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Remarks by Victor Gilinsky
Commissioner, U.S. Nuclear Regulatory Commission
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WHAT ARE WE GOING TO DO WITH SPENT FUEL?

I would like to take up with you the practical question: What are we going to do about the radioactive spent fuel that is piling up at power plants around the country? The storage pools at the plants are filling up and there is, at this point, no other place for the spent fuel to go.

I will dispense with the usual remarks about the importance of this question. I certainly don't have to explain to this audience the public's sensitivity to nuclear waste issues or the public's impatience with the many years of false starts and indecision.

Of course, there wasn't supposed to be a spent fuel logjam.

The original idea was that spent uranium fuel would be reprocessed, a year or so after it was discharged, to extract plutonium formed during irradiation. The plutonium in turn was to fuel a new generation of reactors -- fast breeders. So strong was the belief in this breeder-dominated future that the current generation of U.S. reactors was designed with only enough spent fuel storage capacity for a few years of operation. (By contrast, Canadian reactors were provided with up to 20 years of storage capacity.)

The American utilities were happy with this arrangement because it kept them out of the waste storage business. However, a number of problems were obscured by the general optimism surrounding nuclear power.

First, there were no breeder reactors to take the plutonium. Second, there was no commercial reprocessing. Two small

reprocessing plants were failures and a larger plant, at the Barnwell facility in South Carolina, was caught up in a new government safety requirement that prohibited the transportation of liquid wastes. This meant that Barnwell would have to add a waste solidification plant, thereby doubling the overall cost. Such a plant was never built. Third, the government was getting nowhere in providing a repository to accept the highly radioactive waste for permanent storage.

Then, in October 1976, for international security reasons, President Ford decided that commercial reprocessing should not proceed until we were confident we could prevent diversion of commercial plutonium to bomb use. To keep our domestic policy in line with our international policy, he decided against a government subsidy for Barnwell's waste solidification facility. This effectively put an end to commercial reprocessing in the United States.

By 1977 it was clear that the nuclear waste storage problem had become a spent fuel storage problem, but the utilities still thought they could count on the federal government. Indeed, in 1977, the Department of Energy announced that it planned to accept spent fuel for storage at future government central storage facilities.

But the proposed legislation was never enacted and in 1981, a new Administration withdrew the 1977 promise and left the utilities to their own devices.

In these circumstances it is natural to ask: Can plants expand their individual storage capacities sufficiently rapidly over the next few years to avoid curtailing reactor operation? And, to what extent can the industry count on the government's plans for permanent storage for the more distant future?

SPENT FUEL STORAGE AT REACTOR SITES

Realizing that they would have to provide for themselves, most utilities have found ways to expand spent fuel pool capacity, principally by installing new racks which permit closer spacing of spent fuel assemblies. This method, when fully exploited, usually allows about a three-fold increase in storage capacity. Just about every U.S. nuclear plant has reracked, some of them three and four times. Out of 88 applications for reracking, 81 have been approved so far by the Nuclear Regulatory Commission. In addition, two utilities that had run out of space at one reactor received permission to ship spent fuel to another reactor in their system.

The utilities have been able to exercise sufficient ingenuity and the NRC has been able to review and approve applications for expansions sufficiently quickly, that no

power plant has had to curtail operation because of inadequate spent fuel storage capacity.

At times this has meant dipping into the plant's full core reserve -- the storage capacity maintained to permit emptying the entire reactor core if necessary for inspection or repairs. Maintaining such a reserve is obviously good practice, but it is not an NRC safety requirement.

In any case, through application of these measures, almost all plants will get by until at least 1990.

NEW TECHNIQUES: ROD CONSOLIDATION AND DRY CASKS

To go beyond that, however, will require new storage techniques or construction of new facilities. In order of estimated cost, these include rod consolidation, dry cask storage, and construction of new spent fuel pools outside the reactor.

Rod consolidation involves dismantling or cutting apart the fuel assembly -- which in a pressurized water reactor contains two to three hundred fuel rods -- and putting the fuel rods closer together in about half the original space. The cost is relatively modest. However, this process involves a good deal of mechanical work on the fuel underwater in the spent fuel pool, and reliability and safety need to be proved. Maine Yankee has submitted an application to NRC for permission to consolidate spent fuel, and several other utilities are considering it.

More expensive, but still cheaper than building a new pool, is putting spent fuel, which has cooled for 5 years or more, in large dry casks. A typical cask might hold 10 tons of spent fuel, weigh close to 100 tons, and cost about one million dollars. Cask capacity could be roughly doubled if the fuel were first consolidated. Ideally, such casks would also meet transportation requirements. Then, once the spent fuel was sealed inside the cask, it would not need to be opened before it reached a repository for permanent storage. In the meantime, the cask could remain at the reactor site or at some interim location. We expect an application soon from the Virginia Electric Power Company for such a storage scheme at Surry.

I am especially optimistic about this approach to our storage problems at reactors. If approved and adopted, it would essentially solve the problem of how to store spent fuel safely at reactor sites so as to avoid interrupting reactor operations. So far as I can tell, there would then be no practical limit to the amount of spent fuel that could be stored at most reactor sites.

LONG TERM WASTE DISPOSAL

We do not, however, plan to leave the spent fuel at the reactor sites indefinitely. It has always been assumed -- in fact this was the basis on which power reactors were licensed for operation -- that the government would at some point accept the waste for permanent storage in a federal repository.

The trouble is that the date for this has kept receding. You are no doubt familiar with the dismal history of the federal government's efforts toward this end. The plan in the 1960's for a repository in underground salt formations was switched in the early 1970's to a plan for a surface repository, which was abandoned in the next Administration in favor of a return to the underground approach. Since then, the details have varied from Administration to Administration with the result that we are still not in sight of a repository.

The federal responsibilities are clear. The repository design has to be approved by the NRC from the point of view of public health and safety, and protection of the environment. NRC requirements must be based on overall standards set by the Environmental Protection Agency. The Department of Energy is charged by law with developing the needed technology and building a repository.

Some progress has been made. The first, procedural, part of the NRC's regulations on repository licensing was published in final form in February, 1981. The other part, the set of technical performance standards to be met by the repository, was published for comment in July, 1981, and is now being put in final form by the Commission. Unfortunately, this is being held up by EPA's failure to issue its standards.

Our rule calls for a detailed study of each site, including use of underground exploration. A minimum of three sites, including at least two kinds of underground media, must be studied. DOE intends to do this in basalt at Hanford, Washington; in tuff at the weapon test site in Nevada; and in salt at a location yet to be picked. DOE expects to sink shafts at these three sites in 1983 or 1984, and to select a repository location by 1987 or 1988. The schedule calls for a construction authorization by 1992 and a repository ready for business in the late 1990's.

A bill on this subject has passed the Senate, and a similar bill is before the House. It will likely be passed in the post-election session, although it is unclear whether the Senate/House differences can be resolved in time to enact legislation this year. These bills would essentially confirm the current DOE schedule and would set up a mechanism for resolving state-federal differences over the

placement of a repository. Needless to say, no state is particularly enthusiastic over the prospect of hosting such a repository. The states, having had some unpleasant experiences, simply don't trust the federal government on this issue.

Even if these plans are realized, it would take some years for a repository to absorb the spent fuel in temporary reactor storage. So, for at least the next twenty years, the nuclear waste problem is the problem of where to store the spent fuel. The cumulative amount, to the year 2000, is estimated by DOE to be about 70,000 tons, or nearly ten times the amount already discharged. A typical reactor, by the way, discharges about 30 tons of fuel a year, so the hundred or more reactors expected to operate twenty years from now would add over 3000 tons per year to the DOE total.

