

## DOE ADVISORY COMMITTEE FOR NUCLEAR FACILITY SAFETY (ACNFS)

John F. Ahearne, ACNFS Chairman and  
Executive Director, Sigma Xi, The Scientific Research Society

### ABSTRACT

Events leading to the ACNFS are described. The ACNFS charter is discussed. ACNFS activities are reviewed, including modifications following formation of the Defense Nuclear Facilities Safety Board. Differences between the Committee and the Board are examined, to show the strengths and weaknesses of an advisory committee. Relationships to the DOE Secretary, the Congress, and the public are described.

### INTRODUCTION

Two events initiated external oversight of the Energy Department's Weapons Facilities, although they illustrated problems that had been building for years. These events were complaints by workers at the Uranium Enrichment Plant in Portsmouth, Ohio and an event in the Soviet Union. In the mid-1970s, workers at the enrichment plant believed that safety practices were inadequate. Complaints reached the office of Ohio senator John Glenn. It is my recollection, that Glenn's office initially went to ERDA, the responsible federal agency, and asked for an examination of these claims. As I recall, the federal response indicated that there was little to the claims. Senator Glenn requested the U.S. Government Accounting Office (GAO) to check into these claims. The GAO's report indicated there was substance to the claims. This began a series of GAO reports on the weapons production facilities. In a report in 1981, the GAO concluded: "Major changes are required in the safety and health oversight program at the Department of Energy's (DOE's) contractor-operated nuclear facilities to ensure that safety, health, and environmental standards are met." The GAO identified many problems: DOE's program was inadequate to assure that DOE's employees had safe and healthful working conditions; DOE's facilities were unprepared to respond to nuclear accidents; and DOE was taking very few steps to bring its older facilities up to current safety criteria and standards. The GAO noted that among the alternatives available were for the DOE to reorganize internally or "having outside agencies provide safety and health oversight", a suggestion which the GAO made many times in the subsequent decade. The GAO believed forming a separate internal organization "will do little to enhance the independence or authority of DOE's safety and health oversight program".

In the 1981, report the GAO recommended that the Nuclear Regulatory Commission review and evaluate some of the DOE facilities and report to the Congress. A major obstacle to involving the NRC in the DOE oversight was the classified weapons processes in many DOE facilities. The NRC's review process had become quite open to the public, involving public hearings, the potential for petitions, for shut down of facilities, and extensive and quite adversarial proceedings in which public interest groups took an active part. Some in Congress thought NRC involvement would lead inevitably to public hearings on the defense facilities. These concerned people in Congress believed the motive of

those requesting hearings would be to shut down weapons production. Some of the public hearings which my committee has held in recent years would indicate that these Congressional concerns were justified.

Little was done to implement this GAO recommendation. Then in 1985, a Soviet reactor at Chernobyl suffered a violent nuclear accident. In the subsequent public reaction, the differences between the Chernobyl reactor and the U.S. DOE reactors were not significant. What was significant was that a reactor of the type associated with weapons production had a violent accident, killing numerous people and causing widespread evacuation and global fear.

Even before the accident, the then Secretary of Energy John Herrington had requested a review of the Department's environment, safety, and health programs. Herrington said (National Press Club luncheon, 22 December 1988): "That report, more commonly known as the Kane report, made it clear . . . our environment and our health oversight and our safety program needed strengthening. . . . The operational philosophy was not sound, and it was not receiving sufficient attention. The biggest problem was that environment, safety, and health concerns fell under the oversight of a small office with a relatively small budget. The office did not have sufficient authority or influence to carry out its tasks. Another fundamental problem was that our facilities had been allowed to degenerate. Money was not put back in for modernization, as it should have been. The fact is that many Administrations and many Congresses delayed action because of budgetary constraints." Following the Chernobyl accident, the Secretary requested the National Academies of Sciences and Engineering to provide an independent assessment of what the Chernobyl accident meant for "safe operation of 11 of the Department of Energy's (DOE) larger reactors." The resulting report ("Safety Issues at the Defense Production Reactors", National Academy Press, 1987) criticized the Department. For example:

" . . . the committee concludes that the existing level of understanding of severe accident behavior for the production reactors is inadequate to permit a realistic assessment of the effectiveness of these designs in mitigating the consequences of severe accidents."

