



NUCLEAR ENERGY INSTITUTE

DSI-22

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Dr. Thomas D. Ryan  
SENIOR VICE PRESIDENT,  
REGULATORY POLICY & REFORM

November 27, 1996

Mr. John C. Hoyle  
Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001



**ATTENTION:** Chief, Docketing and Service Branch

**SUBJECT:** NRC Strategic Assessment and Rebaselining  
(61 *Federal Register* 195; October 7, 1996)  
Request for Comments

Dear Mr. Hoyle:

The Nuclear Energy Institute (NEI),<sup>1</sup> on behalf of the nuclear energy industry, has reviewed the Direction Setting Issue (DSI) papers which form a part of the NRC Strategic Assessment and Rebaselining Initiative. The purpose of these papers is to discuss key issues affecting the future strategic direction of NRC and provide options for selection by the Commission. The NRC has requested comments from all "stakeholders" to be considered as part of the Commission's decision making process. Our comments on each DSI paper are organized in the following format:

1. What, if any important considerations have been omitted?
2. How accurate are the NRC's assumptions and projections for internal and external factors?

<sup>1</sup> NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

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3. Do the Commission's preliminary views respond to the current environment and challenge?

#### 4. NEI Recommendations

The NRC is to be commended for undertaking this effort. It is important to periodically review the overall direction of the agency, particularly given the dynamic circumstances in the nuclear industry today. The DSIs identified through the early phases of this assessment are reasonably complete, highlighting the areas in which strategic decisions are needed. Many of our comments highlight areas where the staff analysis of the issues does not include viewpoints significantly different from the status quo.

We are concerned that insufficient review time will reduce the effectiveness of the stakeholder comment process. The stakeholders had a very limited time to solicit and compile comments from their constituencies. We recognize that the public comment period was extended, but the two week extension was announced too late in the process to affect the collection of comments from NEI's members. It is likely that other "stakeholders" representing large constituencies, including licensees with multiple internal organizational groups, were similarly constrained.

Of greater significance is the amount of time the NRC has indicated will be used to assess the comments. NRC staff indicated during the workshops that "Stakeholder Interaction Reports," compiling the comments, would be forwarded to the Commission for consideration within three weeks after the comment deadline. This schedule would make it very difficult for NRC management to consider the variety and volume of public comments that are likely to be received. It could restrict the ability to revise the thinking that went into the initial papers, to define and flesh out new options which may be suggested by the comments, or to provide analysis of such new options for the Commission's consideration. We encourage NRC to take the time necessary to derive full benefit from this important endeavor.

A significant omission from this strategic assessment is the current enforcement policy. That policy has a pervasive effect on the relationship between the NRC and its licensees and on the message the public perceives regarding the safety significance of problems. Other federal agencies with safety mandates, and many foreign nuclear regulatory authorities, have different approaches to enforcement. Some of these are structured differently specifically to encourage compliance, rather than punish non-compliance. NEI strongly encourages the NRC to subject the enforcement policy to the same type of review, examining options different from the

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agency's historical practice, as has been applied to other programs in many of the DSIs.

In many of the DSI papers, past actions of the agency are summarized, but often not critically evaluated. Instead, it appears to be accepted that past regulatory actions were necessary and remain appropriate as continuing regulatory requirements. In fact, many of these actions were in response to specific events and issues, may not have been the most effective means of dealing with the issue, and are inappropriate as continuing burdensome requirements since the causes of the events have been dealt with. A more thorough assessment of previous NRC actions could produce lessons on how the agency could have been, and could be, more effective in addressing issues. Today, the regulatory problems at the Millstone station are the issue of the moment. References to these problems permeate the DSI papers. The papers could well have had a different tone had they been prepared a year earlier. While it is necessary to deal with compliance problems when they are found, it seems inappropriate for individual situations such as Millstone to color so completely the strategic picture for a regulatory agency.

There is agreement between the NRC and industry that safety performance has improved over the last several years. Performance indicators monitored by NRC and industry both demonstrate such improvement. Nevertheless, the total burden imposed by regulatory requirements continues to increase. There is danger that this increasing burden will make it economically infeasible for some nuclear power plants to continue operation, thus depriving the nation of a reliable, clean source of electric power. Such an outcome is not in the public interest if safety is not in question. An improved focus is needed in the nuclear regulatory process on safety significance. We note that Chairman Jackson has often expressed her support for the concept of risk-informed, performance-based regulation. We agree that this is an excellent mechanism for providing the needed focus. It would allow issues to be addressed in their appropriate context, considering both their individual significance and the overall level of safety performance in the industry. It would lead to more efficient means to address those issues that require action. It would appropriately allow for individual variation in the response to an issue, as it is seldom the case that a single specific action is the appropriate, effective response for all members of a class of NRC licensees. The regulatory process needs to recognize this, and allow problems to be addressed in the manner which will be most effective given the circumstances of individual licensees. We encourage the NRC to utilize fully this strategic planning process to further the transition to this more effective and efficient regulatory regime.