In planning for the interim, how much confidence can we have in the government's plans for permanent storage of nuclear waste? Or, how long do we expect the spent fuel to remain in temporary storage?

I've had to give these questions a good deal of thought recently because the NRC Commissioners were asked by the Court of Appeals, in effect, whether we are confident that spent fuel will be removed from reactor sites by the expiration of their operating licenses?

The Commission is in the process of providing the Court with an answer. Let me tell you what I think.

Much as I hope that current plans will work out, there have been too many failures and delays in federal nuclear waste planning for me to be confident of any schedule. The proposed legislation, if passed, would help provide some impetus, and might help resolve state-federal disputes in a reasonable time. But we would still have a long way to go. Public attitudes on this subject are volatile, and many political accommodations remain to be reached. And it does not help that DOE, the agency that is supposed to carry out the program, is slated for extinction by this Administration.

My conclusion is that we had better plan on providing interim spent fuel storage for several decades.

WHAT ABOUT THE INTERIM?

We have seen that there is essentially no practical limit to the amount of spent fuel that could be stored at most reactor sites. This doesn't mean, however, that it would be a good idea to leave it there, especially after the expiration of the site's operating license. The utilities are in the power business, not in the waste storage

business, and we cannot depend on all of them to ensure adequate protection of the spent fuel when their sites are no longer producing power. Moreover, leaving spent fuel in a reactor storage pool after final shutdown complicates cleanup and decontamination.

I would say that it is better not to retain the spent fuel even at an operating reactor if there is a reasonable alternative. There are already enough things to distract station managers from their principal responsibility -- the safe and reliable operation of the reactor.

From the point of view of health and safety, I would prefer that the spent fuel be collected from the reactor sites, probably in dry storage casks, and stored at a central facility, where it would get better supervision and where it would not interfere with reactor operation.

The waste bills in the Congress do contain some provisions for spent fuel storage away from reactors -- but only for about 3 percent of the expected inventory in the year 2000. This is a kind of "last resort" storage; I would make provision for central storage of the bulk of the spent fuel.

The argument is made that if such an interim storage facility is set up, all the steam will go out of the effort to build a federal repository for permanent storage. This would, however, apply equally to extended storage at reactor sites. There is also strong opposition to moving spent fuel and an inclination to put this off as long as possible. Finally, no one seems to want to host a site for such a central storage location, any more than they want to host a site for a permanent repository.

Incidentally, the radioactivity of spent fuel is diminished by about a factor of 100 in the course of the first year after discharge, and by another factor of 10 by the end of ten years. This means that after 10 years the spent fuel is about 1,000 times less radioactive than when it was first removed from a reactor core. This, in turn, means that any waste storage facility is relatively benign compared with a power reactor, which operates at high temperatures and pressures. There has been a lot of exaggeration of the dangers of commercial spent fuel storage and disposal.

What worries people most, I think, is that waste dumps of all sorts are often neglected, and they fear this is also likely to be the case for nuclear waste. Their confidence in government oversight has been further undermined by such things as the leaks in the military waste tanks at Hanford and the flip-flops in government waste policy.

Which brings me to the latest of the flip-flops -- the government's renewed romance with reprocessing and the

encouragement of the use of plutonium fuel in place of uranium. This amounts to a reversion to the policy of the 1960's.

REPROCESSING

Whatever may have been the case before, reprocessing no longer makes any commercial sense. Plutonium can only compete when uranium is very expensive. But there is much more uranium than anyone thought years ago, and the number of reactors expected to use it is much diminished. As a consequence, the price of uranium has been falling. So much so, in fact, that Congress is talking about limiting imports. No commercial reprocessing plant will operate without massive federal subsidies.

The Administration's embrace of reprocessing is not only embarrassingly inconsistent with its free enterprise rhetoric, but it complicates the perfectly straightforward problems of providing for spent fuel storage. For example, the Administration withdrew support for an interim storage facility because it "would detract from efforts to stimulate commercial reprocessing."

DOE insists that reprocessing is the solution to the spent fuel storage problem. They are talking about commercial reprocessing being available in 1992, even though they must know this can't happen because the Office of Management and Budget declines to provide a subsidy. All this is bound to introduce confusion in spent fuel storage planning by utilities.

Entangling spent fuel storage with reprocessing is how we got into trouble in the first place. We allowed the apparent inevitability of fast breeders to dictate the size of spent fuel pools in light water reactors. This time around, let's not permit spent fuel storage to be hostage to grandiose nuclear schemes. Whatever else we do, let's make sure we have adequate spent fuel storage.

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Statement of Victor Gilinsky
Commissioner, U.S. Nuclear Regulatory Commission
before the Committee on Interior and Insular Affairs
Subcommittee on Energy and the Environment
on Nuclear Licensing Reform
June 9, 1983

Mr. Chairman, Members of the Subcommittee,

Thank you for the opportunity to comment on the nuclear licensing reform proposals before you.

I would like to concentrate on two points: the first concerns a central provision of the proposals -- the so-called one-step license -- which I think is mistaken; the second deals with a change not covered in the proposals before you, but which, in my view, is the most important improvement we could make in the licensing process. It is to get the NRC staff out of the agency's hearings as a full party seeking issuance of a license.

ONE STEP DESIGN REVIEW, YES; ONE STEP LICENSING, NO

The one-step CP/OL license would combine the authorizations now granted separately, first under a Construction Permit, and later under an Operating License. An applicant would be eligible to obtain such a combined license, before the start of construction, if the application includes a sufficiently complete design.

Unfortunately, the proposal confuses two ideas, one good and one bad. If an applicant submits a complete design, it makes good sense to review it once and for all and to grant final agency design approval before the start of construction. (Up to now applicants have not submitted such complete designs. If they did, we could change our design review practice, too, right now.)

But approval of an Operating License also involves judgments on operational readiness. For example, the NRC has to

determine whether the plant was properly built and whether an adequate organization is in place to operate the plant. Such judgments can usually be made only when the plant is close to completion. Giving a utility an Operating License on the basis of a paper review, before the start of construction, makes about as much sense as handing an incoming freshman his college diploma on the basis of his course outline.

The DOE version of the proposed legislation would allow the utility to operate the plant subject only to its own certification to the NRC that it has met the applicable requirements. I cannot help wondering how such a process would have worked in the case of, say, the Zimmer plant.

Our encounters with this and other problem construction projects should teach us the need for every new plant to receive a thorough preoperational NRC review. It should then be allowed to operate only after a formal approval by the Commissioners themselves.

I should add that the Commission's proposal -- as opposed to the more extreme one from DOE -- allows for a preoperational NRC review and agency approval of plant operation. But industry wants to do away with this, and I am concerned that, if the law tells a utility building a plant it already has an operating license, the stage will be set for watering down the preoperational check. Moreover, I am concerned that granting an Operating License early in the licensing process will provide an easy excuse for dropping the current requirement that the Commissioners themselves approve full-power operation. This practice was adopted after the Three Mile Island accident by a reluctant Commission under pressure from Congress. It was, in my view, the most important change in our practice to come out of that experience. We need to retain it.

If Congress means for NRC to conduct a rigorous preoperational check, then I urge you not to change the law to give a utility an Operating License before it has demonstrated its readiness for operation.

REMOVE THE NRC STAFF FROM THE HEARINGS AS A PARTY

Let me turn to the role of the NRC staff in the agency's licensing hearings. The staff is a full party in these hearings, and with very rare exceptions, seeks issuance of a license to the applicant. Because it is a litigant, the staff is now barred from communicating freely with the Commissioners on hearing issues.

