

SPENT FUEL OPTIONS UNDER THE  
NUCLEAR WASTE POLICY ACT OF 1982

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## MONITORED, RETRIEVABLE STORAGE IN NUCLEAR WASTE POLICY

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### ABSTRACT

The Nuclear Waste Policy Act of 1982 establishes a program for the siting and construction of deep geologic repositories and also provides for the development of a proposal to Congress for the construction of facilities for the long-term monitored, retrievable storage of spent fuel and high level waste. The fundamental difference between these approaches to the long-term isolation of nuclear waste is that the former is irreversible and the latter is not. This paper discusses the motivations of the sponsors of the MRS provisions of the ACT, the legislative history of these provisions, and the current status of the implementation of the provisions by the Department of Energy.

### BACKGROUND

As far as the public is concerned, the major issue in the rather tortured history of the Nuclear Waste Policy Act of 1982 (NWSA, 42 USC 10101 et. seq.) is how or if the Federal government will take up its responsibility for the management of nuclear wastes. For the governors of States identified as potential hosts for these wastes and for the environmentalists, the issue is the extent to which the taking up of this responsibility can be influenced, including, in the limit, the extent to which outright obstruction of the program is permitted. For the electric utilities owning or planning to own nuclear power plants, the issue is the spent nuclear fuel they had always planned to deliver to the Federal government for treatment and disposal. Fuel that it often seemed they would never be able to deliver to anyone.

The NWSA purports to address these issues by establishing a schedule and a process for the siting and construction of deep underground "geologic repositories" for the irreversible disposal of spent fuel and high-level radioactive wastes. The Act requires nuclear utilities to pay, and they are now paying, 1.0 mills per kilowatt hour to support the program. At the time the Act was passed, its authors expected that the first geologic disposal facility would open for receipt of fuel and waste in the mid-1990's.

Until the 1990's, nuclear utilities will be responsible for the maintenance of the spent fuel they produce. Projections of "needed" temporary away-from-reactor spent fuel storage capacity are notoriously imprecise, but almost everyone agrees that by 1995 there will be at least a few, and probably several, thousands of metric tons of spent fuel without a home in the on-site storage facilities in existence today. The Act provides Federal authority to deal with a limited amount of the excess. Under the Act the Federal government could accept up to 1,900 metric tons of fuel for temporary away-from-reactor storage pending the opening of the first repository (section 1359a)).

However, the Federal government's ability to serve as a custodian of spent fuel is very limited.

Under the Act, no Federal away-from-reactor storage facility may store spent fuel for longer than three years (section 135(e)).

### MONITORED, RETRIEVABLE STORAGE

This paper discusses an entirely different approach to the management of spent nuclear fuel and high-level radioactive waste, namely, the long-term isolation of this material in a manner that permits "continuous monitoring, management, and maintenance of such fuel and waste for the foreseeable future" and provides for "ready retrieval of such fuel and waste for further processing and disposal". The portion of the Act that sets forth the monitored, retrievable storage (MRS) program is found in section 141 of the Act (42 USC 10161).

The essential difference between MRS and the geologic disposal technology envisioned in the Act is the matter of the control of the radioactive material. Under the Act the term "disposal" contemplates the eventual loss of such control and, for all practical purposes, irreversible reliance on natural geologic barriers to any return of radioactivity to the biosphere. A very large effort, involving both dollar and political costs, must be made under the Act to implement such a disposal policy.

The key to the MRS concept is the retention to human control over the radioactive material stored through engineered containment and monitoring in place of the natural barriers that may be provided by a geologic medium.

Retrievability is an attribute an MRS facility has in common with the temporary away-from-reactor storage facilities authorized -- in a very restricted sense -- in the Act. The difference between the two types of facilities lies in the length of time for which the facility is designed to operate. An away-from-reactor storage facility is explicitly temporary in nature. An MRS facility must be capable of storing waste safely for extended periods into the future.

Monitored, retrievable storage is assigned a secondary role in the NWSA. The Act requires the Secretary of Energy to submit to Congress a detailed proposal of the construction of an MRS facility, but it does not authorize such construction.

The MRS proposal is due to be submitted in June 1985, about the time, under the provisions of the Act, that detailed site characterization will be getting under way at three locations named by the President as "finalists" in the search for the location of the deep geologic disposal site. Further Congressional enactment providing for construction of an MRS would be required. The intent is that the new statute accomplishing this would be based on the information, designs and site recommendations contained in the June 1985 proposal that the Act does require.

