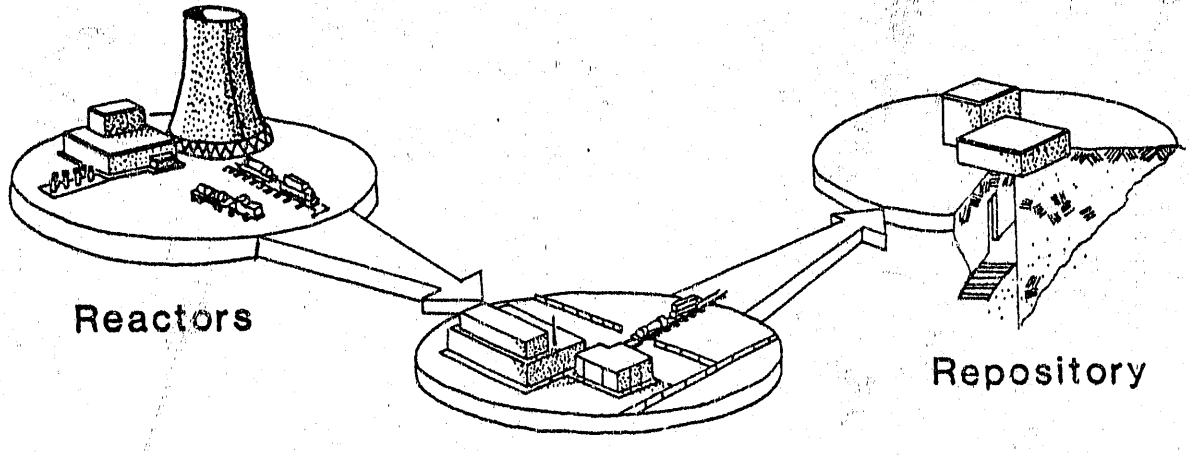
DOE/OR/21555--T4

CLINCH RIVER MRS TASK FORCE

DOE/OR/21555--T4

DE92 011926

RECOMMENDATIONS ON THE PROPOSED MONITORED RETRIEVABLE STORAGE FACILITY



OCTOBER 1985

FG05-85OR21555

Roane County/City of Oak Ridge

Tennessee

MASTER

DISCLAIMER

Submitted to the Tennessee
Department of Health and Environment

as partial completion

of

Contract No. GG0335

October 24, 1985

RESOLUTION

WHEREAS, the Department of Energy (DOE) has proposed the construction of an integral Monitored Retrievable Storage (MRS) facility in the Roane County portion of Oak Ridge, Tennessee; and

WHEREAS, the Clinch River MRS Task Force was appointed in July 1985 by the Roane County Executive and the Oak Ridge City Council to evaluate the proposed MRS facility; and

WHEREAS, the Task Force, made up of three study groups, has spent several months of detailed study and careful evaluation of the MRS concept, including numerous public meetings, and has conducted site visits to relevant facilities; and

WHEREAS, the Task Force has determined that the facility could be safely built and operated in the Roane County portion of Oak Ridge, provided certain concerns are addressed and impacts mitigated; and

WHEREAS, the MRS would not be seen as a beneficial addition to the region's economic base unless DOE is required by the Congress of the United States to comply with stringent but reasonable conditions equivalent to those recommended by the Task Force.

NOW, THEREFORE, BE IT RESOLVED BY THE MEMBERS OF CLINCH RIVER MRS TASK FORCE:

That the attached summary of the study groups' reports on the proposed Monitored Retrievable Storage facility is hereby adopted as the official position of the Clinch River MRS Task Force.

BE IT FURTHER RESOLVED that the Roane County Commission and the Oak Ridge City Council are encouraged to adopt and support the recommendations in this summary as the official position of the two local governments.

BE IT FURTHER RESOLVED that the State of Tennessee, the Department of Energy, and the Congress of the United States are encouraged to incorporate and support the position of the Clinch River MRS Task Force within the MRS authorizing legislation and agreements mandated therein.

This Resolution is approved by the Clinch River MRS Task Force on the 10th day of October 1985.