This arrangement is a holdover from the time when the Commission -- at first, the Atomic Energy Commission -- wanted to help applicants through the hearing process and,

at the same time, wanted to insulate itself from any suggestion of pro-industry bias. Though by law it is the Licensing Board that represents the Commission, as a practical matter, it was really the staff to whom the Commission looked to represent its interests. Even as late as several years ago, when I suggested that we take the staff out of the hearings, the then-NRC Chairman argued that, if this were done, some of the less competent utilities would not make it through.

We have paid a very high price for retaining this arrangement, both by confusing the staff's role, and losing the public's confidence. How can we expect the staff reviewers to approach their responsibilities in an entirely objective way if they are locked in litigative combat to get Board approval of a utility's request for a license? I might add that the confusion concerning who plays what role in these proceedings has on occasion extended to the Commission itself.

And nothing has so undermined public confidence in the NRC as the spectacle of the NRC staff, arm-in-arm with the utility, arguing a common case in the hearings. This was made painfully clear to us by witness after witness at a public meeting in the Three Mile Island area.

The solution is obviously to take the staff out of the hearings as a full party advocating issuance of a license. This would have the added benefit of facilitating communication between the staff and the Commissioners on hearing issues.

REFORM MUST DEAL WITH THE FRAGMENTATION OF THE INDUSTRY

I would like to end with a word about the assumptions which underlie the various licensing reform proposals before you. The conventional view is that utilities are so discouraged with the system of safety regulation that they cannot be expected to order nuclear plants; and that it's up to the regulators to cheer them up with a more accommodating licensing process.

In fact, nuclear plants are not going to be ordered for some years -- for economic reasons -- no matter what Congress does about licensing. Moreover, the problems of getting a plant licensed have been overdramatized. The experience of successful utilities demonstrates that it is possible to build plants that meet NRC standards, and to do it in a reasonable time, and economically. Many of the loudest complainers about regulatory burdens are merely attempting to divert attention from their own managerial failings. Some of them should never have been allowed into this business.

The reason that NRC requirements have increased and become more prescriptive is not capricious regulation but the disappointing safety performance of some of the nuclear utilities. We had a reminder of this several months ago, when our investigation of the Salem reactor trip breaker failures disclosed serious deficiencies in maintenance and plant operations.

The key to the future of nuclear power is not easier licensing but improved performance of the reactors in operation today, and of the ones under construction. In view of the fragmentation of the nuclear utilities -- there are about 60 in all, most of them with only one or two reactors -- NRC's role is vital in maintaining a common discipline.

What I regret most about the Commission's effort to develop licensing legislation is that it has consumed a tremendous amount of time and distracted the Commission from this more important work.

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Remarks by Victor Gilinsky
Commissioner, U.S. Nuclear Regulatory Commission
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MORE NUCLEAR WEAPON STATES?

In the current revival of concern about nuclear war, the emphasis has been on the danger of increasing numbers of Soviet and American nuclear weapons. I'd like to raise with you a related and equally serious concern, one which is being overridden by competing commercial interests. I am talking about the prospect that more and more countries will possess nuclear weapons.

This prospect is especially worrisome when you think about it in concrete terms: nuclear weapons in the hands of more national leaders. We know what some of them have been like.

With more nuclear-armed leaders there will be more occasions when the use of these weapons is contemplated, or even threatened. This is bound to make their actual use more likely. And if it comes to that, we and the Russians may find it impossible to avoid getting drawn in. Imagine our predicament in a nuclear war among Middle Eastern states. In fact, of all the events which might trigger U.S. and Soviet nuclear arsenals, I would not, by any means, put this at the bottom of the list.

We should not assume that countries with small nuclear arsenals will be as cautious as we are. A high-level scientist in one of the near-nuclear countries once said to me: "You Americans overestimate our ability to produce nuclear weapons, but you underestimate what we will do with them if we have to use them."

The sophisticated theories of nuclear deterrence, developed around superpower nuclear forces, have little relevance for small nuclear states. These are not likely to have forces that can be protected against surprise nuclear attack. Frightened leaders may decide to strike first to disarm their opponents before the same thing happens to them. And all countries will have to give wide berth to those which are seen as more likely to resort to nuclear weapons; these are not likely to be the nicest countries.

The acquisition of nuclear weapons is probably an irreversible process. Once a country has them, it is unlikely to give them up. While governments considered friendly or responsible are frequently replaced by governments that are not, plutonium and highly-enriched uranium remain explosive indefinitely. For example, if the Shah had succeeded in building a bomb, then the Ayatollah would have it now, and so would his successors. Government control over these weapons can be lost in the confusion of a coup. Or they might even be sold.

THE WORRY LIST

The chief stumbling block to getting bombs, for countries that want them, is obtaining the nuclear explosive material itself -- that is, plutonium or highly-enriched uranium. Plutonium is a by-product of reactor operation. It can be separated from the highly-radioactive fuel in reprocessing plants. Highly-enriched uranium is concentrated from natural uranium in enrichment plants. Thus, reprocessing and enrichment facilities are key to weapons production. It takes several kilograms of plutonium, or somewhat more highly-enriched uranium, to make one bomb.

It is particularly suspicious that a number of countries which have not renounced nuclear weapons through adherence to the Nonproliferation Treaty are accumulating, or trying to accumulate, militarily-significant amounts of such material. I am talking particularly about India, Israel, South Africa, Pakistan, and Argentina. All have, or are building, facilities to produce nuclear explosives and have not accepted international inspection over them.

India, of course, exploded a bomb in 1974. Since 1970, it has been producing plutonium in a small, Canadian-supplied heavy water reactor near Bombay. (The original charge of heavy water, by the way, came from the United States.) India is also building a larger reactor, apparently for the same purpose. It will not be subject to inspection, either.

Israel is presumed to be producing plutonium in a small, French-supplied reactor at the Dimona desert facility which is closed to international inspection.

South Africa has built a uranium enrichment plant at Valindaba (which, I am told, means "of this we do not speak.") It uses an unorthodox technology -- possibly a South African version of a German process. South Africa does not permit international inspection of its facility.

There are mysterious circumstances that attach to the South African situation. You're probably familiar with the satellite discovery in 1977 of what was suspected to be a nuclear weapon test site being readied in the Kalahari desert. We may never know exactly what went on there.

And even more mysterious was the satellite observation on September 22, 1979, in the South Atlantic, of what seemed to be a small nuclear explosion. Official assessments were divided over whether it was, in fact, an explosion or just a spurious signal. If it was indeed an explosion, no one knows who set it off.

Pakistan, to compete with India, is constructing a secret uranium enrichment plant, presumably to produce highly-enriched uranium for weapons, since Pakistan has no reactors that use enriched uranium fuel. The design of the gas centrifuge plant is based on plans stolen from a Dutch project by a Pakistani engineer, and much of the technology and equipment were obtained surreptitiously from European countries.

Pakistan also purchased from France a reprocessing plant for separating plutonium from used uranium fuel. France froze its participation some years ago, after having supplied Pakistan with the design, but Pakistan has apparently continued on its own.

The last of the five, Argentina, is completing a small reprocessing plant at Ezeiza, near the Buenos Aires airport. The Argentines have no plans to put it under international inspection. Argentina has been very interested in acquiring plutonium and has expressed interest in the use of nuclear explosives for "peaceful" purposes.

So has its neighbor and rival, Brazil, which has also not joined the NPT and thus has not committed itself to international inspection of all its facilities. It is also interested in reprocessing and enrichment. However, Brazil, in contrast with the other countries I listed, does not seem to have any sizeable facilities that are not subject to international inspection.

Of course none of these countries admits to an interest in nuclear weapons. All the projects are supposed to be "peaceful", including India's explosion, although it was indistinguishable from a weapons test. This use of the "peaceful" label tells us less about the nature of the

activities described than about the corruption of the term "peaceful" in nuclear usage.