The committee addressed whether the safety oversight function should be transferred to the Nuclear Regulatory

Commission or to some other outside organization and concluded:

"...the committee recommends that an independent, external safety oversight committee, advisory to the Secretary of Energy, be established. The oversight committee should possess the following features: members should be of recognized stature with expertise covering the full range of disciplines relevant to reactor safety; members should include individuals from outside the DOE community; the committee should have authority to set its own agenda; the committee should be authorized to review both the product and the process of the Department and contractor efforts . . .; the committee should be supported by a full-time, technically qualified staff . . .; and the bulk of the committee's work should be unclassified and available to the public."

As a result, in November 1987, the Department established a charter for the Advisory Committee on Nuclear Facility Safety. The Committee began to meet in the spring of 1988 as our members were finally selected and appointed in February, March, and April.

The Advisory Committee's charter called out two primary duties:

1. The ACNFS will review significant safety concerns and shall provide advice to the Secretary of Energy. In technical matters relating to the safety of the Department's nuclear facilities and operations, this technical review shall include, but not be limited to, existing and proposed program efforts by DOE and its contractors relating to nuclear facility design, construction, operation, decommissioning, safety analysis, inspections, safety standards, and Departmental implementation of safety requirements;
2. As requested by the Secretary, the ACNFS may also review and provide advice on specific issues or matters relating to the safety of DOE facilities or operations."

The general objective was to ". . . provide to the Secretary of Energy technical information, advice, and recommendations concerning the safety of the Department's production and utilization facilities . . ."

The Committee was allocated \$2 million for fiscal 1988 and eight person years, was described as meeting approximately twelve times a year, and was authorized to establish subcommittees. Committee members were to be appointed for a term of two years, and the number of members was established at approximately fifteen. The makeup of the committee established by Secretary Herrington included members from industry, academia, national labs, state government, and former federal officials. At the same time the

Secretary was establishing this committee, bills were moving through the Congress to establish an outside agency. In particular, the Nuclear Protections and Safety Act of 1987 was establishing what would become the Defense Nuclear Facilities Safety Board.

The General Accounting Office had continued its critical studies of the Energy Department's facilities. In addition they had been asked to testify many times on what type of oversight would be appropriate. The criteria that the General Accounting Office established for true independent oversight included two elements which my committee did not satisfy, as the GAO frequently pointed out in testimony. First, we were part of the Energy Department rather than an independent agency. We were appointed by the Secretary of Energy and served at the pleasure of the Secretary. To the GAO, we were a branch of the Energy Department. The second feature was that we had no authority to force the Secretary to do anything. We could not order a reactor to be shut down, we could not order the Secretary of Energy to take an action, nor could we even require the Secretary of Energy to respond to our reports. In the GAO's view, these were fatal flaws. The GAO also did question our ability to set our own agenda and perhaps even to be forthcoming in public. I believe the GAO agrees these latter fears have not been realized.

The Senate report on the Nuclear Protections and Safety Act stated: "The resources invested in the [DOE] complex were insufficient, although the demands for nuclear materials continued largely unabated . . . Production requirements were significantly increased [in the Reagan Administration], but not enough money was requested both to expand production and to modernize the defense complex." While granting that the DOE safety record had been excellent, the Senate concluded "a safety board is needed to ensure that meeting production requirements does not overshadow the need for safe production."

The Advisory Committee has been in operation for almost three years. In that time, we have written the Secretary over 30 letter reports and have visited the following facilities: Hanford, Idaho National Engineering Lab, Rocky Flats, WIPP, Los Alamos, Brookhaven National Laboratory, Y12 at Oak Ridge, Savannah River, and Pantex. We have had no difficulty in recruiting and maintaining extraordinarily highly competent people to be on the Advisory Committee. We also have been fortunate in being able to recruit a high quality, although small, staff. We have five Ph.D. technical people, an Executive Director, three administrative assistants, and access to extremely competent consultants.

Our typical operating style is to alternate meetings in Washington with meetings at a DOE facility. We have set up several subcommittees which meet independently at the particular facility on which they are focused. After a meet-



ing we usually will develop a letter report to the Secretary based upon the material generated for that meeting, the discussions at the meeting, and any subcommittee reports germane to the topics. A draft letter is written within a few weeks of the meeting based upon submissions by the members. This draft is circulated to the members for comments and revisions. If necessary a second draft is also circulated to get committee approval. On particularly controversial or difficult issues, the draft will be discussed at a subsequent full committee meeting prior to sending it on to the Secretary.