Kenneth E. Yager
County Executive - Roane County
Executive Committee
Clinch River MRS Task Force

Roy F. Pruett
Mayor - City of Oak Ridge
Executive Committee
Clinch River MRS Task Force

Robert W. Peelle
Chairman
Environmental Study Group

Larry M. Dickens
Chairman
Socioeconomic Study Group

Shirley P. Hendrix
Chairman
Transportation Study Group

NUMBER 10-154-85

RESOLUTION

WHEREAS, the Nuclear Waste Policy Act of 1982 calls upon the Department of Energy (DOE) to prepare recommendations regarding the need for and location of Monitored Retrievable Storage (MRS) facilities to handle spent nuclear fuel destined for permanent repositories, and

WHEREAS, the Clinch River MRS Task Force has been jointly appointed by the Roane County Executive and the City Council of Oak Ridge to evaluate the MRS facility proposed by DOE to be constructed in the Roane County portion of Oak Ridge, and

WHEREAS, for several months the Clinch River MRS Task Force has carefully evaluated the proposal and has arrived at a position on the MRS which identifies the communities' concerns, describes the potential impacts of the proposed facility, and recommends appropriate mitigative measures, and

WHEREAS, it is the position of the Clinch River MRS Task Force that, if DOE is required by Congress to comply with those stringent but reasonable mitigative measures, the proposed MRS could be safely built and operated and would constitute a beneficial addition to the region's economic base with no harmful effects ensuing.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCILMEN OF THE CITY OF OAK RIDGE, TENNESSEE:

That he City Council of Oak Ridge hereby adopts the position of the Clinch River MRS Task Force as its own and encourages the State of Tennessee, the Department of Energy, and the U.S. Congress to support the incorporation of the position into the MRS legislation and associated agreements.

BE IT FURTHER RESOLVED that with the compliance of the conditions set forth in the adopted position, the City Council of Oak Ridge would willingly accept location of the proposed MRS facility within its jurisdictional limits.

BE IT FURTHER RESOLVED that the Clinch River MRS Task Force is hereby authorized to promote with State- and Federal-appointed officials full understanding and consideration of the City's adopted position.

This the 21st day of October 1985.

APPROVED AS TO FORM
AND LEGALITY:

William E. Lantrip
City Attorney

Mayor

Jacquelyn J. Bernard
City Clerk

IN THE COUNTY COMMISSION FOR ROANE COUNTY, TENNESSEE

FILED
OCT 16 1985

A RESOLUTION adopting the recommendations in the October 10 report of the Clinch River MRS Task Force

WHEREAS, the Clinch River MRS Task Force appointed by the Roane County Executive and the Oak Ridge City Council has submitted a report to the governing bodies requesting the adoption of a series of recommendations.

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of Roane County, meeting in special session on October 22, 1985, does adopt the recommendations in the October 10 report of the Clinch River MRS Task Force. Roane County thereby accepts the position that based on information to date, the MRS facility could be acceptable to Roane County and provide a net economic benefit to our citizens if conditions equivalent to those in the Task Force Report are securely satisfied by the authorizing legislation and intergovernmental agreements provided for by that legislation.

BE IT FURTHER RESOLVED that the State of Tennessee and the Tennessee Congressional Delegation are asked to help obtain adoption of the requested conditions.

BE IT FURTHER RESOLVED that the State of Tennessee and The Department of Energy are thanked for their strong cooperation with the Clinch River MRS Task Force.

Upon motion of Commissioner Langley, seconded by Commissioner Crews, the following Commissioners voted

Aye: Crews, Delaney, Dutton, Ferguson, Hatfield, Hacker, Honeycutt, Housto, Langley, Money, Renfro. (11)

The following Commissioners passed: None

The following Commissioners voted No: None

Thereupon, the County Chairman announced to the Court that said resolution had received a constitutional majority and ordered same spread of record.

APPROVED:

County Chairman

The foregoing resolution was submitted to the County Executive for his consideration this 22 day of Oct., 1985.

ATTESTED:

Dorothy M. Marshall, County Clerk

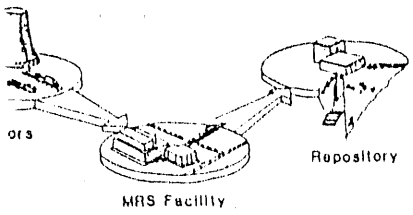
I approve/veto the foregoing resolution this 22 day of Oct., 1985.