If the activities we have talked about are really intended for peaceful use, then why the secrecy? The presumption has to be that these countries have military uses in mind.

NPT AND INTERNATIONAL INSPECTION CAN'T COPE WITH NUCLEAR EXPLOSIVES

If these countries are genuinely interested only in the use of nuclear energy for the production of power, they have the opportunity to adhere to the Nonproliferation Treaty and permit inspection by the International Atomic Energy Agency. We should continue to press for this.

I do not, however, want to leave you with the impression that NPT adherence and acceptance of IAEA inspectors solve the problem. International inspection is, at best, only part of the answer. The way the NPT has been widely interpreted, all nuclear activities short of the actual manufacture of weapons are legitimate so long as they are covered by IAEA inspection. Signatories are required only to pledge not to manufacture nuclear weapons. But such pledges can be withdrawn quickly, and the warning system based on international inspection is frail and only marginally effective.

The inspections can offer reasonable protection, at least in principle, for what we might call "safe" technologies. This includes most of the equipment and materials related to power operation: today's power reactors and their relatively benign low-enriched uranium fuel, and even the plutonium that is still locked inside highly-radioactive spent fuel. But when a country steps over into the "dangerous" technologies involving highly-enriched uranium and separated plutonium, it's a different story. Then, once it has done its nuclear weapons homework, a country can put the explosive material to bomb use almost overnight. That is why ownership and physical control of such material, even if covered by international inspection, is nearly tantamount to possession of nuclear weapons. In these circumstances, countries cannot rely on the inspection system to warn them in time that a neighbor is suddenly making bombs. (That fact must have contributed to Israel's attack on Iraq's nuclear facility.) The obvious conclusion is that nuclear explosives must be kept out of civilian power programs if these programs are to be kept at a safe distance from bombmaking.

EXPLOSIVE FUELS UNNECESSARY FOR NUCLEAR POWER

In retrospect, there is no question that we should have separated the civilian and military atoms more than we did. The really dangerous explosive fuels -- plutonium and highly-enriched uranium -- and their production plants are not essential for gaining the benefits of nuclear energy. In fact, they play almost no role in the U.S. commercial nuclear power program.

We got off on the wrong foot years ago, however, by directing our research and development programs almost exclusively toward the use of plutonium fuel. Plutonium then appeared economically attractive for the future because uranium was thought to be scarce. It seemed to make sense to shift as soon as possible to plutonium-fueled advanced reactors. Following the U.S. lead, nuclear bureaucracies and industries worldwide committed themselves to an eventual shift to plutonium fuel.

The international security implications of this received scant attention, among other reasons, because it was widely thought that commercially-generated plutonium was unusable for weapons. This is dead wrong, but it is still used in arguments, sometimes by persons who know better. Also, bombs were thought to be so difficult and expensive to design and fabricate that possession of the material in itself did not seem particularly dangerous. This, too, is wrong; with the inevitable diffusion of information and skills over the years, making bombs is no longer the hurdle it once was.

The economic assumptions on which plutonium programs were based turned out to be erroneous as well. The cost of reprocessing radioactive spent fuel has gone way up, and the cost of uranium has gone down. The commercial incentive for plutonium-fueled systems has evaporated.

And we now know that the highly-enriched uranium, used to fuel research reactors, can be replaced with less dangerous material of lower enrichment.

There is no question, in other words, that we can enjoy the benefits of nuclear energy perfectly well without involving ourselves with fuels that are also explosive. President Ford made this point in 1976 in announcing a new policy for nuclear power. He said that plutonium should not be put into commercial use until the world can overcome the associated risks of proliferation. But even without plutonium, he said, the United States and other nations could increase their reliance on nuclear power.

REAGAN ADMINISTRATION COMMITS TO COMMERCIAL PLUTONIUM USE

But that was not good enough for the bureaucratic and commercial interests here and around the world. Zealously committed to the future use of plutonium, they were not about to let President Ford, or his successor, take their toys away. They fought back, pulling out every argument for business as usual, ranging from the false claim that commercial plutonium cannot be used for bombs to the cynical conclusion that even if there are dangers, it is too late to do anything about them. Once again we were treated to the classic cry of the exporters: if we don't sell this material and equipment, dangerous or not, other countries will.

Unfortunately, these interests have prevailed in the current administration, which has rejected the Ford-Carter approach and committed itself to a plutonium-based domestic nuclear policy and a more accommodating approach with our trading partners. Ironically, for an administration devoted to free markets, domestic reprocessing and plutonium use would entail massive federal subsidies. Congress isn't likely to approve these so the domestic plutonium policy probably won't get anywhere. But in the meantime, this American commitment to commercial use of plutonium stimulates appetites around the world for this dangerous material at a time when no international mechanism exists for adequately protecting it from military use.

The administration says it supports plutonium use only in what it calls the "industrial democracies," -- this means Western Europe and Japan -- where risk of proliferation seems unrealistic. But if past experience is a guide, such a standard will not hold up for very long; inevitably political pressures and complaints about unequal treatment will surface elsewhere. Exceptions will be made and rationalized on the grounds that the state in question is strategically important and "responsible".

THE LEAST WE SHOULD BE DOING

In nuclear policy (in contrast to gas pipeline policy), this administration says that denying technology doesn't work. The key to dealing with proliferation, it argues, is to reduce the conflicts that lead countries to seek nuclear weapons. That's all very well for the long run, but a way must be found to limit the ease with which nuclear arms can be obtained or there may not be any long run. Our immediate aim has to be to reduce access to those nuclear fuels which are also explosives until we can ensure that they will not be made into bombs.

Few, if any, of the nuclear programs around the world are self-sufficient; certainly none in developing countries are.

In every case, there is substantial dependence on foreign supply. If the advanced countries wanted to, they could make it very much more difficult and risky for the Third World to develop nuclear weapons. But the efforts to control exports have, so far, been little more than half-hearted. The tendency, in order to legitimize dangerous nuclear exports, is to take a customer's claim of "peaceful" intentions at face value.

We would make a good start on dealing with this hypocrisy by talking straight about the dangers ourselves -- for example, by clearly labeling plutonium a nuclear explosive and by abandoning the pretense that international inspection can keep it safe. It would especially help to restrict the word "peaceful," which appears in all the basic nuclear treaties and charters, to activities that are clearly remote from military application. It should never be applied to those technologies which, because they involve nuclear explosives, are intrinsically dangerous.

Finally, there is never going to be a serious international effort to limit access to explosive nuclear fuels unless we take the lead. It has become fashionable in the last few years to deride as naive the suggestion that others would follow the U.S. example. The fact is that, while our direct control in international nuclear affairs is not what it once was, we still have very considerable influence.

I once asked a high French official why he took such a close interest in a California referendum on nuclear energy. He told me that the French government is vitally concerned about public attitudes toward nuclear energy in this country. "If you stop using nuclear energy today," he said, "the Germans will stop tomorrow. And we will have to stop in five years." One doesn't have to think in such drastic terms to sense that our example can provide a powerful argument in domestic debates abroad.

Instead, the Administration argues we can only protect our commercial position by following our nuclear trading partners. If they are interested in the plutonium business, then we should be, too.

President Ford had a more responsible sense of priorities: "I believe," he said, "that avoidance of proliferation must take precedence over economic interests."

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Statement of Commissioner Victor Gilinsky
before the Committee on Environment and Public Works
Subcommittee on Nuclear Regulation
on Nuclear Licensing Reform
May 25, 1983

Mr. Chairman, Members of the Committee,

I appreciate this opportunity to comment on the Commission's legislative proposal on nuclear licensing, particularly as my views on this subject are rather different from those of my fellow Commissioners.

