



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

March 21, 1984

The Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Palladino:

SUBJECT: ACRS REPORT ON DRAFT NRC REPORT TO CONGRESS ON IMPROVING
QUALITY AND THE ASSURANCE OF QUALITY IN THE DESIGN AND
CONSTRUCTION OF COMMERCIAL NUCLEAR POWER PLANTS

During its 287th meeting, March 15-17, 1984, the Advisory Committee on Reactor Safeguards reviewed the draft NRC report to Congress, "Improving Quality and the Assurance of Quality in the Design and Construction of Commercial Nuclear Power Plants," Revision 3, dated March 13, 1984. An earlier version of the draft report was considered during a meeting of the ACRS Subcommittee on Quality and Quality Assurance in Design and Construction held in Washington, D.C. on February 24, 1984. In addition, the Subcommittee reviewed and discussed the NRC's quality-related initiatives during meetings held on July 18, 1983 and December 6, 1983.

The report is both useful and constructive. It gives thoughtful attention to the five alternatives which the Commission was required to consider under Section 13(b) of the Ford Amendment (Public Law 97-415) and reaches well-reasoned conclusions on each. Further, the results of the pilot program mandated under Section 13(c) of the Ford Amendment substantiate the conclusion that comprehensive audits of nuclear construction projects by qualified third parties can provide significant additional preventive and detection capability as well as enhanced assurance that nuclear plants are built in accordance with their design and licensing commitments. The report is candid in conceding errors of omission or commission on the part of the NRC which have contributed to quality assurance deficiencies in the past.

During the Subcommittee's early review of the study, it suggested that the Commission take advantage of the opportunity presented by Congress and expand the scope of the study to address issues beyond those mandated. We are pleased that the report provides a more comprehensive picture of the Commission's actions and initiatives.

Although the report is well written, it is voluminous and repetitious. A concise executive summary would improve the report. This can be accomplished without delaying the submission of the report to Congress.

The lessons learned from past problems in the design and construction of commercial nuclear power plants are described. As indicated in the report, little is said about the operation of plants although many of

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the same observations and lessons should apply. Many of the problems described relate to the inability, or the difficulty, of assuring the quality of some plants as a result of shortcomings in quality assurance and/or quality control programs during design and construction. Not addressed is whether the QA/QC shortcomings had an effect on quality or had significant effect on public safety/risk.

The distinctions among quality, quality assurance and quality control, and their relationship to public safety/risk are, at times, not made clear in the report. This is compounded by the NRC's continued inability to clearly identify those systems and components for which quality is essential to public safety and thus for which programs to control and to assure quality are necessary. Probabilistic risk assessments (PRAs) could help in this regard. We encourage the NRC to expedite the collection of the data necessary to clarify these issues.

Further, although recommendations are based on the findings of the case studies, pilot programs, and other initiatives, it is not clear whether their implementation will actually improve quality or enhance public safety or whether they will merely improve the public's perception of safety. We recommend that the NRC Staff undertake to determine the relative risk significance of the various recommendations and proposed actions as well as determine whether safety would be enhanced by the proposed actions. The NRC should then concentrate its efforts on actions which will enhance public safety.

The report does not contain priorities or schedules for further development of the various recommendations or proposed actions. We believe that the NRC Staff needs to develop more specific recommendations following the submission of the report to Congress. We recommend that in forwarding this report to Congress, the Commission make clear its intention to develop a plan for achieving the assurance of quality in the design, construction, and operation of nuclear power plants. However, we caution that the development of a program plan should not be allowed to interfere with proceeding expeditiously with those actions found to improve public safety significantly.

The NRC Staff has identified management as a major factor affecting the success or failure in assuring the quality and safety of nuclear power plants. While we agree that a poor quality assurance program is an indication of poor management, an apparently good quality assurance program does not necessarily imply the presence of good management. We see the need for an organizationally independent quality assurance department that reports to senior management; however, we fear that the emphasis on independence has in some cases led to the belief that the assurance of quality is someone else's responsibility. To assure quality and public safety, a strong sense of the need for and the benefits from quality, the assurance of quality, and professionalism should permeate a licensee's and/or a vendor's entire organization. The

NRC should continue its efforts to stimulate this kind of professionalism in the nuclear industry.

