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DOCKET NUMBER
PROPOSED RULE PR 21,50,52,54+100
(65FR11488)

May 8, 2000



The Secretary of the Commission
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Dear Ms. Vietti-Cook

Enclosed are my comments on the Advanced Notice of Proposed Rulemaking on Risk-Informing Special Treatment Requirements, 65 Federal Register 11488, March 3, 2000.

Sincerely,

Bob Christie

Bob Christie



TEMPLATE = SECY-067

SECY-02

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Comments of Bob Christie on the Advanced Notice of Proposed Rulemaking for Risk-Informing Special Treatment Requirements.

I. Background - ..."The Commission's current reactor regulatory framework (based largely upon design-basis events rather than on core-damage-accident scenarios) results in reasonable assurance of adequate protection to public health and safety..."

This is a nice sentence and we hear it all the time but, in my opinion, the sentence has no technical justification. Public health risk is dominated by severe accidents (reactor core damage) with containment bypassed or breached. Normal operation of nuclear power plants or accidents at nuclear power plants without severe core damage have little or no impact on public health risk. Consideration of normal operation or the existing design basis accidents should be included in the proposed rulemaking only in clear areas (for example: sabotage) where information from Probabilistic Risk Assessment has not been attempted. From a technical standpoint, complying with the set of existing design basis accidents does not address public health risk except to say that, as far as we know, the plants have enough equipment, if used properly, to avoid and mitigate severe accidents. How equipment and procedures are used (and misused) in the nuclear units for severe accidents should be what we are addressing in the rulemaking.

We need a set of regulations that directly addresses public health risk. Such a set of regulations should be more effective (address the most important equipment and procedures) and more efficient (address the most important equipment and procedures in a cost effective fashion). We need to use Probabilistic Risk Assessments that are specific for each nuclear unit to determine the public health risk from the nuclear unit and decide what we really mean by "reasonable assurance of adequate protection of public health and safety." In my opinion, "better" regulations that use the results of Probabilistic Risk Assessments would lead to better "safety."

One has only to read the reports (Kemeny and Rogovin) that were issued after the accident at Three Mile Island Unit 2 in 1979 to identify the problems with NRC regulations. The same root causes of the problems with NRC regulations that were identified in these reports continue to exist today because the staff of the Nuclear Regulatory Commission will not "let go" of the methods of the 1960s and 1970s for the analysis of public health risk. Technology has moved on; the regulations need to catch up with the technology.

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I. Background (continued)

"...Special treatment as used here may be defined as –

Current requirements imposed on structures, systems, and components (SSCs) that go beyond industry-established requirements for equipment classified as 'commercial grade' that provide additional confidence that the equipment is capable of meeting its functional requirements under design basis conditions. These additional special treatment requirements include additional design considerations, qualification, change control, documentation, reporting, maintenance, testing, surveillance, and quality assurance requirements.

This definition does not encompass functional design requirements; that is, an SSC's functional design requirement is not considered a special treatment requirement."

Need to clarify what the last sentence says. Does the last sentence say that there are no special treatment requirements for design basis accidents? What about SSCs that are both "safety-related" and "safety-significant?" Is it the intent of this rulemaking to shift us over to special treatment that addresses the safety functions that come from each individual nuclear unit's Probabilistic Risk Assessment? This would be a much better set than we have, but as much as I would like such a set, I doubt that the staff of the NRC intends us to have such a set.

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II. Rulemaking Plan

A. Vision

"Develop alternative regulations in 10CFR50 (and other applicable parts) that would modify the requirements for special treatment to focus on those SSCs that have been identified as important to protect public health and safety by using a risk-informed approach."

This is an excellent vision statement and defines where we want to be in the future. It contains both parts of the work. That is: (1) the identification of the most important equipment and procedures and (2) the modification of the special treatment requirements. It indicates that we are to use the Probabilistic Risk Assessment for the nuclear unit to guide our effort.

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II. Rulemaking Plan - Vision (continued)

I would suggest one change. That is: rearrange the sentence structure as follows "By using a risk-informed approach, develop alternative regulations in 10CFR50 (and other applicable parts) that would modify the requirements for special treatment to focus on those SSCs that have been identified as important to protect public health and safety."

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B. Strategies

"Maintain overall safety provided by the existing Part 50 while reducing unnecessary burden associated with these requirements for licensee operational and licensing activities and for NRC oversight and licensing activities."

It is impossible to maintain overall safety provided by the existing Part 50 if you don't know what level of safety Part 50 provides. There is not a nuclear electric generating unit in the United States that knows the level of public health risk (prompt fatality rate and latent cancer fatality rate) represented by the unit when the unit is considered as a whole much less the part provided by the existing Part 50. Trying to maintain the overall safety provided by the existing Part 50 is just a figure of speech and we should stop using such figures of speech.

The strategy should be to identify the equipment and procedures that are most important to public health risk. That is: the equipment and procedures most important to severe accidents (reactor core damage) with containment bypassed or breached. Then identify the "special treatment" requirements that might help avoid and mitigate such accidents.