County Executive

STATE OF TENNESSEE
COUNTY OF ROANE
Attest:
Dorothy M. Marshall
Clerk

SUBMITTED BY: TEELLE FOR THE CLINCH RIVER MRS TASK FORCE

Certified a true and correct copy
October 22 1985
Month Day Year
By Vickie L Shoate



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

Clinch River MRS Task Force

POSITION ON THE PROPOSED MONITORED RETRIEVABLE STORAGE FACILITY

ABSTRACT: The Clinch River MRS Task Force was appointed in July 1985 by the Roane County Executive and the Oak Ridge City Council to evaluate the Monitored Retrievable Storage (MRS) facility proposed by the Department of Energy to be constructed in the Roane County portion of Oak Ridge. After several months of study, numerous public meetings, site visits to relevant facilities, and careful evaluation of the integrated MRS concept, it is the considered opinion of the Task Force that the facility could be safely built and operated in Roane County/Oak Ridge. However, an MRS facility constructed in the Roane County portion of Oak Ridge would not be generally perceived as being safe by the citizens of Roane County and Oak Ridge unless the recommendations of the Task Force are prescribed to be implemented by the MRS authorizing legislation. Moreover, unless the listed concerns are addressed and impacts mitigated, the MRS would not be seen as providing net economic benefit to the local communities, region, and state. Provided DOE is required by Congress to comply with stringent, but reasonable, conditions recommended by the Task Force, the group finds that the MRS facility could be made acceptable to the communities of Roane County and Oak Ridge. The Roane County Commission, Oak Ridge City Council, State of Tennessee, United States Department of Energy, and Congress of the United States are requested to adopt the recommendations of the Clinch River MRS Task Force.

Monitored Retrievable Storage

The Nuclear Waste Policy Act of 1982 requires the Department of Energy (DOE) to provide for the development of deep, geologic repositories for the disposal of spent nuclear fuel and other high-level radioactive wastes and to submit for Congress' consideration a proposal on the need for one or more Monitored Retrievable Storage (MRS) facilities. Although the MRS was initially considered as a backup for a repository, DOE determined that the facility would perform a more effective role as a receiving, packaging, and lag storage center handling fuel assemblies en route to the repository. The MRS proposed by DOE and evaluated by the Task Force is often referred to as an Integral Monitored Retrievable Storage or I-MRS facility.

The Clinch River MRS Task Force

Following the Department of Energy's announcement in April 1985 that three Tennessee sites were to be considered for the Monitored Retrievable Storage facility, Governor Lamar Alexander initiated a review of the proposal to be coordinated by his Safe Growth Team. Roane County and the City of Oak Ridge, the local governments sharing jurisdiction over DOE's primary and secondary sites, were invited to participate in the state's review of the MRS proposal. A similar invitation was provided to local governments in the Hartsville area, location of the third alternative MRS site. The Clinch River MRS Task Force was devised as a means of accomplishing a local evaluation of the Oak Ridge sites. To defray expenses incurred by the Task Force, a $100,000 grant was awarded by the Tennessee Department of Health and Environment from $1.4 million provided by DOE to fund the state's review of the MRS proposal.

Many issues related to the proposed MRS are being considered by the Governor's Safe Growth Team. The primary objective of the Clinch River MRS Task Force has been to determine whether the proposed Monitored Retrievable Storage facility should be accepted by the local governments, and if so, under what conditions. The Task Force has not addressed the question of need for the MRS or the rationale employed by DOE in recommending that it be constructed in Tennessee. It is the belief of the Task Force that these are issues to be resolved by Congress, not by the local communities.

The 31-member Task Force is composed of an equal number of appointees from the County and City, with staff support provided by the City of Oak Ridge. The Clinch River MRS Task Force is organized into an Executive Committee cochaired by the Roane County Executive and Mayor of Oak Ridge and three Study Groups focusing on environmental (including health and safety), socioeconomic, and transportation issues. Each eight-person Study Group is composed of an elected County Commissioner and City Councilman, three citizens appointed by the County, and three citizens appointed by the City. Each Study Group is supported by a City staff person. Additional support is provided as needed by the two local governments, interns, and consultants.