#### LEGISLATIVE HISTORY

In the 96th Congress, the Senate's proposal for long-term isolation of spent fuel and high-level radioactive waste was essentially identical to the MRS provision contained in the 1982 Act. This provision had survived a challenge during Senate floor debate on the legislation by proponents of a nuclear waste policy based on geologic disposal. At the close of the 96th Congress, the House passed a nuclear waste bill that, among other things, would have established a schedule for the siting and construction of a geologic disposal facility. However, negotiations aimed at reconciling differences in the Senate and House bills, including differences between these two approaches to the problem of waste isolation over the long term, broke down as the 96th Congress ended.

The inclusion of an MRS provision on the NWSA is primarily the result of the persistence of Senators J. Bennett Johnston and Henry M. Jackson, who had sponsored the MRS concept in the 96th Congress and guided the corresponding legislative provisions through the Senate. The Senate came under Republican control in the 97th Congress, bringing new leadership to the Senate Committees. The Chairman of the Senate Committee on Energy and Natural Resources in the 97th Congress, Senator James A. McClure, was quite anxious to have bipartisan support for another attempt at enacting a nuclear waste policy. So McClure was not reluctant to support Johnston and Jackson in insisting that the MRS option be preserved in the NWSA.

The motivation for the supporters of MRS is a desire to provoke the Federal government into prompt and definitive action on the long-term management of spent fuel and high-level radioactive waste. The most straightforward method to achieve this is to adopt known technology and broaden the universe of possible sites. Long-term storage of highly radioactive material is generally thought to be possible without introduction of any significant new technology. Engineered, monitored containment can be sited in a wide range of environments independent of subsurface geology. Numerous sites for an MRS can be found that meet the necessary technical specifications.

Adoption of a MRS technology for the long-term isolation of spent fuel and high-level waste would represent a decision to do what can be done soon with high confidence of success. At the same time retaining the ability to retrieve the radioactive material would permit a change to any other improved management approach to become available.

It is beyond question that the absence of a credible Federal policy and program for the long-term management of nuclear waste was (and, despite the passage of the Act, is) one of the most difficult burdens the nuclear industry must carry. The opponents of expanded use of nuclear power have been successful in placing the responsibility for the existence of nuclear waste on the nuclear utilities. The NWSA embodies this attitude. However, as attractive as this allocation of blame may seem politically, the ultimate responsibility for nuclear waste management in fact lies with the Federal government. Without an effective Federal program, nuclear utilities cannot solve a problem with which they are inextricably involved. If the Federal program doesn't even exist, the situation is all the more hopeless.

The Senators sponsoring MRS hoped to create the requisite Federal program sooner than later. The MRS approach seemed ideally suited for this purpose.

#### IMPLEMENTATION

The Administration's support for MRS has varied from mild hostility to indifference. During negotiations leading to the enactment of the NWSA the Administration was ready at any time to have a nuclear waste law devoid of any reference to MRS. The survival of the provision mandating the MRS proposal was due to the need to keep those Members of Congress favoring the MRS option in the coalition supporting the legislation in the last month of the 97th Congress.

Since the enactment of the NWSA the Department of Energy has been very reluctant to act on the requirements of the NWSA that must be met if an adequate MRS proposal is to be prepared for Congress by mid-1985. The budget sent to the first session of the 98th Congress contained no funds for the development of the MRS proposal. Congress provided funding for the program. Administration spokesmen continue to refer to the MRS "study" contemplated in the Act. At Congressional hearings they are reminded that the MRS provision contemplates much more than a study. There has been no attempt by the Department to involve the States, local governments and Indian tribes in the process of selecting sites for the MRS facility, although the Act requires such consultation.

The MRS concepts selected by the Department for further development seem easier to understand as adjunct to the Department's geologic disposal program than as free-standing waste management option. Recently, the Department has realized the likelihood that a geologic disposal facility will not be available in the mid-1990's when Federal spent fuel storage capacity may be required or in the late 1990's when the Federal government is obligated under the Act to begin accepting the spent fuel for which the 1.0 mil-per-kilowatt-hour fee has been paid (section 302(a) (5) (B)).