One of the recommendations from the management analysis conducted by N. C. Kist & Associates, Inc. is to establish a quality assurance program within the NRC. Although noted in passing in the report, it remains a fallow recommendation. The report does contain a recommendation for performance audits of NRC QA activities. However, we believe that the relationship between QA and prudent management, as discussed in Section 3.5 of the report and in this letter above, is equally applicable to the entire NRC. Therefore, we suggest that the Commission give prompt and careful consideration to the recommendation that the NRC establish a program to assure the quality of its activities. We do not believe, however, that a formal QA program is necessary or desirable.

The recommendation that the NRC establish a body of experts to advise the Commission on the capability of applicants to effectively manage a nuclear construction project is worthy of further consideration. The ACRS currently does not contain extensive expertise of the types envisioned for the proposed advisory body, and to establish such expertise within the ACRS membership might sacrifice other requisite expertise. The report has also recommended that future construction permits be conditioned on a demonstration of the licensee's continuing ability to effectively manage the project. Those responsible for the development of these recommendations should consider the difficulties associated with judging such management capabilities.

The ACRS supports the NRC Staff's shift in inspection emphasis from looking at the content of quality assurance plans to looking at actual plant quality and at the implementation and effectiveness of programs to assure quality. However, we believe that the NRC Staff will experience difficulties implementing the modified inspection program until performance criteria are established.


Useful insights have been obtained from Integrated Design Inspections (IDIs), Independent Design Verification Programs (IDVPs), and Construction Appraisal Team (CAT) inspections. We recommend that for the present these inspection programs continue.

The concept of using designated representatives is worthy of further consideration. In addition to augmenting NRC resources, it may be a way of stimulating and rewarding professionalism and dedication to quality in the workplace. We would like to be kept apprised of the NRC Staff's efforts regarding the designated representative concept and other QA initiatives, and we would appreciate the opportunity to comment on them at a later date.

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Additional comments by ACRS Member Glenn A. Reed are presented below.

Sincerely,



Jesse C. Ebersole
Chairman

Additional Comments by ACRS Member Glenn A. Reed

I consider the report to Congress to be deficient in its study of Alternative b(4), and I am concerned that Congress may continue endorsing regulatory approaches that are too similar in many ways to those that have in the past proved ineffective. I concur with this ACRS report concerning the above referenced report to Congress in most aspects, but in my opinion it does not go far enough, and is not critical enough with respect to the following:

1. The ACRS report states that the report to Congress "gives thoughtful attention to the five alternatives" I disagree that thoughtful or appropriate in-depth attention was given to Alternative b(4), which addresses improvements in the NRC's organization, methods, and programs for quality assurance.
2. The report to Congress recommends that a body of experts be established to advise the Commission on an applicant's management capabilities. The ACRS report states that this recommendation is worthy of further consideration. I disagree, and do not feel such expertise, with the time and objectivity, could be constituted to undertake this activity. Further, I disagree that such a body of experts is even desirable or necessary if a more astute study of Alternative b(4) is made.
3. What the ACRS report does not address, or recommend, is more in-depth consideration of the NRC's organizational structure, and what obstacles this present structure may place in the path of achieving quality in design and construction. The present NRC structure does not motivate professionalism and craftsmanship in the workplace. In my opinion, high quality can only be achieved by the enthusiastic and dedicated action of real professionals and crafts people who are motivated to standards of excellence by a regulatory structure that better recognizes human factors. I am aware of and have read an NRC Staff report which addresses the FAA designated representative (DR) system. In my opinion, the report to Congress should not have glossed over the FAA's DR program, but should have included a detailed study of that system and its potential for correcting the adversarial climate that is growing in the nuclear workplace. Given the current structures of the nuclear

industry and the NRC, the genuine professionals and crafts people are somewhat overwhelmed by top brass and regulations, yet the answers for real quality in this highly technical nuclear industry lie with those professionals.

In my opinion, the achievement of a high degree of design and construction quality can come from a modified version of the FAA system of DRs in design and architect-engineer organizations and in manufacturer and constructor shops. I would consider it appropriate for these DRs to be nominated by their peers, approved by their employers and perhaps the NRC, then established in a quasi-regulatory role while continuing their regular duties. Along similar lines, the NRC might consider structuring some licensed personnel in nuclear power plants into a DR system somewhat similar to the way in which the Massachusetts Department of Public Safety has incorporated licensed operating engineers into its regulatory structure.

References:

1. Public Law 97-415, NRC Authorization Act for Fiscal Years 1982 and 1983, Section 13 on Quality Assurance, dated January 4, 1983.
2. Draft NRC report to Congress, "Improving Quality and the Assurance of Quality in the Design and Construction of Commercial Nuclear Power Plants," Revision 3, dated March 13, 1984.