Task Force members have contributed considerable time in evaluating the MRS proposal. The Task Force as a whole has conducted monthly work sessions and business meetings since its establishment. Study Groups have typically held weekly work sessions. In addition, the Task Force and its Study Groups have sponsored several special events designed to involve the entire community in the evaluation process. All meetings have been open to the public. To supplement the series of public meetings, Task Force members have visited relevant federal and private facilities. Sites visited have included a fuel handling facility at Morris, Illinois, operated by General Electric; low-level radioactive waste facilities in Barnwell, South Carolina, operated by Chem-Nuclear; fuel handling and storage facilities at DOE's Idaho National Engineering

Laboratory and DOE's Nevada Test Site; and cask testing facilities operated for DOE by Sandia National Laboratory at Albuquerque, New Mexico. Cask testing and reactor fuel handling sites at the Oak Ridge National Laboratory were also visited, as was the Radiation Emergency Assistance Center/Training Site operated by Oak Ridge Associated Universities.

The Department of Energy is scheduled to present its recommendations on the MRS facility to Congress in mid-January of 1986. At the time of its inception, the Clinch River MRS Task Force determined that its initial position on the proposal to place the MRS facility in Oak Ridge should be completed in time to be of use to DOE in the preparation of those recommendations. Consequently, it has been necessary for the Task Force to complete its evaluation within a very limited time frame. The Department of Energy has not yet issued its environmental assessment of the proposed facility, and a full environmental impact statement (EIS) is not required until the MRS is authorized by Congress. The Clinch River MRS Task Force and the local government it represents, anticipating full participation in the review of these and other important forthcoming documents, reserve the right to modify positions taken based on information yet to be presented.

The Nuclear Waste Policy Act establishes a unique process of consultation between DOE and state and local governments. This is a welcome step in the improvement of intergovernmental relations. In its prompt response to written and verbal questions and requests for available information, the Department of Energy has been most cooperative in assisting the Clinch River MRS Task Force to complete its initial review. DOE and contractor personnel have been available at most, if not all, Task Force meetings to answer questions.

Summary of Findings

Based on its review of the proposed MRS facility and its expectation that Congress and the state will adopt the conditions recommended below, the Clinch River MRS Task Force concludes the following:

1. Spent nuclear fuel and other high-level radioactive wastes can be safely transported.

   - Spent nuclear fuel is highly radioactive, and exposure to even low levels of radiation over sufficiently long periods of time can cause harmful health effects. However, spent nuclear fuel is not explosive. Nor is there risk of a self-sustaining nuclear reaction within a shipping cask.

   - Spent fuel shipping casks are heavily shielded and constructed so as to protect the public from any significant radiation levels.

- The NRC-licensed casks designed for shipment of spent nuclear fuel provide for containment of their contents in the event of accidents. Extensive testing has proven that such casks can provide for safe shipment of fuel assemblies to and from the proposed MRS. Any future casks will be subject to the stringent regulations required of current casks.

- The federal government and nuclear industry have safely transported nuclear waste materials for nearly 30 years, including hundreds of spent nuclear fuel shipments through Tennessee. There has never been an accidental release of radioactive material in the transport of spent nuclear fuel.

- The state would determine by which Tennessee routes spent fuel will be shipped to and from the proposed MRS facility. The rail line upgrades and roadway upgrades and improvements for State Routes 58 and 95 recommended by the Task Force would support safe travel from the main rail line and interstate to the proposed MRS sites.

- Shipments of spent nuclear fuel are already strictly regulated for safety and security purposes and provide an adequate margin of safety. If the escort and inspection procedures recommended by the Task Force are adopted, the margin of transportation safety would be enhanced.

- The emergency response planning procedures and DOE-provided first responder training program recommended by the Clinch River MRS Task Force would prepare the state and local governments to deal with any accident involving the transport of spent nuclear fuel.

2. Based on the best information currently available to the Task Force, either the preferred Clinch River site or the secondary DOE Reservation site could accommodate the proposed MRS facility from an environmental viewpoint.

- Ecosystem damage does not appear so significant as to be an overriding factor in determining location of the proposed MRS facility at either Roane County/Oak Ridge site. Mitigation of ecological and scenic impacts would be possible following the recommendations of the Task Force.