We do no service to ourselves or to the public by making statements that have no technical meaning. I suggest that this part of the strategy be deleted.

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C. Objectives

"Establish the criteria for acceptable methods for determining the SSCs that require special treatment in the regulations of Part 50. These criteria should be sufficiently clear and robust such that if a licensee's program meets the criteria there is not a need for prior NRC review and approval of the plant-specific program."

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II Rulemaking Plan - Objectives (continued)

Nice to say but impossible to do in actual practice. Public health risk is plant specific and changes with time. The Probabilistic Risk Assessments methods are plant specific. Other than setting some overall levels of public health risk, I don't see how you are going to write general criteria for importance that cover all the plants. In reality, the NRC is going to review all the plants before approving the methods anyway no matter what amount of detail is included in the rulemaking. The nuclear unit would have to convince the NRC staff, in detail, that the nuclear unit is covered by the rulemaking.

I suggest that the second sentence of this objective be deleted.

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"Ensure that the categorization process has been evaluated under a pilot program to verify that the requirements and their associated guidance can be implemented by industry, and that the results of licensee implementation provide reasonable assurance that public health and safety is maintained."

One cannot ensure that the results of licensee implementation provide reasonable assurance that public health and safety is maintained when you don't know (1) what is the level of public health risk in the first place or (2) what is reasonable assurance of public health risk. In addition, we all know there is no way to measure the change in the level of risk when we change the special treatment requirements.

Our objective should be to focus on the most important equipment and devise a new set of "special treatment" requirements that we believe will be effective for severe accidents. Look at the Vision statement. We can use the nuclear unit's Probabilistic Risk Assessment to quantify everything that we know about the public health risk and then evaluate and monitor the level of risk in some "Living PRA" model. If we do our job right, "safety" will increase because public health risk will decrease because we will be concentrating on the most important equipment and procedures. If we do our job right, we will be able to measure the decrease.

I suggest that the objective read:

"Ensure that the categorization process has been evaluated under a pilot program to verify that the requirements and their associated guidance can be implemented by industry."

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F. Implementation

1. New Appendix versus Regulatory Guide

Having been in the nuclear electric power business for a number of years and noting the difficulties we have with respect to changing 10CFR50, I believe it would be much better to have a Regulatory Guide than an Appendix to 10CFR50. Once something ends up in 10CFR, it tends to be written in stone no matter what new information is acquired from nuclear plant operating experience. The fact that we have to go through the South Texas Exemption Request and this rulemaking process is a clear example of the fallacy of writing detailed instructions in the 10CFR.

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2. Additional Guidance

The production of a regulatory guide should be a "living process." I believe it is technically impossible to determine in advance all the permutations that might arise in the implementation of changes to special treatment requirements for each nuclear electric power unit. Any document intended for later use as a Regulatory Guide, either by NRC or NEI, should have no official endorsement until the completion of a large number of pilot programs. Even after an official endorsement, there should be an easy process to change the guide as more operating experience is obtained. We should learn from the implementation of 10CFR50.65, Monitoring the effectiveness of maintenance, that guidelines written in advance and "locked into" the regulatory process are not effective or efficient.

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G. Pilot Plant Program

Pilot programs are essential. As indicated in the second paragraph: "The most important aspect of the pilot plant program will be to demonstrate the viability of risk categorization processes to establish alternative risk-informed special treatment requirements."

However the third paragraph of this section is a blueprint for disaster. Stating that: ["It must agree on overall and plant specific schedules and the rules to be piloted. Pilot plant program participants must commit to meet the resulting requirements and proposed NEI guidance for categorization and implementation. In addition, pilot program submittals should address how design basis functions will be preserved when special treatment for safety-related SSCs is reduced as a result of the risk categorization processes. The discussion should address how these SSCs will be treated by the licensee's design control

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G. Pilot Plant Program (continued)

and corrective action programs."] makes no technical sense. These sentences should be deleted.

The reason for pilot programs is to test out special treatment requirements. No one should commit to schedules and requirements in documents today when the purpose of the pilot program is to test the viability of the documents in implementing the "Vision" stated above. No one should commit to preserving design basis functions when it is known that design basis functions are not directly important to public health risk. We have a better tool (Probabilistic Risk Assessment) to measure and evaluate public health risk which comes from severe accidents (reactor core damage) with containment bypassed or breached. We are going to use risk-informed approaches to modify the existing special treatment requirements to focus on the most important equipment and procedures with respect to public health risk. We will try various approaches in pilot programs and adopt those approaches that result in the most effective and efficient regulations.

As with any unknown process, when you start the process it will be difficult to determine what schedules and resources must be applied to the process to come up with a "good" product. All that can be done is to initially define the best scope of work possible with well defined deliverables and schedules. As one proceeds with the pilot programs, continuous feedback must be used to adjust the process as one goes. It makes no technical sense to commit to schedules and requirements in advance. It would be nice if we knew the answers and how long it would take before we started, but we don't.

