MRS - THE NON-VIABLE ALTERNATIVE: A STAGING AREA TO NOWHERE

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ABSTRACT

The Department of Energy describes the Monitored Retrievable Storage facilities as a staging area for the high-level nuclear waste repositories. What is being proposed is unnecessary to repository operations and is at this time inappropriate to the mandate of the Civilian Radioactive Waste Management Office. Utilities have been charged with the responsibility for storing spent fuel, and are making significant progress. The DOE should focus its attention on establishing a suitable repository, as required by law.

INTRODUCTION

Congress, in developing the Nuclear Waste Policy Act (the Act), determined that "federal efforts during the past 30 years to devise a permanent solution to the problem of civilian radioactive waste disposal have not been adequate." I think we all agree with this quote from the Act. Congress proceeded to define the responsibilities and roles appropriate to various parties in order to establish a permanent repository for wastes. While we may not concur wholeheartedly with every detail in the Act, these responsibilities and roles have become law.

The Department of Energy (DOE) was directed by the Act to develop repositories. DOE has chosen to "hold their own feet to the fire" by broadening their mandate to include development of temporary storage facilities at one or more Monitored Retrievable Storage (MRS) sites. We should not be sidetracked. In 1985 the priority is the repository program. The MRS decision must wait until the program and its needs are better understood.

BACKGROUND

During the past 40 years high-level radioactive wastes have been accumulating at defense sites and spent fuel has been accumulating at commercial power reactor sites. The Act offers a unique opportunity: industry, governments, and public policy groups could work together in a framework which provides protections for each and a schedule to establish the nation's first repositories.

Among other assignments, the Nuclear Waste Policy Act directs the Department of Energy to prepare a detailed study of the need for, and feasibility of, one or more Monitored Retrievable Storage facilities for high-level radioactive waste and spent fuel assemblies. DOE is charged with submitting this report and a proposal to Congress by this June 1; DOE representatives have recently indicated that the proposal will be delivered next January. An interim status report may be delivered this June.

DATES SPECIFIED IN THE ACT

There are several dates specified in the Act. Siting Guidelines, Environmental Assessments, Defense Waste plans, and numerous other projects are all to be developed, and each with a specific delivery date.

In fact, no important dates have been met during the first 27 months of the Act. Some of these dates were not met for very good technical reasons, others because of inter-agency problems, and some for the most partisan of political reasons.

The only date alleged by DOE to be a directive, rather than guidance, is 1998, when DOE claims it is obligated to begin wholesale receipt of spent fuel from utilities. The DOE has seized upon a date which is mentioned one time in the Act, in the section which describes the Nuclear Waste Fund. This Fund is financed by a 1 mill per kilowatt hour surcharge on nuclear-produced electricity, and finances the nation's high-level nuclear waste repository program.

The Act states that "in return for the payment of fees..beginning not later than January 31, 1998, (the DOE) will dispose of the high-level radioactive waste or spent nuclear fuel.." If the word had been "accept" high level radioactive wastes, or "store" high-level radioactive wastes, the present MRS program proposal might be valid. But the Act clearly defines "disposal" as emplacement in the repository with no foreseeable intent of recovery. The portion of the Act which DOE claims to be the basis for the MRS is being misconstrued.

DOE should begin to dispose of spent fuel in 1998; if DOE is late opening the repository with good cause, it raises no greater problem than DOE's failure, for good cause, to meet other dates specified in the Act.

WHAT IS THE PROPOSED MRS?

The exact justification for the proposed MRS has remained elusive. The MRS is now proposed to be an integral part of the repository program. An important consideration is the perception that utilities need help and deserve federal assistance in spent fuel storage. The MRS would receive, handle, package, shape and adapt materials from reactors. The purpose is to maximize safety and minimize costs, and provide a staging area for wastes being transported to the MRS or the repository. In addition, the MRS would provide cooling time for the spent fuel.

The MRS would transfer certain functions away from the repository site, allow the repository to focus on geological replacement and confinement, and decrease the scope of the license application of the repository. It would serve from the mid 1990's throughout the life of the repositories and be available for 50 years after the last repository closes.

PROBLEMS WITH THE PROPOSED MRS

The primary problem with the MRS is that it is a concept which is being promoted without a factual data base. Although National Environmental Policy Act standards are encompassed in the Nuclear Waste Policy Act, the DOE has not implemented systematic processes to develop the data bases important for making major decisions. Current MRS proposals appear to be directives in search of a rationale; the MRS is built upon a foundation of presumptions.

The MRS proposal assumes that the utilities are either unwilling or unable to make progress in developing on-site storage options for spent fuel. It apparently assumes that the federal government can store spent fuel as cheaply at a federal site as the utilities can store it at their own sites. The Act clearly states that utilities benefiting from MRS will pay for the costs of MRS; DOE apparently assumes that utilities will accept and financially support the proposed MRS in addition to the costs of the mandated repository program.

The cost of the MRS is an important unknown. This summer some of the first official cost estimates should be available. In the meantime, Ben Cooper estimates about $1 billion, and another study makes various estimates based upon differing designs which range from $2 to 4 billion.[1]

The proposed MRS offers time for cooling of spent fuel. It takes about 45 years for 10-year old fuel to decay to half the heat level; much of the fuel sent to a repository would be at least 25 years old. The requirement or benefit of cooling spent fuel has not been established. If we make a decision now to emplace 45-year old fuel, we will have to ignore the 1998 goal. The Act allows even 5-year-old fuel to be emplaced in the repository, and no technical reason has been presented to overturn one of the fundamental requirements of the Act.