- Site design of the proposed MRS seems to assure that its component facilities would be properly placed relative to natural features. This region is not prone to significant earthquakes, the proposed sites are located will above flood levels, and the underlying rock formations will support the MRS receiving and handling facility.

3. The proposed MRS facility can be safely constructed and operated.

- The MRS facility would be fully licensed by the Nuclear Regulatory Commission (NRC), which would regulate its construction and operation.

- In addition to NRC regulations, the construction of the proposed MRS would be subject to numerous federal, state, and local codes, as well as industry standards.

- The construction methods and operating technologies of the proposed MRS are already largely proven.

- All fuel assemblies would be remotely handled in "hot cells" to protect workers and the surrounding population. The facility would be constantly monitored to detect radiation levels, and sufficient redundancy in environmental control and monitoring systems would assure that performance standards are met.

- Compared to a conventional factory or processing plant, the MRS would be a relatively "clean" facility. NRC regulations control any liquid, solid, or gaseous escapes, and limit such releases to the outside environment.

- Radiation monitors located inside and outside the MRS facility would ensure detection and warning of accident conditions.

- Typical background radiation levels from natural and medical sources are between 100 and 200 millirem per year in the East Tennessee area. Operational radiation exposure to a person living near the proposed MRS facility is stated to be less than an additional millirem per year.

- Adoption of Task Force recommendations regarding establishment of an MRS Environment, Safety, and Health Review Board and the implementation of a Community Environmental Monitoring Program would ensure local oversight of regulatory activities. Such oversite would provide the population surrounding the proposed MRS increased understanding and thus increased confidence in the environmental release data.

4. The proposed MRS facility could benefit the economies of the local communities, the region, and the State of Tennessee.

- The proposed MRS facility would employ approximately 750 contractor and DOE personnel. Annual operating costs, including payroll expenditures, would be approximately $50 million.

- Construction of the MRS facility itself would cost approximately $1 billion. Costs for on-site storage casks would eventually

amount to approximately $300 million. Research and development activities associated with transportation issues could cost more than $200 million. Expenditures associated with transportation cask production and transport could total $3 billion. With adoption of Task Force recommendations to encourage the procurement of goods and services from Tennessee vendors, a portion of this business would stay in the state.

- Potential support and satellite activities associated with the MRS would include training, transportation, metals technology, waste packaging, laser cutting, and robotics.

- As recommended by the Task Force, annual impact assistance payments equivalent to tax revenue on a $1 billion industrial facility would be made to state and local governments from authorization of the MRS until its operation, and again from cessation of operations until its complete decommissioning.

- Assuming adoption of Task Force recommendations, during operations the MRS would pay grants equivalent to all state and local taxes, annually generating several million dollars in much needed public revenue.

Summary of Concerns, Anticipated Impacts, and Recommended Mitigations

Even assuming the proposed MRS facility would contribute to resolution of the nation's spent fuel disposal problems, an MRS constructed in Oak Ridge would neither be acceptable nor provide net economic benefit to the local communities, region, and state unless certain critical concerns are addressed and impacts mitigated. The most important issues identified by the Clinch River MRS Task Force are enumerated below, along with recommended mitigating actions. Because the process of MRS authorization and construction would be a long one, it is important that mitigative measures be agreed to early and formalized in binding agreements. However, it should be noted that the Task Force is at this point most interested in making clear its objectives, not necessarily in dictating the specific means for achieving them.

1. Without diligent adherence to rules, regulations, and safety procedures, the MRS could adversely impact the surrounding population and local environment. Monitored Retrievable Storage health and safety issues are considered by the Clinch River MRS Task Force to be of primary importance. It is critical that the following recommendations be adopted:

   1.1. A citizen MRS Environment, Safety, and Health Review Board should be established to represent the communities' interests

during construction, operation, and decommissioning of the proposed MRS facility. The Board would be characterized as follows:

1.1.1. An equal number of Board members would be appointed by Roane County, the City of Oak Ridge, and the state.

1.1.2. The Board would operate under formal arrangements with responsible federal agencies. It would not supplant regulatory agencies responsible for activities at the proposed MRS and, to the greatest extent possible, would make use of data collected by those agencies. However, the Board should have the authority to conduct its own inspections and collect additional data as needed.