At each full committee meeting we set aside some time for public comment. In Washington we have tended to do this as part of the working day, since the people who come to the Washington meetings are usually paid representatives of groups housed in Washington. We attempt to hold the public meetings at DOE facilities in the evening to give the local public an opportunity to attend. The public meeting is structured by requesting those wishing to speak to sign up in advance. We normally allocate five minutes for each person to speak. If few people sign up, we let them talk for a longer time.

The first year of our operation was dominated by concerns about the Savannah River reactors. A few months after we began, several events occurred at the Savannah River reactors which led to strong Congressional and public interest and the Department requiring significant action be taken. These steps led to many changes, including a new contractor to run the Savannah River reactors, a new office established within the Department for reactor restart, and many Congressional hearings focused on what went wrong and when could the reactors restart. As of this moment, none of the three reactors have restarted.

A short summary of some of the comments and recommendations we have made provides a flavor of the approach we have taken. As I mentioned, the first year we concentrated on Savannah River. A few of our comments were the following:

"We recognize that the SRP [Savannah River Plant] reactors exist to produce material for the U.S. nuclear weapons program. However, production objectives and safety concerns are countervailing forces that must be balanced, and the primary objective of the SRP safety enhancement programs should be to improve safety. It was not clear to the Committee that this is currently the case."

...

"The Committee has some concerns about the adequacy of the analyses being used to support the choices among options for upgrading safety, with particular emphasis on improved containment and spray systems. The effort described to us for evaluating the

options in terms of the NRC safety goals was defective." (Letter of 15 August 1988)

"... we have reviewed the November 1988 document, "Savannah River Plant K Reactor Restart Strategy"... in our opinion... the Restart Strategy document represents only an initial step in DOE's efforts to develop sound operations at SRP.

"We have broad concerns regarding safety philosophy, the overall criteria for restart, and management. . . . the Committee has several specific concerns about the present plans for a restart. These cover...: (1) the technical sufficiency of the criteria, (2) the degree to which the criteria addressed the underlying problems which led to the August events at the P reactor, and (3) the adequacy of the strategy to deal with long and short term safety needs.

...

"Substantial and, to a large extent, justified criticism has focused on weaknesses in management control, training, operator practices, and reporting procedures at SRP.

... However, the problems did not all fall within the contractor's organization and responsibilities nor with DOE's Savannah River Operations Office. DOE headquarter's operational and regulatory responsibilities require attention so that the field can more effectively achieve an acceptable start-up condition. The Department should maintain the distinction between management and oversight. . . . Management directions should be transmitted along a single, clearly identified line." (Letter of 14 December 1988.)

In this eleven page letter report, we addressed safety philosophy, criteria for restart, management, operating power level, control room and operating philosophy, reactivity control, seismic issues, ultrasonic testing, configuration verification, and quality assurance.

As part of the Department of Energy's weapons facilities authorization in 1988, the Committee on Armed Services required a response from the National Academy on the status at the Department's facilities. By agreement with the Congressional committees and the National Academy, the ACNFS provided information on the production reactors and the National Academy committee reported on the rest of the weapons complex. In a letter report of 14 December 1988 we said the following:

"There are safety issues at the Savannah River site. Some of the more important issues that are being followed by the Advisory Committee are:

Analyses to date are unable to demonstrate that the emergency core cooling systems would maintain cool-

ing of the reactor cores in the event of a large pipe break accident at full power.

...

Safety analyses of the reactors are not up to the standards developed within the commercial nuclear power community.

The inadequacy of seismic constraints identified at P-reactor not only indicates that similar problems exist at the other reactors, but raises questions about configuration control at these plants."

We went on to say that we are keeping track of the modifications to the emergency cooling system and the Department's analyses. We indicated: "We will follow these activities closely. Pending the results of these analyses, we cannot advise as to any power level being demonstrably safe."

In a letter of 25 October 1989, we expressed concern that the DOE safety philosophy was not penetrating to middle management and below. We noted that more vigorous oversight of contractor activities by the Savannah River DOE office required accelerating the development of DOE's own training program. Earlier we had expressed concern that focusing on the restart of all three reactors over a short period of time was not prudent. In this letter, we expressed concern that the number of well trained personnel needed for restart would be inadequate to support all three reactors basically simultaneously.

In the spring of 1990, the Secretary informed us that the Defense Nuclear Facilities Safety Board oversight of the Savannah River reactors was such that the Secretary believed it was no longer appropriate nor necessary for my Advisory Committee to continue reviewing these reactors. Consequently, on 30 April I informed the Secretary we were ceasing oversight of the restart. We did say that we would continue following the PRA, in particular with respect to the power level issue, because of the larger questions of PRA within the department on which a subcommittee was focusing.