I would like to start with a word about the assumptions which underly this and other licensing reform proposals. The conventional view is that nuclear licensing is so strewn with obstacles and so uncertain that utilities have become discouraged, and that they cannot be expected to order nuclear plants unless the regulators "stabilize" safety requirements.

My own view is that the problems have been overdramatized. The experience of successful utilities demonstrates that it is possible to build plants in a reasonable time, and to do it economically.

It is also true, however, that NRC requirements have increased and become more prescriptive, and the end is not in sight. But the reason for this is not capricious regulation; it is the uneven safety performance of the nuclear utilities, and their inability to regulate themselves.

Some of the utilities, of course, are very capable and have been doing a good job. But others are not; and some of them should never have been allowed into this business.

Poor performance of some utilities dictates ever tighter safety requirements across the board. We had a reminder of

that a couple of months ago. Our investigation after the Salem reactor trip breakers failures disclosed serious deficiencies in maintenance and plant operations. As a result, we will likely expand our oversight in these areas. This is a graphic illustration of how requirements grow.

From the point of view of safety -- and it is well to remind ourselves that nothing threatens this industry more than another large accident -- we should concern ourselves more with improving the performance of the utilities than with cheering them up with more accommodating licensing rules.

ONE STEP DESIGN REVIEW, YES; ONE STEP LICENSING, NO

It is essential that every new plant receive a thorough preoperation NRC review, and that it be allowed to operate only after a formal agency approval -- in my view, by the Commissioners themselves. For this reason, I am very much opposed to the so-called one-step license. It would be desirable to have a single, thorough design review and approval before the start of construction. But giving a utility an Operating License at the same time it gets a Construction Permit makes about as much sense as handing an incoming freshman his college diploma.

The Commission's proposal allows for a preoperational review, but some of the industry groups want to eliminate it, and I am concerned about how these provisions will be interpreted. So long as the law tells a utility building a plant that it has an operating license, and at the same time tells the regulators it is still up to them to determine the readiness of the plant for operation, someone is being fooled. I am concerned that it may be those who expect a rigorous preoperation check.

On the basis of my experience, I believe that the NRC should, in fact, be increasing the number of licensing stages (though not hearings). In France and in the U.K., for example, there are a number of specific and formal regulatory approvals that must be obtained as a plant nears commercial operation. It is interesting that in France, a utility is first issued a temporary license; a final operating license is given only after a two to three year shakedown period.

REMOVE THE NRC STAFF FROM THE HEARINGS AS A PARTY

Aside from the one-step license provision, the Commission's legislative proposal seems a reasonable effort to adjust our process. The proposal fails, however, to include the single most important improvement that we could make in the licensing process. That is to abolish the NRC staff's role as a full party in the hearings.

Nothing has so undermined public confidence in the NRC as the spectacle of the NRC staff arguing the utility's case in hearings. Whether or not this role has affected the staff's safety judgments, it has made a terrible impression on the public -- and nowhere more so than around Three Mile Island.

Moreover, because the NRC staff lawyers do not have a concrete stake in resolving the case, and because of their own bureaucratic interests, they have sometimes exacerbated the litigative nature of hearings. The solution is to take the staff out of the hearings as a full party advocating issuance of a license. This would have the added benefit of eliminating the ex parte bars between the staff and the Commissioners.

When I suggested this years ago, a former NRC Chairman insisted the staff was needed to get the less competent utilities through the hearings. I assume that is no longer an acceptable argument. But it brings home the lengths to which we have gone to keep the door open to virtually every utility.

REFORM MUST DEAL WITH THE FRAGMENTATION OF THE INDUSTRY

Which brings me back to the question of utility performance and what we can do about it. The disappointing performance of some of the utilities is, to my mind, a direct consequence of the fragmentation of the nuclear power industry. Any effort at serious reform has to move beyond tinkering with the licensing process and has to confront the fact that we have in this country about sixty utilities either running nuclear plants or building them. That is roughly ten times as many operating entities as in any other country. Most of our utilities will have no more than two reactors, and many will have just one.

This makes for a bewildering variety of equipment and procedures. As a result, it is very difficult, both for the utilities and for us, to come to grips with safety problems in a systematic and satisfactory way. The situation cries out for order.

The conventional wisdom says that licensing reform is the way to promote standardized reactor designs. The trouble with this approach is that it has things the wrong way around. France, for example, has standardized nuclear power plants not because its licensing rules permit this, but because France has one operating company that builds its own plants and buys from one manufacturer. That is not the right answer for us, but I also do not think we can continue to cater to the idiosyncrasies of sixty utility managements and accept sixty different solutions to safety problems.

In short, there is a mismatch between the safety imperatives of nuclear technology and our institutions for using it commercially. If we continue with the present fragmented operating structure, then the demands of safety -- and public acceptance, as well -- will drive us to more intrusive and prescriptive regulation. Despite all the talk about regulatory reform, that is the course we are on.

There is an alternative, if we really want to bring order to the use of this technology under a less prescriptive regulatory regime. That is to reduce sharply the number of nuclear operating companies. Each of these would then operate a large number of power plants, and each would be better able, than most of the utilities today, to regulate itself. I realize this may sound unrealistic. But so is the idea of major changes in nuclear regulation without changes in the structure of the industry.

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Remarks by Victor Gilinsky
Commissioner, U.S. Nuclear Regulatory Commission
before the
10th Annual Illinois Energy Conference
Chicago, Illinois
October 13, 1982

WHAT ARE WE GOING TO DO WITH SPENT FUEL?

I would like to take up with you the practical question: What are we going to do about the radioactive spent fuel that is piling up at power plants around the country? The storage pools at the plants are filling up and there is, at this point, no other place for the spent fuel to go.

I will dispense with the usual remarks about the importance of this question. I certainly don't have to explain to this audience the public's sensitivity to nuclear waste issues or the public's impatience with the many years of false starts and indecision.

Of course, there wasn't supposed to be a spent fuel logjam.

The original idea was that spent uranium fuel would be reprocessed, a year or so after it was discharged, to extract plutonium formed during irradiation. The plutonium in turn was to fuel a new generation of reactors -- fast breeders. So strong was the belief in this breeder-dominated future that the current generation of U.S. reactors was designed with only enough spent fuel storage capacity for a few years of operation. (By contrast, Canadian reactors were provided with up to 20 years of storage capacity.)

The American utilities were happy with this arrangement because it kept them out of the waste storage business. However, a number of problems were obscured by the general optimism surrounding nuclear power.

First, there were no breeder reactors to take the plutonium. Second, there was no commercial reprocessing. Two small

reprocessing plants were failures and a larger plant, at the Barnwell facility in South Carolina, was caught up in a new government safety requirement that prohibited the transportation of liquid wastes. This meant that Barnwell would have to add a waste solidification plant, thereby doubling the overall cost. Such a plant was never built. Third, the government was getting nowhere in providing a repository to accept the highly radioactive waste for permanent storage.

Then, in October 1976, for international security reasons, President Ford decided that commercial reprocessing should not proceed until we were confident we could prevent diversion of commercial plutonium to bomb use. To keep our domestic policy in line with our international policy, he decided against a government subsidy for Barnwell's waste solidification facility. This effectively put an end to commercial reprocessing in the United States.

By 1977 it was clear that the nuclear waste storage problem had become a spent fuel storage problem, but the utilities still thought they could count on the federal government. Indeed, in 1977, the Department of Energy announced that it planned to accept spent fuel for storage at future government central storage facilities.

But the proposed legislation was never enacted and in 1981, a new Administration withdrew the 1977 promise and left the utilities to their own devices.