1.1.3. The Board should participate in the development of environment, health, and safety performance standards and criteria for the MRS facility and have access to all information on the condition of shipments arriving at the MRS, effluents released to the outside environment, radiation exposure to workers and the surrounding population, accidents, and incidents as classified by the NRC.

1.1.4. Procedures should be developed whereby the Board could cause a suspension of operations if releases at the MRS are above action levels jointly preestablished with DOE and regulatory agencies.

1.2. Management of plant operations should be designed to limit the potential for harm to workers and the surrounding population. Such procedures should incorporate the following:

1.2.1. Local environmental and demographic parameters should be used to evaluate the consequences of air or liquid releases. Performance standards and graded action levels should be developed for evaluating and responding to releases.

1.2.2. Performance standards should require a vigorous "As Low As Reasonably Achievable" (ALARA) program to control radiation exposures, and sufficient redundancy of control and monitoring systems should be utilized to assure that standards are met.

1.2.3. All information on radiation releases and accidents should be made available to the proposed MRS Environment, Safety, and Health Review Board as well as to the general public.

1.2.4. A Community Environmental Monitoring Program similar to the one operated by EPA at DOE's Nevada Test Site should be established well in advance of MRS operations.

1.3. Research, development, and rigorous testing should continue on prototypes of spent fuel transportation and storage casks so that those models put into service in conjunction with the proposed MRS facility are proven to effectively withstand accident conditions and contain radioactive materials.

1.4. Transportation safety should be enhanced by means of "gold star" inspections performed at the originating point of each spent fuel shipment and again at the MRS facility. Shipments out of the MRS to the permanent repositories should be subject to identical inspections. These inspections, conducted by personnel independent of DOE, should guarantee compliance with rigid standards relating to radiological, vehicle, and personnel safety. Those conducting such inspections should have authority to detain noncomplying outgoing shipments and to levy stiff penalties for noncompliance with applicable standards.

1.5. For purposes of assuring continuing communications and rapid response to emergencies, each spent fuel shipment to and from the MRS should be accompanied by a single vehicle escort.

1.6. As the NRC licensee for the MRS facility, DOE should assume the lead role in developing emergency response procedures to be followed by local and state public safety personnel in the event of an accident involving spent nuclear fuel. First responders from local and state agencies should be trained and equipped by the federal government with associated costs, including partial operations funding, borne by the Nuclear Waste Fund.

1.7. The local governments in the MRS site area (e.g., those in Anderson, Knox, Loudon, and Roane Counties) would experience the greatest transportation impacts from operation of the facility. Formal opportunities should be granted for local governments in this area to address with DOE such transportation issues as routes, travel speeds, and operating procedures. The Task Force at this time specifically recommends the following:

1.7.1. Both state roads 95 and 58 should be designated as preferred routes for transport of spent nuclear fuel from the interstates to the proposed MRS. Use of other existing routes should be prohibited except in the case of emergencies.

1.7.2. Costs for necessary improvements to state and local routes used for transport of spent fuel to and from the MRS should be borne by the federal government outside the normal allocation of highway funds to the State of Tennessee.

1.7.3. Spent fuel should be transported on railroad tracks in Tennessee that meet Class IV structural standards. The rail links between main lines and the MRS facility should meet these standards.

1.8. To mitgate the adverse construction impacts on private property surrounding the proposed MRS facility, the Task Force recommends establishment of a heavily landscaped buffer around the selected site and adherence to state and local noise, blasting, erosion, and other development codes.

1.9. The secondary radioactive waste generated at the proposed MRS (i.e., assembly fittings, contaminated gloves and protective clothing, etc.) should be disposed of outside Tennessee.

1.10. To address concerns regarding long-term site conditions, a plan should be established before operations at the MRS begin outlining how the facility would eventually be fully decommissioned and decontaminated so that the site can be made available for unrestricted use at the earliest possible date.

2. The proposed MRS facility could delay construction of the geologic repository and become a de facto site for permanent spent fuel storage. Despite clearly stated national policy to the contrary, there are legitimate concerns that once in operation, the MRS would relieve pressure on DOE and the Congress to follow through on plans to construct a permanent repository. The Task Force recommends that MRS-authorizing legislation specify the following:

2.1. No more than 300 metric tons of spent fuel should be received by the MRS facility before a construction license is granted for the permanent repository.

