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The Role of the ACRS in Nuclear Regulation and Safety: Looking Back, Looking Forward

**Remarks by Chairman Richard A. Meserve
before the ACRS Symposium on Role of Advisory Committees
in Nuclear Regulation and Safety, NRC Auditorium**

March 4, 2003

Good morning. I am very pleased to welcome you to this symposium honoring both the fiftieth anniversary and the 500th meeting of the Advisory Committee on Reactor Safeguards. This occasion provides an opportunity to welcome back to the NRC many of the distinguished individuals who have served on the ACRS over the past 50 years. A number of these people are personal friends, and seeing them again is a great pleasure. I also welcome the other guests who have joined us here today, both from the U.S. and overseas.

One of the hallmarks of ACRS over the years is the candor of its members. I believe that I was first exposed to this characteristic over 25 years ago when I met one of your more retiring members, Hal Lewis. Upon learning of my background, Hal asked whether I knew what was black and brown and looked particularly good on a lawyer. I always feel challenged in the fashion arena, so I welcomed Hal's input. His response was "a Doberman." So, as you can see, I have been receiving candid advice from ACRS members long before I arrived at the NRC.

I will take a few minutes to discuss the role of the ACRS as it has evolved during its 50 years of existence, taking note of some of key issues. I will then discuss some of the important issues that are engaging the ACRS today and will do so in the future. For the historical information, I am indebted to Sam Walker, who has chronicled the early days of nuclear regulation in this country in his two books, *Controlling the Atom* and *Containing the Atom*.

The ACRS's history actually extends back for more than the 50 years. Shortly after the Atomic Energy Commission's establishment in the Truman administration, the Commission recognized the need for an independent technical group to review and provide advice on nuclear reactor safety. Thus

was established the Reactor Safeguard Committee, chaired by no less than Dr. Edward Teller. That committee clearly established an enduring characteristic of the ACRS – a willingness to provide candid views on reactor safety issues, even at the risk of taking unpopular positions. Dr. Teller has recalled that “the Committee was about as popular - and as necessary - as a traffic cop.”¹ A second advisory committee, the Industrial Committee on Reactor Location Problems, was established in 1950 and was asked to look at what we would today call siting issues, including seismic and hydrological characteristics of proposed sites, population distribution, and so forth. The Commission merged the two committees in 1953 and the ACRS was formally born.

Though its establishment as a statutory committee would not come for another four years, the ACRS played a key role in the AEC’s operations from the start. In fact, for the first two years of its existence, the ACRS was the only body reviewing reactor safety issues. (Doesn’t this seem amazing today?) The AEC recognized that this was a significant burden on a part-time group of consultants, and proceeded to create a permanent staff organization within the Commission to address these issues. The establishment of staff capability allowed the ACRS’s role to evolve to the one that it fills today. I believe, however, that the rigorous technical standards adopted by the ACRS in those early days set the stage not only for its own future operations, but also for the technical excellence that has been a hallmark of the AEC and NRC regulatory staffs.

In 1957, the ACRS became a statutorily based entity by virtue of certain amendments to the Atomic Energy Act of 1954. The ACRS was thus invested by law with its independent advisory role, and the responsibility to “review safety studies and facility license applications...” and to “advise the Commission with regard to the hazard of proposed or existing reactor facilities and the adequacy of reactor safety standards,” plus any other duties the Commission might designate. This step resulted, in part, from a controversy involving licensing of the Fermi-One liquid metal fast breeder reactor, and was accompanied by a significant expansion of public access into the regulatory and licensing activities of the AEC, including a requirement for public hearings as part of the licensing process. The entire episode demonstrated the willingness of the Committee to involve itself in cutting-edge, state-of-the-art issues -- an attitude that has characterized the ACRS to the present day.

A full accounting of all of the significant activities of the ACRS over the past 50 years would far exceed the time available this morning, but I do want to take note of a few key areas in which the Committee’s activities and advice were of particular importance.

Early in the development of commercial nuclear power, the ACRS became concerned with the potential and consequences of a severe accident, particularly one in which the plant’s emergency core cooling system might fail to operate as designed. Although the likelihood of such an event was considered to be extremely small, the potentially serious consequences were seen to justify careful study. As a result, the AEC undertook a study of the potential causes and consequences of core melt accidents. The significant developments associated with these activities form the basis of many of the most important accomplishments of the AEC and the NRC. These include:

- establishment of a set of general design criteria for nuclear power plants, the forerunner of today’s Appendix A to 10 CFR Part 50;

¹*Controlling the Atom*, p. 60.

- expansion of the reactor safety research program in areas such as thermal-hydraulics and reactor vessel embrittlement and thermal shock;
- the ECCS rulemaking on system acceptance criteria; and
- the AEC’s decision to undertake a study to estimate the probability of a severe accident.

This last item, of course, resulted in the publication of the landmark Reactor Safety Study, WASH-1400, and the beginning of the science of probabilistic risk assessment as applied to nuclear power plant safety. In short, some of the most central components of our regulatory system were motivated by the ACRS’s work.

The ACRS was also at the forefront of the development of quantitative safety goals. I believe that it is hardly a coincidence that the first set of trial goals was developed by the Committee under Dave Okrent’s leadership, and that another former ACRS member, the late Joe Palladino, oversaw the development of the Commission’s Safety Goal Policy Statement as the NRC Chairman. Other vital matters in which the ACRS played a major role include seismic hazard analysis, anticipated transients without scram, and the development of generic safety issues for nuclear plants.