We also have focused on the Rocky Flats facility. We visited Rocky Flats for an orientation visit in the spring of 1989, and our first Rocky Flats letter was on 30 November 1989. We presented a list of concerns, including the following: weaknesses in operations, attitudes, and PRA pointed out by the Mattson criticality study; the lack of integration of environmental issues into the overall management plan at Rocky Flats; the slow pace of constructing the super-compactor, which had the potential of preventing a forced shut down because of the violating the limit for on-site storage, which is based upon volume; the transition to a new contractor would see many of the same problems already seen at Savannah River, stressing that the difficulty of transition might be greater than was understood; the shortage

of capable DOE oversight personnel; and the ineffective interaction of DOE with the local public. We stressed that the DOE should open at least one public document room where the public could have ready access, not at the plant, where the PDR was currently located. In one of the few cases in which the Committee did not make a unanimous recommendation, we said that EG&G (the new contractor) should rapidly assess the situation at Rocky Flats to decide whether it would be possible to make all of the changes required while continuing operations. If not, then production should be reduced to a level consistent with minimal national security and training needs.

Subsequently, the Rocky Flats plant was shut down and we have focused upon what is required for restart. In general, we have been quite skeptical of the Department's plans. In a letter of 4 June 1990, we recommended that EG&G and DOE should respond accurately and carefully to citizen groups and try to obtain their support for, or acceptance of, the restart prior to the resumption of plutonium operations. We recommended a more deliberate approach to restart should be taken than had been recommended by the Rocky Flats Office. The majority of the Committee believed that improvements necessary to justify restart were unlikely to be completed within the year. We also indicated that, to the extent national security was the driving influence for restart, we thought that the Denver public would benefit from a better explanation of why near-term operation would be necessary.

In a letter of 11 September 1990, we indicated that there were clear signs the management perception was that DOE is pushing a specific restart schedule rather than letting the restart schedule follow from progress on necessary improvements. We noted that both EG&G and DOE appeared to have significantly overestimated their ability to correct the procedural and cultural problems at Rocky Flats in the time frames suggested by the Department. We were concerned that both the Department and the contractor may be attacking symptoms with reassignments of responsibilities and changes in policies, rather than facing up to the root cause, management failure to implement previously defined commitments. We went on to point out that our June letter underestimated the time that would be required for resumption of operations and said that we could not see readiness for resumption in anything as short as six months from our April review. Finally we said many of the problems are so serious that the Department should put aside a schedule and concentrate on identifying the problems, developing a plan for their solution, and devoting sufficient resources to complete the plan.

Those comments give the flavor of the recommendations we have been making to the Secretary. In general, we have been critical. To some extent this is because we are an advisory committee of experts looking at a situation where



neglect was rampant for many years. To a large extent, people were trying to do their very best to meet production goals with minimal attention focused upon safety issues or environmental questions. I do not know whether this was due to lack of interest, lack of attention, lack of funding, lack of support from local and department offices and OMB in Congress. My committee has not tried to examine past history.

At the Secretary's request, we have examined the restart of the HFIR (High Flux Isotope Reactor) at Oak Ridge, the HFBR (High Flux Beam Reactor) at Brookhaven, and the WIPP (Waste Isolation Pilot Plant) at Carlsbad, New Mexico. Our WIPP report was extensive because the Secretary asked us to review the Safety Analysis Report (SAR). Also at the Secretary's request, we have examined an accident at the Pantex Plant in which some tritium was released. We have looked at the waste tanks and Purex and the other processing facilities at Hanford. We have had subcommittees examining the Department's probabilistic risk assessment methodologies and approaches, radiological safety, quality assurance, and the restart at Rocky Flats. I could easily devote many pages to quoting from our letter reports, but the general tenor is the Department is in trouble, it took decades to develop these problems, and it will take many years to recover.

Two points should be made clear:

1. By explicit exclusion in our charter, we do not examine the Naval Reactors program. I will not comment as to whether this is prudent or not. I merely note that we do not.
2. We have not attempted at any time to bring a judgment as to whether or not defense requirements should be met. Several times we have pointed out that we are advising on the safety of these facilities. We have indicated that the judgment of whether national defense needs require operation is outside our scope of knowledge and responsibility. We have not as a committee examined the requirements of the Defense Department, nor have we examined how does the Energy Department plan to meet those requirements. That is another completely separate set of issues that is really outside the Committee's expert knowledge.

