction in safety margins that must be technically justified.

The petitioner contends that the PRA policy statement and RG 1.174 concepts support the petition, and that the technical basis for the petition is insights and information provided in the area of leak-before-break, fracture mechanics, and plant specific PRAs. They also expect licensee and generic owner's group submittals and application-specific analyses to be based on probabilistic principles. IDNS questions to what extent the ASME PRA standard, the NEI PRA peer review criteria, or RG 1.174 guidelines adequately treat pipe cracking issues. Predicting the probability of a pipe failure is far different from predicting system inter-relationships and responses in contributing to a core damage accident sequence.

We question how generic the proposed petition would be. Each plant has its own as-built configuration and operating history that affects pipe failure probabilities. The crack repair history in older Illinois boiling water reactor recirculation loop piping and other reactor components does not give IDNS comfort for the long term. We would hope that previous inservice inspection findings, flaws left in place, and repairs would be considered in plant-specific pipe failure probability analyses. We hope that any owner's group generic analyses will be applied specifically to individual plant Section XI results. IDNS looks skeptically at reducing Section XI requirements in aging reactors. The Davis Besse reactor head corrosion problem only reinforces that degradation mechanisms are not fully understood, and new ones emerge periodically. Also, leak-before-break, fracture mechanics, and PRA's are not adequately developed to reliably predict potential failures. Nor were these applications ever intended to predict or quantify a failure mechanism such as boric acid erosion or hydrogen explosions in reactor coolant system piping. We think they need to be before regulations are relaxed.

**Range of Expected Benefits**

The petitioner contends that regulatory improvements could be expedited by up to two years. The petitioner argues that approving the petition will improve the consistency of existing regulations, and improve plant safety through more realistic technical specifications in surveillance testing. IDNS agrees that there are minor inconsistencies between ECCS regulations as a result of adopting leak-before-break engineering techniques. We disagree that the inconsistencies are egregious enough to require actions that this petition proposes. Furthermore, IDNS argues that developing new regulations that licensees have the *option* to follow (are voluntary) will contribute uncertainties to regulations. Having to regulate to two sets of regulations for the same issue may result in reduced regulatory burden for some licensees, but certainly will not reduce it for the NRC. So we look skeptically on voluntary regulations.

The petition states that because it takes substantial design, licensing, operational activities, and resources to deal with the LBLOCA event, it is appropriate to provide an option to licensees to modify their design and licensing basis to a more risk-based approach. As stated, IDNS generally looks favorably on a risk-informed and performance-based regulatory approach. But if the proposed changes are good for light water reactor licensees, then they ought to be good for <u>all</u> light water reactor licensees. To have more than one set of regulations increases the regulatory burden on the NRC staff at a time when the regulatory work load is ever increasing. This seems to go against the NRC strategic objectives of reducing regulatory burden, maintaining public confidence, and increasing regulatory efficiency and effectiveness. Voluntary regulations imply that either the risk-informed

proposed changes are not as desirable as the petitioner thinks, or that the whole industry is not fully committed to the approach.

The petitioner alleges one of the benefits of the petition will be increased plant safety through more realistic technical specification surveillance testing. IDNS believes that if existing technical specification surveillance testing requirements are unrealistic, then they should be amended to make them more realistic. We assume by unrealistic, it is meant they are not risk-informed. If plants are less safe under existing unrealistic licensing bases, why aren't the existing standard Technical Specifications (TS) risk-informed? We suggest this petition be denied in favor of an accelerated effort to risk-inform current TS. If the industry believes that PRAs are good enough to support relaxing regulations, and offer relief from unnecessarily harsh testing conditions, then they should be of a high enough quality to seek relief under the current licensing basis.

The petitioner claims that the requested changes will provide impetus and direction in the development and approval of the LBLOCA implementation applications. This will result in safety and resource benefits from risk-informing the LBLOCA criterion. We don't know what this means, see no examples of the expected safety benefits to the public, or recognize what resource benefits will result to whom from the petition. The petitioner says they will take into consideration defense-in-depth, safety margins, and performance monitoring, and evaluate changes under 50.59. They don't say how.

Given the number of questions raised, IDNS would remind the commission that, since the TMI accident, the current design basis accident focus has provided the public with a relatively high level of confidence that the regulator is keeping a close watch on a complex and potentially hazardous technology. This is evidenced by surveys that public approval of the industry has risen. We don't think approving this petition at this time will have a positive effect on that confidence level, and recommend the commission proceed cautiously.

Questions should be addressed to me at 217 785-9868.

Sincerely,

Thomas W. Ortciger
Director

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