2.2. No more than 10,000 metric tons of spent fuel should be received before the out-shipments of consolidated fuel rods begin to the permanent repository.

2.3. Any proposed extension of the MRS storage capacity beyond the 15,000 metric tons currently envisioned should be subject to the same review and notice of disapproval procedures followed to initially authorize the MRS.

2.4. Any spent fuel stored at the MRS longer than 15 years should be subject to a significant "overdue-removal penalty" levied by the state.

3. The MRS facility could hinder the communities' efforts to diversify and expand their commercial/industrial base. There is concern that the MRS, if handled as just another federal facility, would significantly impede the local communities' efforts to achieve a strong and more diversified economic base. In addressing this concern, the Clinch River MRS Task Force recommends the following:

3.1. With regard to permanent repositories, Section 116(c) of the Nuclear Waste Policy Act directs that host jurisdictions receive grants equal to taxes that would be paid were the facilities privately owned. Authorizing legislation should ensure these or equivalent provisions apply to the MRS as well. Such authorization should additionally provide for:

- Coverage for all local and state taxes, including real and personal property taxes; and

- Specification of how tax equivalency will be administered, including valuation formulas, and for an arbitration board or alternative means for settling disputes.

3.2. Annual impact assistance payments commensurate to grants equal to taxes paid on a $1 billion facility should be provided to the state, Roane County, and the City of Oak Ridge beginning with the date of Congressional authorization of the MRS and continuing until grants equivalent to taxes are made on the constructed facility. Such impact assistance payments should again be made from cessation of operations at the facility until it is completely decommissioned.

3.3. The management of MRS design, construction, and operation, as well as management of transportation for the entire civilian radioactive waste program, should be relocated to DOE's Oak Ridge Operations office.

3.4. Proximity to Oak Ridge should be established as a significantly weighted selection criterion for MRS procurement so that, to the fullest extent possible, all related research, development, goods, and services are acquired from within the communities, region, or state.

3.5. To the greatest extent possible, all MRS related activities should be conducted in the private sector and on privately owned facilities.

3.6. A significantly weighted criterion for selection of major contractors to construct, operate, and provide services to the proposed MRS facility should be the commitment of those firms to the diversification of the communities' economic base. All contractors selected should be expected to bring non-DOE business into the communities.

3.7. Programs necessary for MRS and transportation system employee training should be provided through local educational institutions.

3.8. To assist in the communities' continued industrial development activities, DOE should make available for purchase at full market value an industrial site in the Roane County portion of Oak Ridge which is equivalent to the Clinch River site.

4. Public trust in DOE has seriously eroded. Environmental problems, long-standing debates on issues of taxation, and DOE's historically poor relations with the communities and state leave many skeptical that DOE's assurances regarding the MRS will be fulfilled.

4.1. Section 117(c) of the Nuclear Waste Policy Act provides for "consultation and cooperation" (C & C) agreements between DOE and the state. The MRS-authorizing legislation should provide for C & C agreements directly betweeen DOE and units of local government as well as between DOE and the state.

4.2. In its authorization of the MRS, Congress should specify DOE's compliance with Task Force recommendations contained herein, whether through C & C agreements or other means. The C & C agreements must be completed before the state's right to issue a notice of disapproval expires. In authorizing the MRS, Congress should provide that the right to issue a notice of disapproval expires at the end of the 60-day period specified by the Nuclear Waste Policy Act or six months after commencement of C & C negotiations with state and local governments, whichever is later.

4.3. The local governments should be granted preferred status in continuing interactions with the state, DOE, and NRC regarding the MRS. The communities' future recommendations should be given full consideration and, when appropriate, incorporated into C & C agreements.

4.4. A schedule for bringing all DOE Oak Rige Operations facilities into compliance with state and federal environmental regulations should be established prior to Congressional authorization of the MRS, and clean-up programs should be implemented to the satisfaction of regulatory agencies prior to commencement of MRS operations.

4.5. Establishment of the aforementioned MRS Environment, Safety, and Health Review Board and Community Environmental Monitoring Program should be implemented as means toward ensuring public confidence in the safe operation of the proposed MRS facility.

4.6. A simple and inexpensive procedure to guarantee private property values surrounding the MRS site and along the railroad spur serving the MRS facility should be implemented by DOE.