As the NRC moved into the 1980s, and continuing to the present day, much of the emphasis in reactor regulation has shifted from plant design and construction to plant operations. As a result, the ACRS has turned its attention in that direction as well. The Committee has made valuable contributions over a wide range of issues at operating plants, including fire safety, operator training and human performance, steam generator performance and degradation, and plant aging. All of these efforts have provided important guidance to the Commission.

In recent years the Commission has focused on the evolution toward a risk-informed and performance-based regulatory system. The ACRS has been extremely helpful in this effort, building on its early work in severe accidents, risk assessment, and safety goals. The Committee has reviewed the revised reactor oversight process, and has provided constructive recommendations regarding the efforts to use performance indicators and to allow estimates of risk significance to guide the regulatory response to inspection findings. The Committee has followed closely the development of regulatory guidance for the implementation of risk-informed programs and processes, and of the standards for the probabilistic risk assessments that will be used to support these programs and processes. The ACRS has also taken a leading role in considering some of the challenging issues that have arisen in this effort, such as the application of defense-in-depth in a risk-informed context, and the assessment and impact of safety culture in nuclear plant operations.

The new emphasis on plant operations and risk-informed regulation does not mean, however, that the ACRS has neglected other important issues. For example, the ACRS monitors the NRC’s safety research program, and periodically reports to the Commission on its assessment of our research efforts. This is particularly valuable in these days of tight budgets; it is my view that a decade of significant decline in budgetary support has allowed our research program to atrophy and the ACRS’s guidance on how to rebuild it is particularly valuable.

As we look to the future, the ACRS’s technical advice is likely to be more essential than ever. Although no U.S. electric generating company has announced its intention to order a new nuclear plant, it is clear that the conditions for revival of the nuclear option in this country are more favorable than they have been for many years. This condition is reflected in the rapidly expanding NRC efforts related

to new plant designs and potential sites. If all goes as currently planned, we will soon have under review three applications for early site permits and at least four – and possibly as many as six – applications for certification of advanced reactor designs. The ACRS was deeply involved in the advanced plant reviews during the 1990s, and the Commission will, I am sure, rely on the Committee's candid assessments of sites and designs in the years to come. Indeed, there is a need for deep technical advice as we consider designs that are radically different from our current fleet of light-water-cooled reactors. And if and when an application for a new plant is submitted to the NRC, the ACRS will no doubt provide essential advice from construction to operation, just to ensure that the job is done right.

This brief review of history reveals that some of the most significant successes of the Nuclear Regulatory Commission were achieved in large part with the benefit of the wise counsel – perhaps even the prodding – of the ACRS. The history shows that the ACRS has been successful in a fashion that no doubt far exceeds the expectations of even those who created it over 50 years ago. We might appropriately ask about the characteristics that allowed this relationship to yield such riches. Let me close this morning by mentioning a few.

First, technical excellence. The NRC has the responsibility for regulating a complicated technology and needs to apply the best scientific and engineering judgment. Our technical staff is composed of engineers and scientists who are highly knowledgeable in their fields and are dedicated in their work. But the ACRS provides the Commission with access to technical advice that might otherwise be denied us. Members of the ACRS have a breadth of experience in all aspects of the nuclear enterprise: industry, government, national laboratories, and universities. Their wisdom significantly augments the advice provided by the staff.

Second, independence. The Commission strives to base its decisions on objective and unbiased assessments of all available information. The ACRS offers a unique service by providing the Commission with advice that is both technically credible and independent, reflecting a variety of perspectives and professional experience. Indeed, because the Committee's views and assessments are independent of the Commission, the ACRS's input enhances the credibility of the NRC's work.

Third, openness. The NRC recognizes that nuclear regulation is the public's business. As a result, the ACRS's meetings are open to the public, unless classified or proprietary information is being discussed. The Committee's meetings thus provide a means for open communications among all concerned parties in a forum that facilitates a cogent exchange of technical views and frank discussions of differing opinions. This process both enriches the ACRS's recommendations and contributes substantially to the Commission's goal of increasing public confidence.

Fourth, candor. The success of the ACRS is attributable, in part, to its willingness to call things as it sees them, with no punches pulled. I understand that during Hal Lewis's era on the Committee, an NRC statistician informed the Committee that Bayesian statistics were completely wrong-headed and had no role in our regulatory processes. I am told that Hal fired off a short note, as follows: "You idiot! Harshly worded letter to follow." We have never lacked for candid advice.

Finally, dedication. I recall a Friday evening when I was pulling out of the garage in my car at about 7 p.m. and encountered George Apostolakis and some of his colleagues headed over to Eatzi's, the neighborhood take-out place. I yelled out the window, "George, get back to work." George smiled – he knew this was a lame attempt at a joke – and said that the Committee was going to go back to work, and would be meeting on Saturday as well. I must admit that I felt somewhat ashamed of my comment as I drove home. Indeed, over my entire tenure at the Commission, I have been struck by the

quality and scope of the ACRS's work. It has seemed incredible to me that so much work could be accomplished by a group of part-time employees. It is this willingness to make extraordinary effort that no doubt accounts for the history of success.

These characteristics -- technical excellence, independence, openness, candor, and dedication -- have resulted in a half-century of remarkable accomplishment. And I am confident that the past will serve merely as prologue. As we mark ACRS's 50th year and 500th meeting, we recognize that the ACRS's mission is far from complete. I am confident that the Committee will continue to play an essential role in maintaining safety in the years ahead.

Let me conclude by expressing my personal thanks to all of the past and current members of the ACRS. I know that I speak for all of the members of the Commission and the NRC staff when I say that your work in ensuring the safe use of nuclear technology has constituted a significant public service and is greatly appreciated. We salute you.

Thank you.