The MRS is claimed to increase safety and cut costs. However, in the absence of specifics, these claims are weak.

The references to transferring functions to an MRS and away from a repository are not consistent. If the repository would not provide facilities for receiving spent fuel from a nearby reactor site, then shipping of spent fuel would be required to first a far-away MRS, and then back to the repository. If the MRS might be filled, there would be no repository option for accepting wastes. Should the repository be incapable of on-site storage of spent fuel casks which might have to be removed from the tunnel areas of operation for a short time? Should the repository be designed as incapable of repackaging fuel damaged on site? Would it be less difficult to license a repository without these handling and storage services? Or would it be more reasonable to build and license these facilities at the repository site?

Preliminary information indicates to me that an MRS would duplicate licensed functions provided at the repository. The "certain functions" which are proposed to be transferred away from the repository do not appear completely transferable. Duplication of facilities would be required, more design and construction activities for the nuclear waste program; handling and transportation do not seem to be reduced. Instead of simplifying licensing, many more licensing processes would be required, and at numerous sites. Most importantly, we do not now have enough information to justify an MRS or to make fundamental decisions regarding important functions an MRS might provide some time in the future.

The MRS is proposed to offer rod consolidation services to the utilities. Consolidation offers a particular kind of volume reduction. Spent fuel rods from two fuel assemblies can be removed and placed into a new container which is the size of one fuel assembly. This reduces the volume of high-level wastes which must be transported to the repository, and it enables the use of more standarized canisters than might be used if the fuel had not been consolidated.

Considerable confusion regarding the MRS is associated with the proposed practice of wide scale rod consolidation. This idea has been assumed to be trouble free, economically viable, and beneficial to repository operations. As we gain experience with rod consolidation, we may come to these conclusions, but at this time we do not have sufficient experience to make an informed judgment.

During the consolidation process wastes are generated which must be disposed of. Fuel assembly structural components and other wastes resulting from rod consolidation have traditionally been sent to Washington State and South Carolina for burial. That option is not necessarily available in the future. It is possible that regional compacts will choose not to accept such materials for shallow land burial. If so, the rod consolidation wastes would probably be packaged into another cask and sent to the repository - or stored until the repository is available. This may not decrease the volume of nuclear wastes generated and transported.

Justifying the need for the MRS will be critical during the siting process. Both the justification for the MRS and political problems of siting such a facility have been discounted by DOE. Without a clear and present need, local challenges would impede a repository program which is dependent upon an MRS facility. The proposed facility, with an active life of 100 years or more may not be regarded as "temporary" in the minds of its potential neighbors.

ALTERNATIVES TO THE MRS

The basic premise that utilities need help in storing spent fuel is not obvious. In the two years since the Act was passed, most utilities have looked closely at a number of options for increasing their capability for managing spent fuel on site. Their efforts have been successful. On-site cask storage is expected to be licensed. Pool storage can be greatly increased beyond present practices when very detailed structural and seismic analyses are undertaken; spent fuel capacity has been increased beyond reracking by about a factor of 4 using this tool.[2]

Some exciting work with full cycle cask concepts indicates that spent fuel can be removed from the fuel pool and stored in a dry cask at the utility site.[3] That same cask can later be used for transportation, and perhaps even for disposal. If this option can be pursued, many handling options can be avoided. Preliminary costs appear competitive.[3,1] Most importantly, spent fuel can be managed at the utility site by the utility as specified in the Act, and DOE can focus its attention on repository development.

If utilities begin programs to undertake the extended burnup of fuel, fewer spent fuel rods will be generated in the future. Although the Civilian Waste Management Office has judged that extended burnup fuel would be too hot thermally and in curie content to be safely transported and emplaced in the repository[4], that has not yet been clearly established. Extended burnup fuel may be cooler than consolidated fuel, with similar volume reductions. Much less handling is required, and with less anticipation of and planning for possible future repository needs.

Extended burnup of fuel, increased from 30,000 to 45,000 megawatt days per metric ton of uranium, is now being accomplished at some utilities. Extended burnup allows more efficient use of fuel assemblies because 50 percent more electricity is generated from the same size fuel assembly.

CONCLUSION

The need for MRS and the services it might offer are not useful to repository development projects in 1985, and may be irrelevant to repository operations in the year 2000. We who are charged with the responsibility for establishing a repository have important tasks to accomplish this year if we are to comply with the Nuclear Waste Policy Act.

If the nuclear industry survives its present doldrums, it will have to develop public confidence through the design, sale, and efficient performance of light water reactors. The establishment of a repository site is also important to public confidence.

If the DOE would set aside the MRS it could use more time and resources to work with the states, improve communications and trust, improve the working plan, and build public confidence that the repository program will be successful. Years ago the Office of Technology Assessment targeted public confidence as the most critical factor in siting a repository. Few would disagree with that conclusion, but DOE is failing to appreciate its importance.

Prior to developing specific MRS plans, a number of clarifications are required. At least one repository site should be identified so that the MRS location can be efficiently located. The utilities' need for federal assistance in storing spent fuel, and utility agreement to fund the MRS, should be clearly established. Technical understanding of many of the other premises now serving as the foundation of the program should be clarified. Most importantly the DOE should improve its methodology so that a credible program can develop. One of the persistent problems in the Civilian Radioactive Waste Program is the shaping of rationales to justify premature decisions. The MRS example is not the only instance in which facts appear to be arranged to suit a premature or an apparently political decision.

Finally, some sort of broadly based continuous oversight for the repository program is required. The only present oversight is provided by Congress at a few critical points in the program. Because priorities are becoming obscured and expensive mistakes may be made, improved communication and consensus building activities should be made into a high priority.

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