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Several of the DSIs would benefit from a practical definition of an adequate level of protection of public health and safety. It is difficult to discuss how to (1) improve public communication, (2) improve the efficiency and effectiveness of the regulator, and (3) properly focus a regulatory oversight program without defining the baseline against which effectiveness can be measured. Without a more objective definition of adequate safety levels, one cannot determine when programs are successful or address a perception that more needs to be done. The NRC needs to develop means for applying the safety goals in a practical manner in order to provide a benchmark that is useful for determining when and how much additional action is required to assure safety.

Significant management attention will be required to implement any changes that result from this strategic planning process. The experience with risk-informed performance-based regulation is instructive in that regard. The Commissioners and senior staff management repeatedly have made comments supportive of such approaches to regulation. There appears to be an understanding, at the policy level, that it is appropriate to deal with issues in their particular safety context. This policy has not been effectively transferred to the working level of the staff. Inspectors and reviewers, whose actions impact NRC licensees on a daily basis, remain focused on detailed, prescriptive approaches. They continue to be concerned with how the "requirements" of NRC guidance documents are met, regardless of the safety objective and inherent flexibility of guidance. It will be very important for the Commission and staff management to devote considerable effort to translating any policy changes resulting from this rebaselining to changes in practice at the working level, so that they may indeed improve the effectiveness of the regulatory process.

We appreciate the opportunity to comment on these issues. We are willing to meet with the Commission or staff to discuss our comments or the related broader issues. Please contact me at (202) 739-8013 if there are any questions regarding our comments.

Sincerely,



Thomas D. Ryan

TDR/RWH/ec  
Enclosure

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c: Hon. Shirley Ann Jackson, Chairman  
Hon. Kenneth C. Rogers, Commissioner  
Hon. Greta J. Dicus, Commissioner  
Hon. Nils J. Diaz, Commissioner  
Hon. Edward McGaffigan, Jr., Commissioner  
Mr. James M. Taylor, EDO

**Nuclear Energy Institute Comments**

**on**

**Direction Setting Issue Papers**

**from**

**NRC Strategic Assessment and Rebaselining Initiative**

**November 27, 1996**

## DSI 22 – RESEARCH

### 1. What, if any, important considerations have been omitted?

- The paper should address two key policy issues -- the application of NRC's first two "Principles of Good Regulation": Independence and Openness -- in the context of the NRC's research program.
- A question frequently raised by industry and the NRC's own Nuclear Safety Research Review Committee in briefings before the Commission is not confronted in this paper. That question is "How much of the work being done by industry has to be duplicated by NRC". The need to maintain an adequate research program sufficient to support NRC's statutory responsibilities in the face of reduced resources demands a thorough review of this important question.
- When compared to other national and international research programs, including ones maintained by other governmental organizations (some with regulatory responsibilities), the NRC Research program is not viewed by industry as an "open" process. The process of deciding which issues need research, what technical approach should be followed in addressing that issue, what assumptions, data, and methods should be used, etc., is basically not open to the public. Documentation available to the public on NRC's research program, prior to the publication of final reports, is very limited. Contractors to NRC on a particular issue are expected to avoid any interaction with industry researchers studying the same issue. This closed approach to research has, on occasion, led to inefficiencies and delays in the regulatory process due to the need to reconcile conflicting results from industry and NRC contractor research.
- The paper stresses the challenge to NRC research programs from increasing budget constraints. Yet, the options do not include initiatives to cope with the reduced budget beyond "strawman" eliminations, (e.g., stopping research, dropping exploratory research, dropping international cooperation), which are not acceptable options if NRC is to fulfill its Congressionally-mandated research role. Ways should be identified to pursue a valid research program with strong core competencies, but more cost efficiently, by applying innovation measures, not just by reducing or eliminating major segments of the program.
- It should be recognized that not all research the NRC may conduct is of equal importance. It must also be recognized that all research need not be done in the lab (i.e., parts of it can very well be done in-plant). Therefore, it is appropriate to establish criteria to determine the amount and scope of research required to obtain essential initial information. For example,

permission to apply a new digital control or protection system to one channel in one plant should not justify an independent, NRC-sponsored research program. It could justify NRC/industry dialogue regarding information needed from initial in-plant application before broader application is acceptable. Similarly, new core designs or new burnup limits do not get applied uniformly throughout many plants simultaneously. They are introduced through lead test assemblies or in one batch at one plant. NRC's research programs should recognize the value of in-plant information regarding new concepts and improvements.