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H. South Texas Exemption Request

As stated in the advanced notice of proposed rulemaking, the review of the South Texas Exemption Request should be completed before the rulemaking effort begins. If the South Texas Exemption Request is not approved, or is approved only with major restrictions on the use of Probabilistic Risk Assessment to determine safety significance, then it is unlikely that the proposed rulemaking will have any probability of success in achieving the Vision stated in the advanced notice of proposed rulemaking.

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III. Specific Proposal

C. New Appendix to Part 50

In my opinion this entire section should be deleted. As indicated above, we do not need a new Appendix to 10CFR50 to determine safety significance. At most, we should aim for some sort of a "Living Process" for each nuclear unit that makes maximum use of existing procedures to determine safety significance augmented by new processes that are developed as part of the pilot programs. We are not that good technically to write a detailed proposed guideline. We still have a lot to learn as demonstrated by the effort involved in the South Texas Graded Quality Assurance Program.

One can clearly see in the proposed Appendix T, the desire by the staff of the NRC to throw everything (add on) into the document no matter what technical knowledge exists.

For example:

"Process for Categorization

To accomplish these objectives, the process to categorize SSCs should consist of the following elements:

(5) b. Evaluation of the overall change in plant risk as a result of changes in treatment requirements, and readjustment (if necessary) of the categorization of SSCs based on this estimation of changes in risk."

The nuclear industry and the staff of the NRC know this can't be done because we don't know the impact on equipment availability and reliability for the **existing** special treatment requirements. We can deplore this situation exists but there it is. The nuclear units have spent billions of dollars in the name of design basis accidents and special treatment requirements (Quality Assurance) and no one can technically determine the impact of the special requirements other than to say we have examined a few pieces of equipment and sometimes the impact appears positive and sometimes the impact appears negative. However, the staff, in spite of this technical knowledge, wants to cover all bases and therefore throws a requirement which can't be met into the proposed Appendix T.

Another example:

"Risk Indices Outside the Scope of the PRA

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III Specific Proposal (continued)

...Therefore, when an SSC is not identified as safety significant by the PRA, the Integrated Decision-making Panel (IDP) must verify low safety significance by determining if:

(iii) Failure of the SSC will result in unintentional releases of radioactive material even in the absence of severe accident conditions."

The nuclear industry and the staff of the NRC know that public health risk is dominated by severe accidents (reactor core damage) with containment bypassed or breached but rather than concentrate on the important equipment and procedures with respect to public health risk, the staff throw in requirements to evaluate potential failures of any piece of equipment which might result in any unintentional release of radioactive material.

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**Summary of comments**:

In my opinion, the effort by the staff of the NRC, as defined in the advance notice of proposed rulemaking, with respect to the categorization process is based on an "add on" approach. That is: the staff of the NRC want to retain all the existing special treatment requirements for design basis accidents and throw in some more special treatment requirements for severe accidents. Such a process will not result in more effective and efficient regulations.

My recommendation for the process is as follows.

The categorization process should start with the Vision statement and work down:

Vision Statement:

"By using a risk-informed approach, develop alternative regulations in 10CFR50 (and other applicable parts) that would modify the requirements for special treatment to focus on those SSCs that have been identified as important to protect public health and safety."

From here the categorization process would focus down on the important items:

1. Public health risk is dominated by severe accidents (reactor core damage) with containment bypassed or breached.

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**Summary (continued)**

2. Probabilistic Risk Assessment (PRA) is the best tool to evaluate public health risk. A plant specific PRA will be used to determine the "safety significance" of equipment and procedures modeled in the PRA using a plant specific procedure that has been approved by the NRC.

3. Items, other than those identified by the PRA as "safety significant," will be added to the safety significant category by an Integrated Decision-making Panel only if it can be demonstrated that the PRA deliberately ignores the item (sabotage) or the treatment of the item in the PRA is deemed inadequate by the Integrated Decision-making Panel. The process (blended approach) that the Integrated Decision-Making Panel uses to determine the adequacy of the PRA for safety significance determination will be a plant specific procedure that has been approved by the NRC but the plant specific procedure will not be tied to the existing design basis accident process.

4. The special treatment requirements that are applied to the safety significant equipment and procedures will be determined on the basis of importance as defined in the PRA or the importance as defined by the Integrated Decision-making Panel.

5. A monitoring program will be implemented that makes maximum use of existing monitoring programs to quantify and evaluate public health risk. The Integrated Decision-making Panel will determine levels of acceptable safety (risk) for the facility as defined in the PRA and the importance evaluations of the Integrated Decision-making Panel. The Integrated Decision-making Panel will obtain approval of the measurement of the level of acceptable public health risk for the facility from the NRC. A corrective action program will be implemented to fix problems that arise that indicate the acceptable levels of safety (risk) are not being met.