In these circumstances it is natural to ask: Can plants expand their individual storage capacities sufficiently rapidly over the next few years to avoid curtailing reactor operation? And, to what extent can the industry count on the government's plans for permanent storage for the more distant future?

SPENT FUEL STORAGE AT REACTOR SITES

Realizing that they would have to provide for themselves, most utilities have found ways to expand spent fuel pool capacity, principally by installing new racks which permit closer spacing of spent fuel assemblies. This method, when fully exploited, usually allows about a three-fold increase in storage capacity. Just about every U.S. nuclear plant has reracked, some of them three and four times. Out of 88 applications for reracking, 81 have been approved so far by the Nuclear Regulatory Commission. In addition, two utilities that had run out of space at one reactor received permission to ship spent fuel to another reactor in their system.

The utilities have been able to exercise sufficient ingenuity and the NRC has been able to review and approve applications for expansions sufficiently quickly, that no

power plant has had to curtail operation because of inadequate spent fuel storage capacity.

At times this has meant dipping into the plant's full core reserve -- the storage capacity maintained to permit emptying the entire reactor core if necessary for inspection or repairs. Maintaining such a reserve is obviously good practice, but it is not an NRC safety requirement.

In any case, through application of these measures, almost all plants will get by until at least 1990.

NEW TECHNIQUES: ROD CONSOLIDATION AND DRY CASKS

To go beyond that, however, will require new storage techniques or construction of new facilities. In order of estimated cost, these include rod consolidation, dry cask storage, and construction of new spent fuel pools outside the reactor.

Rod consolidation involves dismantling or cutting apart the fuel assembly -- which in a pressurized water reactor contains two to three hundred fuel rods -- and putting the fuel rods closer together in about half the original space. The cost is relatively modest. However, this process involves a good deal of mechanical work on the fuel underwater in the spent fuel pool, and reliability and safety need to be proved. Maine Yankee has submitted an application to NRC for permission to consolidate spent fuel, and several other utilities are considering it.

More expensive, but still cheaper than building a new pool, is putting spent fuel, which has cooled for 5 years or more, in large dry casks. A typical cask might hold 10 tons of spent fuel, weigh close to 100 tons, and cost about one million dollars. Cask capacity could be roughly doubled if the fuel were first consolidated. Ideally, such casks would also meet transportation requirements. Then, once the spent fuel was sealed inside the cask, it would not need to be opened before it reached a repository for permanent storage. In the meantime, the cask could remain at the reactor site or at some interim location. We expect an application soon from the Virginia Electric Power Company for such a storage scheme at Surry.

I am especially optimistic about this approach to our storage problems at reactors. If approved and adopted, it would essentially solve the problem of how to store spent fuel safely at reactor sites so as to avoid interrupting reactor operations. So far as I can tell, there would then be no practical limit to the amount of spent fuel that could be stored at most reactor sites.

LONG TERM WASTE DISPOSAL

We do not, however, plan to leave the spent fuel at the reactor sites indefinitely. It has always been assumed -- in fact this was the basis on which power reactors were licensed for operation -- that the government would at some point accept the waste for permanent storage in a federal repository.

The trouble is that the date for this has kept receding. You are no doubt familiar with the dismal history of the federal government's efforts toward this end. The plan in the 1960's for a repository in underground salt formations was switched in the early 1970's to a plan for a surface repository, which was abandoned in the next Administration in favor of a return to the underground approach. Since then, the details have varied from Administration to Administration with the result that we are still not in sight of a repository.

The federal responsibilities are clear. The repository design has to be approved by the NRC from the point of view of public health and safety, and protection of the environment. NRC requirements must be based on overall standards set by the Environmental Protection Agency. The Department of Energy is charged by law with developing the needed technology and building a repository.

Some progress has been made. The first, procedural, part of the NRC's regulations on repository licensing was published in final form in February, 1981. The other part, the set of technical performance standards to be met by the repository, was published for comment in July, 1981, and is now being put in final form by the Commission. Unfortunately, this is being held up by EPA's failure to issue its standards.

Our rule calls for a detailed study of each site, including use of underground exploration. A minimum of three sites, including at least two kinds of underground media, must be studied. DOE intends to do this in basalt at Hanford, Washington; in tuff at the weapon test site in Nevada; and in salt at a location yet to be picked. DOE expects to sink shafts at these three sites in 1983 or 1984, and to select a repository location by 1987 or 1988. The schedule calls for a construction authorization by 1992 and a repository ready for business in the late 1990's.

A bill on this subject has passed the Senate, and a similar bill is before the House. It will likely be passed in the post-election session, although it is unclear whether the Senate/House differences can be resolved in time to enact legislation this year. These bills would essentially confirm the current DOE schedule and would set up a mechanism for resolving state-federal differences over the

placement of a repository. Needless to say, no state is particularly enthusiastic over the prospect of hosting such a repository. The states, having had some unpleasant experiences, simply don't trust the federal government on this issue.

Even if these plans are realized, it would take some years for a repository to absorb the spent fuel in temporary reactor storage. So, for at least the next twenty years, the nuclear waste problem is the problem of where to store the spent fuel. The cumulative amount, to the year 2000, is estimated by DOE to be about 70,000 tons, or nearly ten times the amount already discharged. A typical reactor, by the way, discharges about 30 tons of fuel a year, so the hundred or more reactors expected to operate twenty years from now would add over 3000 tons per year to the DOE total.

In planning for the interim, how much confidence can we have in the government's plans for permanent storage of nuclear waste? Or, how long do we expect the spent fuel to remain in temporary storage?

I've had to give these questions a good deal of thought recently because the NRC Commissioners were asked by the Court of Appeals, in effect, whether we are confident that spent fuel will be removed from reactor sites by the expiration of their operating licenses?

The Commission is in the process of providing the Court with an answer. Let me tell you what I think.

Much as I hope that current plans will work out, there have been too many failures and delays in federal nuclear waste planning for me to be confident of any schedule. The proposed legislation, if passed, would help provide some impetus, and might help resolve state-federal disputes in a reasonable time. But we would still have a long way to go. Public attitudes on this subject are volatile, and many political accommodations remain to be reached. And it does not help that DOE, the agency that is supposed to carry out the program, is slated for extinction by this Administration.

My conclusion is that we had better plan on providing interim spent fuel storage for several decades.

WHAT ABOUT THE INTERIM?

We have seen that there is essentially no practical limit to the amount of spent fuel that could be stored at most reactor sites. This doesn't mean, however, that it would be a good idea to leave it there, especially after the expiration of the site's operating license. The utilities are in the power business, not in the waste storage

business, and we cannot depend on all of them to ensure adequate protection of the spent fuel when their sites are no longer producing power. Moreover, leaving spent fuel in a reactor storage pool after final shutdown complicates cleanup and decontamination.

I would say that it is better not to retain the spent fuel even at an operating reactor if there is a reasonable alternative. There are already enough things to distract station managers from their principal responsibility -- the safe and reliable operation of the reactor.

From the point of view of health and safety, I would prefer that the spent fuel be collected from the reactor sites, probably in dry storage casks, and stored at a central facility, where it would get better supervision and where it would not interfere with reactor operation.

The waste bills in the Congress do contain some provisions for spent fuel storage away from reactors -- but only for about 3 percent of the expected inventory in the year 2000. This is a kind of "last resort" storage; I would make provision for central storage of the bulk of the spent fuel.

The argument is made that if such an interim storage facility is set up, all the steam will go out of the effort to build a federal repository for permanent storage. This would, however, apply equally to extended storage at reactor sites. There is also strong opposition to moving spent fuel and an inclination to put this off as long as possible. Finally, no one seems to want to host a site for such a central storage location, any more than they want to host a site for a permanent repository.