2. How accurate are the NRC's assumptions and projections for internal and external factors?

- Most of the assumptions for internal and external factors are accurate. We agree that resources for both private and government-sponsored R&D in the U.S. will continue to come under very close scrutiny, and that despite this budget pressure, questions will continue to arise on nuclear technical matters that will require research programs to address. This paper accurately expresses the need, but misses some of the key opportunities to meet this need through both government and private sector-sponsored R&D in the U.S.
- One assumption regarding external factors that we consider inaccurate relates to the role and substance of the nuclear industry's research program. Although we agree that financial pressures and commercial needs have focused private sector nuclear research on areas where clear value will be derived from the investment, we think the differences in scope and objective between NRC research and industry research have been exaggerated. Clearly, there are areas of research in the private sector that NRC does not pursue (product development, O&M cost reduction technologies, etc.). Similarly, there are issues that NRC is researching which the industry does not consider important, or where industry considers that sufficient research has been done on that issue for it to be closed.

However, there is a very large segment of nuclear research that is being duplicated by industry and NRC. This segment is comprised of the set of open issues and related technical areas where either NRC or industry consider important questions to remain that may have potential safety significance, plus the set of issues and areas where new science and technology offers an opportunity to address safety significant matters better and more cost efficiently than they are being handled today. This area of overlap represents a large and costly portion of the ongoing nuclear R&D in the U.S.

Examples of overlap include:

- \* design-basis and severe accident analysis (including tests and computer models);
- \* operating experience analysis (including system and component failure data, event initiator data, etc.);
- \* materials aging and corrosion research related to reactor pressure vessels, piping, steam generators, support structures, etc.;
- \* nuclear fuel reliability; spent fuel storage, transportation, and disposal.

Industry and NRC have cooperated in this type of research previously (e.g., sharing test facilities, data). We have worked together, often with DOE, to complete important and urgent research necessary to resolve regulatory issues.

The industry fully appreciates the need for regulatory independence. NRC's responsibility for adequate protection of public health and safety demands a strong and independent regulator -- one that can independently assess submissions from applicants and licensees. However, industry disagrees that duplication of research is essential to maintain this independence. Better alternatives are discussed later.

Much of the R&D that utilities conduct (e.g., via EPRI), that duplicates NRC research, relates to independent confirmation of third party work. Examples include the safety, performance, and quality of products and services being offered to utilities for use in nuclear power plants, offerings of new generation nuclear plant designs, development of nuclear waste storage, transportation and disposal technologies, etc. It should be recognized that utility interests in the safety and performance of these products and services are identical to that of the NRC. Today, in "confirmatory research", industry and NRC are duplicating efforts in pursuit of common goals, creating unnecessary costs and delays. It should be sufficient for NRC and utilities to jointly conduct a single independent confirmation of third party products and services, or for one to conduct the independent study and the other to verify its adequacy. This principle should allow increased cooperation among utility-funded contractors and NRC-funded contractors.

3. Do the Commission's preliminary views respond to the current environment and challenge?

The preliminary Commission views do not reflect any concern over the mismatch of requirements and resources, nor do they address any of the industry cooperation issues outlined above. Earlier in the Issue Paper, it is stated: "Recently, Chairman Jackson tasked the staff to explore further, more formal and innovative integrated programs of cooperative research through the pooling

of increasingly scarce resources.” Given that many opportunities exist to meet the Chairman’s tasking that were not covered in this paper (but are addressed in our comments here), it would appear that the Commission’s views on this paper could more explicitly address the thrust of the Chairman’s tasking. Specifically, given the many years of decline in industry-NRC cooperation on research, we believe that the Commission should specifically direct greater cooperation, via Commission Policy.