The questions of the strength and weaknesses of an Advisory Committee are directly seen in the differences between my committee and the Defense Nuclear Facility Safety Board. An advisory committee such as ours is more able to get internal access to Department people than is the external board. To some extent, we are seen within the Department as an extension of the Secretary's office. As such, when we ask a question or ask someone to talk to us,

it really is viewed as a request from the Secretary. This gives us much greater levels of cooperation from the Department -- as long as we are perceived as doing something the Secretary believes is important.

That also is the weakness. Whereas the Nuclear Facility Safety Board has its charter from the Congress and, consequently, its requests must be seen as being Congressionally mandated, our charter comes from the Secretary. When the Nuclear Facility Safety Board makes a request, it is not really critical whether the Armed Services Committee is or is not interested in the request. The request is legally binding. When we make a request, the perception within the Department of whether my committee is of interest to the Secretary is quite significant. Our ability to get information has fluctuated, depending upon how the rest of the Department has perceived the Secretary's interest in our reports. For example, we had been following the New Production Reactor (NPR) program and had set up a subcommittee which met with a variety of NPR people. Last fall, we had set up an NPR subcommittee meeting only to be informed that the Department's representatives would be unavailable for our meeting. It was not until after this refusal that we learned that the Secretary had concluded that the Nuclear Facility Safety Board would now be relied on to provide that oversight of the NPR program.

Other differences concern the relationship to Congress. The Defense Nuclear Facility Safety Board has been established by Congress, to whom it basically reports and from whom it gets its support. Consequently, if the Safety Board concludes it needs more authority or more resources, it must go back to the Congress to request them. In the case of the Advisory Committee, if we were to conclude we needed more resources or to get more responsiveness from the Department, my recourse would be to go to the Secretary.

The actual role of an advisory committee is not clear within the Federal Government. My view of an advisory committee keys off the word "advice". The role of an advisory committee is to use expert knowledge to provide a perspective that senior officials would not get from other sources. We have tried repeatedly, and I must admit without complete success, to get across within and outside the Department that we are not an oversight organization. We are not trying to provide daily review, verification that things are being done right, and sign off on actions. In our monthly meetings and the quite limited amount of time that our busy members can devote, we are trying to provide the Secretary with our summary judgment -- advice -- on certain areas of the Department and its activities. We do not pretend our letters provide complete information on any of these issues and we have never taken the position that the Secretary must accept our recommendations.

We have attempted to provide independent advice from a group of people who spend their principle amount of time working on issues outside the department but, in many cases, related to the questions we are addressing. For example, the chairman of our PRA group is a professor who has spent most of his professional career developing risk analysis, has written extensively on the subject, lectures on it, has done substantial amount of research on it, and is at the forefront of the state of the art. Consequently, when he examines PRA's done by the Department, he is not using some textbook knowledge that he acquired from courses taken several years ago. He is using the most up-to-date approaches. On the other hand, he is not going to spend weeks or months developing a PRA for DOE or examining in every detail a DOE PRA. He will provide, via his subcommittee and their consultants, an insightful overview of the process that the Department has established to do PRAs and of the progress the DOE is making in doing PRAs.

The Safety Board has a responsibility from the Congress to provide true oversight and true verification. In establishing the Safety Board, the Congress basically established a mini-NRC. The Congress has, I believe, the correct expectation that the Safety Board will "sign off" on such things as the restart of the Savannah River Reactors. We have attempted to make it clear within the Department and to the Congress that, although we will provide our comments on the restart of Rocky Flats, we are not verifying the adequacy of the procedures, modifications, and personnel at Rocky Flats for restart. To do so would require a far more direct involvement than our members are able or willing to give. We did not come on a regulatory commission; we came onto an advisory committee.

Public expectation has been difficult to meet. It is clear from many of our meetings, that the public either hopes or believes that we can direct the Department. We have met hostility, anguish, as well as praise at public meetings. At one meeting, the representative of a public interest group commented that, in less than an hour listening to Energy Department presenters at our meeting, he had learned more about the issues his group was interested in than they had been able to get in several years of attempting to meet with the Department and filing Freedom of Information requests.