Incidentally, the radioactivity of spent fuel is diminished by about a factor of 100 in the course of the first year after discharge, and by another factor of 10 by the end of ten years. This means that after 10 years the spent fuel is about 1,000 times less radioactive than when it was first removed from a reactor core. This, in turn, means that any waste storage facility is relatively benign compared with a power reactor, which operates at high temperatures and pressures. There has been a lot of exaggeration of the dangers of commercial spent fuel storage and disposal.

What worries people most, I think, is that waste dumps of all sorts are often neglected, and they fear this is also likely to be the case for nuclear waste. Their confidence in government oversight has been further undermined by such things as the leaks in the military waste tanks at Hanford and the flip-flops in government waste policy.

Which brings me to the latest of the flip-flops -- the government's renewed romance with reprocessing and the

encouragement of the use of plutonium fuel in place of uranium. This amounts to a reversion to the policy of the 1960's.

REPROCESSING

Whatever may have been the case before, reprocessing no longer makes any commercial sense. Plutonium can only compete when uranium is very expensive. But there is much more uranium than anyone thought years ago, and the number of reactors expected to use it is much diminished. As a consequence, the price of uranium has been falling. So much so, in fact, that Congress is talking about limiting imports. No commercial reprocessing plant will operate without massive federal subsidies.

The Administration's embrace of reprocessing is not only embarrassingly inconsistent with its free enterprise rhetoric, but it complicates the perfectly straightforward problems of providing for spent fuel storage. For example, the Administration withdrew support for an interim storage facility because it "would detract from efforts to stimulate commercial reprocessing."

DOE insists that reprocessing is the solution to the spent fuel storage problem. They are talking about commercial reprocessing being available in 1992, even though they must know this can't happen because the Office of Management and Budget declines to provide a subsidy. All this is bound to introduce confusion in spent fuel storage planning by utilities.

Entangling spent fuel storage with reprocessing is how we got into trouble in the first place. We allowed the apparent inevitability of fast breeders to dictate the size of spent fuel pools in light water reactors. This time around, let's not permit spent fuel storage to be hostage to grandiose nuclear schemes. Whatever else we do, let's make sure we have adequate spent fuel storage.

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Remarks by Victor Gilinsky
Commissioner, U.S. Nuclear Regulatory Commission
before the
Atomic Industrial Forum, Inc.
Kansas City, Missouri
May 24, 1982

STREAMLINING NUCLEAR REGULATION?

I have been asked to give my views on recent initiatives to "streamline" the regulatory process for nuclear power plants.

We all know the political winds have shifted, and with them the pressures on the regulators -- the nuclear safety regulators included. At NRC, references to Three Mile Island and calls for tighter safety requirements at power reactors have given way to talk of regulatory reform.

NRC and DOE task forces are redesigning the power reactor licensing process and proposing legislation that would feature one-step licensing of standard plants, with the promise of abbreviated hearings. The proposed legislation is seen as an important element in a revival of nuclear orders.

There has been a shift in the political composition of the Commission and, while the ultimate effect of that is unclear, it does seem that various Commission decisions are touched by Administration policies more than before.

The NRC staff certainly senses a different mood: some of the very same senior NRC officials who were outdoing each other three years ago in proposing new safety requirments are now competing to eliminate such requirements. A new review committee, intended, at least in part, to be a bottleneck for new requirements, is having just that effect. Moreover, to slow the process even more, there is talk of having any NRC office that proposes new requirements for licensees submit a detailed cost-benefit analysis of alternatives along with such proposals. The last follows

the recommendation of the President's Task Force on Regulatory Relief.

The Commission has also been breathing down the necks of the licensing Boards, involving itself in the details of the Boards' procedural decisions in order to drive home the message that they are to construe their role narrowly. In a series of decisions on San Onofre, Comanche Peak, and Summer, the Commission has come down hard against attempts by Boards to raise and resolve safety issues.

For those of you who have been scrambling for the past few years to satisfy the increased and shifting safety requirements imposed on power reactors, and who have experienced occasional rough handling by the safety bureaucracy and the frustrations of extended public hearings, this must be sweet music. It's understandable that you should enjoy the new anti-regulation rhetoric. But there is a danger in getting carried away by it because it does not respond to your more serious problems. That is what I want to caution you about.

Of course, some of what is being done or proposed is useful. Indeed, some of it is long overdue. I've supported eliminating the financial qualifications review and the alternative sites review at the operating license stage, and dropping the Appeal Board phase in the Commission's effectiveness review, thereby saving about sixty days of decision time. These were, in fact, my proposals. And I'm all for tightening up management at NRC, including clarifying the process of imposing requirements on licensees.

What concerns me, however, is that along with some sensible improvement of our regulatory system, there is, in the current talk of regulatory reform at NRC, more than a hint of tagging nuclear safety regulation as the source of nuclear power's troubles, of rejecting safety improvements no matter what, of hostility to public hearings, and a harking back to past dreams about the future of nuclear energy which no longer make any sense. That is where I part company with some of my colleagues and the Department of Energy. I think you should, too.

LEGISLATION TO SPEED LICENSING

Let me start with the latest legislative drafting effort at NRC, the proposed Nuclear Standardization Act of 1982. I have supported the proposal to broaden the basis upon which early site approvals can be obtained. For example, this would authorize states to seek approval of a site well in advance of the time when a utility would generally apply for such approval. But it is difficult to see the other provisions of the proposed bill as more than so much smoke,

designed to give the illusion of important reform. As far as I can determine, the Atomic Energy Act presently authorizes the Commission to take virtually all the actions which would be authorized by the proposed legislation.

It is misleading to suggest that it is the Commission's lack of legal authority which is holding back standardization. Moreover, if the Commission were really serious about this subject, it would act on its own. For example, the Commission could, by amending its regulations, go much further than the proposed bill and require that all applicants, and not just those using a standardized design, submit an essentially complete plant design as part of the construction permit application. The operating license review could then be limited to issues which were not covered in the construction permit proceeding. This approach would, for all practical purposes, be the equivalent of one-step review.

But, more importantly, all this modification of the licensing process applies to plants that are yet to be ordered. What good is it, if there are no new orders? And no one seems to think that there will be any orders anytime soon, no matter what the NRC does. That does not mean we should not improve the process for future plants where we can, but it should affect the priority of such an effort. Nevertheless, for political reasons, the effort gets high priority and a lot of Commission attention. It is an expensive distraction from more important problems, some of which are not getting enough attention.

REAL PROBLEMS

In my view, we should be concentrating on the plants in operation and those under construction. As you know, there are about seventy nuclear power plants, with an electrical capacity of about 55,000 megawatts, now operating. Our first interest should be to insure smooth and safe operation of these plants. They represent a very large investment, and I don't have to tell this group that their significance lies not only in their total contribution to the country's electricity supply, but also in the diversity they add to that supply.

In addition, there are fifty-odd plants under construction with a generating capacity roughly equal to that in operation -- also about 55,000 megawatts. (Nominally there are about seventy plants under construction, but I expect the number will be pared down by energy economics.) Our immediate interest here is to ensure that these plants are constructed properly so that they will operate smoothly, efficiently, and safely. Being newer, they represent an even more valuable investment than those already in operation.

There was concern a year or so ago that the regulators would hold up completed plants because the regulatory formalities at the operating license stage would not be completed in time. As it turns out, this is not going to happen because plant construction has moved much more slowly than predicted by the utilities. Of the 33 plants which were slated for completion and licensing by the end of 1983, I expect that about 12 will make it by then; the remainder will not be ready.

As for holdup of the plants which were under review for construction permit, or announced to be in the planning stage, the issue is academic, because none appear likely to see the light of day.