#### 4. NEI Recommendation

We concur with the Commission’s preliminary views on the following:

- that the research program should have elements of both confirmatory and exploratory research (Option 4)
- that the Office of Research should develop criteria for determining the core research capabilities it needs to maintain (Option 5)
- that NRC should continue to support the Educational Grant Program (Option 6)
- that NRC should actively participate in international safety programs (Option 7)

In addition, we offer the following comments on the full range of options presented in this paper.

#### OPTION 1: Discontinue NRC’s Research Program

Obviously this is not a credible option, given the ongoing need for research in some areas and the legislative mandate to maintain a research program at NRC. However, the NRC research program could be reduced significantly in scope and even more in expense through higher leveraging of research investments. This sub-option is not articulated.

Historically, one of the primary factors in elevating the importance of nuclear research was that certain physical phenomena associated with design basis and severe accident sequences have never been observed, and were thus a source of significant uncertainty in the design process. Without experience to confirm how these phenomena would actually occur and how well design features would respond, early design philosophy relied heavily on large conservative margins in all aspects of design and design analysis. Later, it was judged prudent to conduct tests and computer simulations to verify adequate design margins existed. This process has continued for at least two decades and has reached a point of high confidence in the design margins of both current plants and future

ALWRs. The computer models in use today are well-validated and generally accepted by NRC and industry with confidence. Most open safety issues have been resolved, and the nuclear industry is considered to be a mature industry with well-understood and safety-defensible design criteria. The need for research into safety issues is much lower than it was in the 1970s and 1980s. Needs for safety research will still arise, so maintaining a modest response capability at NRC is clearly prudent. This capability can and should be scaled back from its size in earlier years.

This option discusses the need to close some research facilities if NRC's research program were discontinued. It acknowledged that some of these facilities are jointly supported today by DOE and industry. Clearly, NRC, DOE, and industry should review all these facilities, project future needs that any or all of these parties might have for their use, and decide which ones are essential to remain open and available. Appropriate funding could be retained for the selected facilities, some via cost-sharing, and probably at lower cost than today.

The discussion on the need for independent information to confirm licensee or vendor proposals confuses the issue of what the nature of NRC independence must be. Clearly NRC must be able to make independent judgments on these proposals. Industry recognizes that some issues, because of the importance of the issue or the degrees of uncertainty involved, warrant independently conducted research at NRC. However, there is a range of approaches that can be taken, from totally independent (and redundant) research, testing, etc., to independent verification of the licensee or vendor proposal, to collaboration with industry on early stages of the research that then allows NRC to retain independence in its conclusions. Options other than total independence are implicitly rejected in the discussion of the ramifications of the loss of the NRC's research program.

Safety issues can be addressed by NRC participation in or monitoring of industry research programs, by post-research verification and validation, etc. They can also be addressed via improved coordination at the front-end of the process, through efforts to reach a common understanding between NRC and licensees/applicants on the scope and definition of the issue, on the parameters for successful resolution of the issue, on the mutually agreed methods and assumptions that can be used to address the issue, etc. Where expensive test facilities or expensive data bases are required, it should be permissible for industry and NRC to construct a single foundation for resolution of the issue, to agree on required capabilities and functions, and then complete the factual data gathering phase collaboratively (just as is done today by NRC with international collaboration). NRC would then conduct the analysis and interpretation of that data independently.

The benefits of research program leverage can be seen through examples of successful domestic collaboration between NRC and EPRI in the 1980s, and through the successes in international collaboration today. It is important to recognize that collaboration with international and domestic R&D organizations has already been shown to leverage NRC's research funding significantly. But in recent years, although international collaboration has increased, collaboration with U.S. industry has fallen to close to zero. This contrasts with the highly successful NRC-industry collaboration on the post-TMI small break loss of coolant program, in which NRC had only to provide \$1 for every \$3 spent. The reason given for this fall-off is the potential loss of NRC independence, yet independence can be assured by full transparency of the experimental results. The National Academy study of NRC research concurred in this judgment and recommended increased collaboration with U.S. industry.

Another opportunity for collaboration is with DOE research programs. Recent cooperation on the reactor pressure vessel annealing demonstration has been beneficial for all parties, and should reduce the time and cost of making this option available in the U.S. Other opportunities for collaboration with DOE should be encouraged. For example, DOE has been funded to carry out R&D to improve reactor safety in the former Soviet Union (fSU) and Central/Eastern Europe (CEE). NRC also has provided support to improve fSU and CEE reactor safety. It would be more cost-effective and beneficial to both NRC and DOE if a joint program was planned including safety issues each would pursue anyway and which would improve fSU reactor safety.