To cope with these difficulties, the Department is apparently considering proposing construction of an MRS facility that would provide interim storage for spent fuel until the first geologic disposal facility is completed. The Act prohibits the construction of an MRS facility in any State containing a site undergoing characterization of its potential for geologic disposal. So such an MRS facility would have to be sited separately from any

geologic disposal facility and could not be located at a potential geologic disposal site. An interim storage role for an MRS facility is inconsistent with the NWPA, a problem the Department would have to convince Congress to address in the legislation implementing the June 1985 MRS proposal.

The Department's current intentions towards its obligations under the MRS provisions of the NWPA appear to fall substantially short of compliance with the Act. However, these intentions are evolving and it is difficult at any given time to know in detail what they are. It seems that this uncertainty will continue until the MRS proposal is actually submitted to Congress in 1985.

#### OPPORTUNITIES AND PROBLEMS

What would constitute compliance in good faith with the MRS provisions of the Act? The answer to this question is not difficult if one reads the Act. Section 141 of the NWPA requires an MRS proposal that is sufficient in its detail to solicit bids for the construction of the first MRS facility. The proposal must therefore be site specific. It must contain cost estimates, construction schedules, and engineering plans and specifications. It must provide a program for siting, development, construction and operation of MRS facilities -- a complete system design.

The MRS facilities must accommodate spent fuel and high-level radioactive waste from civilian nuclear activities. We know that spent fuel will be the principal waste form from civilian nuclear activities. Barring an entirely unforeseen change in policy and economics, the United States is not going to reprocess spent fuel from civilian nuclear power reactors in the foreseeable future. So we will have no civilian high-level radioactive waste to store (or dispose of) beyond that which exists today.

MRS facilities must be designed to store this fuel safely "as long as may be necessary". Thus the MRS system should be able to function long into the future in the event that no alternative storage or disposal program is implemented. In particular, the MRS system must function to safely store spent fuel in the very likely event that the Federal government decides not to dispose of such fuel irreversibly in a geologic disposal facility.

There may be good reason to want some option to be available to implement a retrievable storage system. In the late 1990's the nation's nuclear utilities will have large and overflowing inventories of spent nuclear fuel. These utilities will not have produced any processed high-level waste. The ratepayers of these utilities will have paid several billions of dollars to the Federal government for the development of a radioactive waste management system.

Under current policy, that system will consist of a single geologic disposal facility located deep underground and specifically designed to irreversibly dispose of radioactive material, not to store it. The material that this facility was intended to receive -- processed civilian high-level waste -- will be in short supply and will not constitute a significant management program for anyone.

So the disposal facility will have to be operated to handle spent fuel retrievably. The large amounts of dollar capital and political capital expended to insure that the facility can operate irreversibly may

seem to be an extravagance to those who paid.

When will the nuclear utilities of the United States produce glassified high-level waste for which a disposal facility would be designed? No one knows. We do know it won't be until well after the year 2000, if ever.

Nor do we know very precisely when the disposal facility itself will be available. The projected date that the first such facility will open has slipped significantly in the first year of the NWPA. It is almost inevitable that this date will slip further as the NWPA siting process unfolds. That process offers tremendous opportunities for anyone seeking to delay the construction of a geologic disposal facility.

None of this will slow the rate of production of spent nuclear fuel. That rate is governed by processes that are not affected by the NWPA. Continued operation of nuclear power plants will exhaust utility spent fuel storage capacity at some point. When this occurs something will have to be done by the Federal government to permit these plants to continue to operate.

#### CONCLUSION

The MRS option has advantages of flexibility, cost, technical manageability, assured safety and siting that ought to recommend it to the Department of Energy more than has been the case. It has been a continuous struggle to provide this option a chance at viability. That struggle has not ended, but it is proceeding more or less according to the schedule anticipated by the Congressional sponsors of the MRS provisions of the Act. In the past 25 years the Federal government has repeatedly postponed the establishment of actual facilities for the long-term management of nuclear waste. Seen in this context the current reluctance of the Department of Energy to comply with the MRS provision of the NWPA is disappointing but not surprising.

It is the task of Congress to insist that the Federal government actually assumes in some definitive way its responsibilities for the management of nuclear waste. It is possible to accomplish this under the NWPA, but it will not be easy. It will be a lot harder if the monitored, retrievable storage option continues to receive the inadequate attention that has so far characterized the implementation of this part of the Act by the Department of Energy.