This is not the way it was supposed to be and it is understandable that the figure of 100,000 or so nuclear megawatts in the 1990's should be disappointing. The nuclear construction and operation pipeline once held about 250 plants, and in the decade in which this number was supposed to double, it halved instead. But there is no way to reverse these developments by manipulating the regulatory process. They are too deeply embedded in the fundamental changes that have taken place in the economy over the past decade. There is no point in complaining about this situation. We need instead to concentrate on the reactors now in operation and under construction. They are a valuable investment that needs protection.

What are their problems? While plants are not being held up by lengthy proceedings, there is the possibility, if not the likelihood, that plants which are largely finished will not go into operation on schedule because they have not been built right. One, for example, is stuck with an extensive design reverification program because problems have been discovered in its seismic design. More than one is going through an elaborate and time-consuming process of checking and correcting actual construction because proper quality assurance practices had not been followed. Some have had to halt construction to straighten themselves out; another is dead in the water because the architect-engineer was replaced; and so on. And it is not outside the realm of possibility that some of these reactors may not operate at all.

In the category of operating reactors, we have also had to deal with some poor performers. And of course, there is Three Mile Island.

Origin of the Problems

It's worth reflecting on the origins of these problems. They are complex, but it seems clear that the civilian

nuclear program scaled up too rapidly, both in terms of the size and the number of power reactors involved.

Let me give you one indication of this. The first plant over 600 megawatts to get an operating license was Oyster Creek. Before the operating license was issued in April 1969, we had issued construction permits to 38 other plants over 600 megawatts, some up to 1100 megawatts. Yet by April 1969, we had total operating experience with plants over 200 megawatts of only 4 reactor-years.

Compared with many other countries, our utility system is highly fragmented. This more than anything else affected the fortunes of nuclear power. Some of the utilities that jumped on the nuclear bandwagon were ready to take on nuclear responsibilities, but some were not. At one point there were about 80 utilities with commitments to nuclear plants, and there still are about 65.

This might have been less of a problem if the safety regulators had taken a firm hand and maintained tight discipline. Instead, very nearly the opposite was true. The regulatory system was weak by design.

Some History

In asking Congress for changes in the 1946 law, President Eisenhower explicitly stated in early 1954 that one goal of any new law should be minimum regulation for the new industry. Very early, AEC chairman Lewis Strauss told the Joint Committee on Atomic Energy that agency policy would be one of "exerting the minimum of control." He wanted regulations that would "not impose unnecessary limitations or restrictions upon private participation in the development of the atom's civilian uses," or "interfere with management practices."

Commissioner Willard Libby expressed his fear about strict regulation: "Our great hazard is that this great benefit to mankind will be killed aborning by unnecessary regulation." This attitude kept the AEC's small regulatory staff on the defensive from the outset. This had unfortunate consequences.

When serious safety problems of the larger plants began to be understood in the late 1960's, the regulatory system was unprepared to cope with them. It has never fully recovered its balance.

The question we should be asking is not, Why are there so many regulations and requirements and so much inspection? The question ought to be, Why is the system not more effective? We should all be thinking less about how to water down requirements, or stop new requirements, or get

the inspectors under control, and more about how we can ensure that regulatory review and inspection are sufficiently thorough so that all the safety bases are covered.

Slowing down safety requirements is not necessarily to your advantage. Let me give you one example. Last March, a plant in New England had a severe problem with failed bolts on a primary system manway. Now, more than two months later, the NRC bulletin to other licensees on corrective measures is still bogged down in cost-benefit analyses and risk assessments. It does not seem to me that solving an obvious mechanical boundary problem in the primary system requires review by armies of accountants and probabilistic risk analysts.

Consider this: You are all hostage to the worst performers in the industry. I don't have to tell you that what this industry can least stand is another serious accident, even if no one is hurt. Another Three Mile Island and you can kiss Wall Street financing good-bye.

In these circumstances, do you really want to rely on self-regulation? And however helpful INPO is, do you really think it can replace the NRC, which acts with tne force of law? I'll tell you that if I owned one of these plants, I would want the toughest possible NRC.

HEARINGS

Let me turn to the subject of hearings. I spoke of the recent trend by the Commission to come down hard on attempts by the Licensing and Appeal Boards to raise and resolve safety issues.

The latest example of the Commission's heavy hand involves the Licensing Board on the Summer Plant, which attempted to call its own witnesses on seismic safety because it was not satisfied that the staff or the applicant had shown the plant to be safe. The Appeal Board, apparently taking its cue from the Commission, ruled that the Licensing Boards may call their own witnesses only in a "most extraordinary situation" where the need is demonstrated "beyond question" and no other alternative exists -- obviously an almost insurmountable standard. The Commission decided last week not to review this ruling.

Before you cheer this turn of events (and I might add the applicant did not object to the Board's inquiry), you might reflect on the role of hearings in gaining the public's acceptance and support of nuclear power.

The hearing process, as it is conducted today, had its origins in the 1957 compromise that produced the

Price-Anderson Act. At first, hearings were conducted by examiners with no technical expertise. The process was adjusted in 1962 to permit use of Licensing Boards with two technical members. The rationale for the change was, in part, to allow for further technical review of dissent at this decision level. The change provided the added attraction of giving a greater public appearance of technical competence, and therefore enhancing the legitimacy of the licensing process.

It is also worth remembering that easy public legal accessability to nuclear power issues was created, not by those who currently utilize it, but rather by the nuclear community who saw national public confidence in nuclear power increased by an open licensing process.

In spite of this, there was constant griping about the licensing process. The AEC sought ways to streamline regulations at a time when these were ridiculously inadequate. In 1971, AEC Chairman Glenn T. Seaborg said "The procedures for regulating the use of atomic energy ... impose a serious financial and time-consuming burden on the licensees of the AEC. There is hope that the regulations can be streamlined ..." "Streamlining" has been a cliche ever since.

I'd like to make another observation on the scope of hearings. We cannot view the question of scope apart from federal preemption of state authority over all radiological health and safety issues. So long as there is not another forum, technical or political, where issues related to individual plants can be dealt with, then it is bad law and bad policy to take the narrowest possible interpretation of the scope of the nuclear licensing process -- at least in a democracy. You can't have it both ways. If you want a narrow technical scope for the NRC hearing -- which otherwise makes a lot of sense -- then you have to be willing to give up preemption of state authority, something for which I do not sense much enthusiasm in the nuclear industry. Failing that, you will have to put up with the present situation.

REPROCESSING AND THE BREEDER

The last point I would like to raise with you deals with the revival of the Government's love affair with reprocessing and the breeder. These don't have to do with regulatory reform, but they are part of the Administration's hoopla about a revival of nuclear power. And they affect our regulatory process.

The Administration's emphasis on commercial reprocessing as the right way to handle spent fuel, when it is clear there isn't going to be any commercial reprocessing, introduces

confusion over spent fuel storage and waste disposal, as well as possible legal uncertainties. It is a perfect example of ideology getting in the way of common sense.

This isn't the place to review the merits of the Clinch River Breeder Reactor, but those of you with responsibility for commercial plants under construction should understand when CRBR gets high priority at NRC, a commercial power reactor gets lower priority. My own preference is to exempt the plant altogether from licensing. High pressure tactics by the Administration in attempting to gain an exemption for CRBR have had a disruptive effect on the Commission. The whole thing is another expensive distraction for NRC.

CONCLUSION

I talked earlier about concentrating on the plants we have, and the need to build them right and run them right. We also want to keep open the possibility of building more of these plants should we want them and need them.

Again, the answer is the same. If the current plants don't have a good record over the next several years, there is little future for nuclear power; if they do have a gocd record, well, nothing will do more for the future of nuclear power.