OPTION 2: Conduct Only Confirmatory Research; and

OPTION 3: Conduct Only Exploratory Research; and

OPTION 4: Conduct Both Confirmatory and Exploratory Research

These binning labels miss what appears to be the primary issue underlying the discussion, namely, should the Office of NRC Research (RES) continue to conduct research only on request from one of the program offices (whether that research is "confirmatory" or "exploratory" in nature), or should RES have more discretion in deciding what it wants to work on (whether that research is "confirmatory" or "exploratory" in nature). The legislation that established RES provided that NRC should conduct research as required to meet an identified need in one of the NRC program offices (e.g., NRR, NMSS). Given that resolution of safety issues requiring research may in theory require either "confirmatory" or "exploratory" R&D, it seems that the program offices could be expected to initiate requests for either.

The process for deciding what research is needed should continue to conform to the law. RES should continue to conduct its research based on a formal request from another NRC program office. This formality does not (and should not)

prevent RES from approaching one of the program offices with information (perhaps from foreign research) that suggests a need for NRC research, including exploratory research. A provision for RES to suggest to one of the program offices that they should consider formally requesting RES to conduct certain research should continue, thereby retaining the formal step that expects NRR or NMSS to make their own determination regarding the regulatory need for the research.

In terms of the needs for safety research as seen by industry, it is clear that some research capability should be retained at NRC in both exploratory and confirmatory categories. As discussed in Option 1 above, the amount of research needed in the future is less than in the past. This conclusion applies to both of these categories.

These binning labels miss another important issue underlying the discussion, namely, should the Office of NRC Regulation (NRR) conduct confirmatory research as part of a regulatory analysis responsibility, or should RES be asked to do this work? Today, there is significant NRR funding of contractors to do work that is similar to either RES work or industry work in the "confirmatory research" field. Some of this work is clearly redundant, or at least not well coordinated.

Option 4 contains a discussion of how expertise could be maintained in important areas (e.g., in-house vs. contractor support). The options for contractor expertise reject the possibility that contractors for industry (whose work would be verified independently by NRC), could be used as a source of expertise in the future. We believe NRC should rethink this implicit decision and allow for the possibility, especially in areas where no current research is ongoing but a desire exists to maintain access to expertise in that area, that reliance could be placed on the ability to draw on industry expertise, as long as NRC retains sufficient in-house expertise to independently verify this work (a capability NRC should have anyway, even for its own contractors).

#### OPTION 5: Establishing and Maintaining Core Research Capabilities

The discussion of this option does not make it clear that a risk-basis should be one of the criteria (if not the preeminent criterion) for defining the scope of core research capabilities. Another should be a formal process that involves the NRC program offices in helping decide which particular core capabilities should be maintained.

The suggested criteria listed in the paper should be examined carefully, e.g.:

- It is not necessarily true that all new technology needs NRC research;

- It is not necessarily true that every research facility that is "unique" should be retained;
- It is not necessarily true that NRC needs to gain access to independent expertise on all matters currently within the NRC's research program.

Finally, the suggested criteria here again imply that NRC does not consider the expertise that currently resides within the industry to be relevant to the question of where NRC could go to get expertise if it were to drop that field from its core activities. As stated above, if NRC retains an in-house expertise to verify the correctness of research in a particular field, that expertise could just as faithfully judge the adequacy of work by an industry contractor as an NRC contractor. A traditional industry contractor could be put under NRC contract for work needed by NRC. This would create large cost savings by allowing for use of private sector expertise as-needed, as opposed to retaining fully compensated expertise "on call" at national labs, even during periods when that expertise is not needed. Appearances of conflict of interest can be avoided if the NRC maintains its independent in-house expertise in that field to direct and assess research properly.

#### OPTION 7: Continue To Actively Participate in International Safety Programs.

Regarding the need to maintain U.S. leadership in nuclear research, industry strongly supports this objective, and has articulated the rationale and benefits of such leadership in its own strategic planning process. It should be noted that the arguments that support the need for the U.S. to retain its leadership in nuclear research relate to national interests that include but are not limited to NRC safety research. It also applies to DOE's nuclear energy R&D program and to the private-sector nuclear R&D programs in the U.S. From a strategic planning perspective, it is important to recognize the benefits of coordinating the efforts of NRC, DOE, and the private sector in pursuit of this goal. The discussion of international collaboration in this paper appears limited to independent international activities that do not include any coordination with DOE or U.S. industry. This perspective needs fundamental reconsideration.