We have attempted to distill the public's concerns and reflect them back to the Energy Department. In some cases we have been successful, for example, in getting a much better public document room at Rocky Flats. It is not obvious that we have been successful in several of our other attempts, for example, in getting environmental reports released rapidly. In some cases these reports still seem to take more than a year. We have attempted to follow the prescriptions of the Advisory Committee Act. For example, "detailed minutes of each meeting of each Advisory Com-

mittee shall be kept and shall contain a record of the persons present, a complete and accurate description of matters discussed and conclusions reached, and copies of all reports received, issues, are approved, by Advisory Committee." (Public Law 92-463, Section 10(C)) Our meetings are held in public, we have a transcript made of each meeting, and our letters to the Secretary are public. Exceptions have been made when we handled classified material. This has been quite rare.

There are some major weaknesses in relying on an advisory committee, both from the public and Congressional view and, I believe, from the Secretary's view. From the public and Congressional view, we are not really responsive to strong requests from either. We do respond to Congressional requests in the sense that on very few occasions I have been asked to testify, I have done so. When we have been asked by the Congress to provide answers to certain questions as a committee, we have done so. On the other hand, when I have been asked whether I would be interested in testifying, I have declined. At the public meetings, the public frequently have raised questions of why does the department need to produce nuclear weapons. A fundamental concern of several of the public interest groups in Idaho, at Rocky Flats, Savannah River, has been opposition to the production of nuclear weapons. We have refused to get into that issue, both because of our charter and also because of the lack of expertise of the majority of our members on these issues.

From the Secretary's point of view, I believe there are several reasons that he has not found us as useful as he would like:

1. Our meetings and our letters are public. This is required by the Advisory Committee Act, but a trusted advisor is one you can turn to and ask to examine a sensitive question that you are not ready yet to take a position on or that you suspect might require substantial amount of work before you are ready to go public with it. My Advisory Committee cannot be the source of such advice.
2. Timeliness. As I mentioned earlier, to produce a letter report for the Secretary typically requires about a month. Any complex or controversial subject can easily take two months to approve a letter. In addition, since we are a collection of quite part-time people with busy schedules, we plan our meeting dates several months in advance. If the Secretary suddenly needs an issue addressed, it is difficult for us to come together quickly for a meeting -- it is nearly impossible. Of course, for an issue of vital importance, we could. But for most

issues on which a Secretary might want quick advice, we cannot do so.

I believe we have provided a valuable service both to Secretary Herrington and to Secretary Watkins. The advice we have provided has been overwhelmingly criticism. We have criticized specific technical features of design. We have extensively criticized the Department's approach to management of its operations. We even have criticized the overall Department's safety policy -- or lack of one. I suspect the Department must be weary of constantly hearing criticism. We are not unlike a newspaper. Newspapers seldom concentrate on the good news. As one commentator mentioned, one seldom will read in the newspaper about the thousands of airplanes that landed safely the previous day. I can say honestly that we have attempted to praise where we thought praise was due. We praised some of the operations at Pantex and some at Los Alamos. We praised some of the features at the Idaho National Engineering Lab, primarily the Naval program.

Unfortunately, as I attempted to make clear at the beginning of this paper, the Department's problems are large. The GAO began to uncover them, the National Academy report's went further, Congressional committees, the ACNFS, and now the Nuclear Facility Safety Board have continued this process. The problems of the department are not the problems of the Department of Energy. These problems began under the Atomic Energy Commission, continued through the Energy Research and Development Administration (ERDA), and grew under the Department

of Energy. They are neither Republican nor Democratic problems. They grew under Administrations of both parties. The Congress cannot solely fault the Executive Branch. The Congress was made aware of these problems, certainly as early as the GAO's early studies. OMB is not faultless, because funding has been constrained for many of these facilities.

The barrier of secrecy, originally erected to ensure that the weapons design in processing secrets would not get into unfriendly hands, was not a one-way barrier. It was a two-way barrier. After the passage of NEPA (the National Environmental Protection Act) in the early 1970s, concern for the environment slowly grew, even within the federal government. After the Three Mile Island accident in 1979, the commercial nuclear industry made enormous strides in improving analysis of safety, upgrading maintenance, and, perhaps the most fundamental change, upgrading the training and quality of the operating personnel. The two way barrier between the defense facilities and the outside world kept most, if not all, of these changes from penetrating into the defense facilities. Consequently, the improved techniques and the focus on safety concerns were not well known within the defense facility structures and organizations -- in many cases, not known at all. Consequently, the changes that have been required to make as Secretary Watkins often says, a new safety culture to upgrade the facilities to adequate standards for environment and safety, will require very large resources, substantial effort, and many years.