5. The MRS may be perceived as a "nuclear waste dump." DOE's environmental record has adversely impacted the regional and national image of Oak Ridge. Although the "waste dump" label already given the proposed MRS by many throughout the state can be proven erroneous, it exacerbates the problems Oak Ridge now experiences in maintaining its image as a high quality community. In accepting the proposed MRS facility, the local governments should be assured that DOE will accept the following recommendations:

5.1. DOE should finance a significant preoperational public education program, beginning upon authorization of the MRS, conducted by the County and City to highlight progress being made by DOE in resolving environmental problems and to promote the communities' favorable quality of life.

5.2. Upon authorization of the MRS, DOE should construct, support, and promote new exhibits in the American Museum of Science and Energy and provide adequate funding for programs explaining MRS and its role in the integrated nuclear waste system. An aggressive program should also be mounted to better explain existing DOE Oak Ridge facilities.

5.3. The MRS facility itself should be well designed and landscaped so as to be aesthetically pleasing.

5.4. As part of the MRS, DOE should construct, staff, operate, and promote a visitor's center for the purpose of explaining MRS and its role in the integrated nuclear waste system.

ENVIRONMENTAL STUDY GROUP REPORT

PROPOSED
MONITORED RETRIEVABLE STORAGE FACILITY
IN ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

FINAL REPORT

TO

CLINCH RIVER MRS TASK FORCE

from the

ENVIRONMENTAL STUDY GROUP

Chairman:
Robert W. Peelle

Vice-Chairman:
Shelby J. Smith-Sanclare

Susan A. Carpenter
Frank L. (Pete) Charton
Charles C. (Chuck) Coutant
Donald G. Jacobs
Elaine C. Trauger
James T. Roland

October 15, 1985

TABLE OF CONTENTS

INTRODUCTION

The Environmental Study Group is concerned with environmental issues and on-site conditions that might impact the health and safety of the public and plant workers. In the view of the public, assurance of health and safety are preconditions for acceptability; without such assurance, there is no willingness to discuss economic or social issues. Citizens have a basic right to protection of their health and safety.

In developing its recommendations, the Study Group first sought to determine whether or not an MRS could be operated safety and, if so, to establish a set of conditions that would make the MRS acceptable to the local public. This was accomplished by cataloging the public concerns about the plant and devising means of mitigating them. To identify concerns, we listened to public expressions in forums, studied reports written by persons and groups tending to oppose an MRS, and held a special meeting in the community closest to the Clinch River site. To evaluate the importance and likely permanence of the identified concerns and how they might be resolved, we reviewed the available DOE MRS literature, formally questioned DOE on a variety of issues (Task Force Memoranda 3 - 9), and used our own understanding of the issues. A majority of the study group spent a week visiting sites in Idaho, Nevada, and New Mexico where related development work is being performed.

Based on information acquired to date, the group believes that an MRS can be built and operated safely and without serious environmental damage. The public concerns are also related to whether the facility will be constructed and operated in this manner. The study group found that the expressed public concerns, related to a lack of trust of institutions, are consistent with frequent public experience with large organizations. The task was then to identify a set of conditions that would reassure all of us that the possibility of an acceptable MRS will become a reality; we recommend that the authorization of an MRS in Tennessee be contingent upon satisfying these conditions. It should be noted that the local public is not very familiar with the assurances instrinsic to the requirement that an MRS be licensed by the Nuclear Regulatory Commission; the study group believes that the NRC will play a quite positive role in the actual regulation of an MRS, but a lesser role in the initial acceptability of the proposal.

We are secure in our belief that conditions closely paralleling our recommendations must be adopted for an MRS to be accepted. Moreover, we think the proposed conditions are reasonable and that adoption of similar arrangements for other projects could reduce the public clamor that awaits every proposal to site a facility that could be noxious to the public. Since other detailed conditions are possible to satisfy the public concerns that we have identified, we encourage DOE, and the State, City, and County to improve on the ideas presented. Communication and support among all levels of government will be essential as a viable proposal is developed by DOE for presentation to the Congress.

In our study group's area, an extraordinary amount of information will become available as the MRS proposal is finalized for Congressional review and later when the formal Environmental Impact Statement is prepared. The study group expects to examine this material to determine whether our response to identified concerns should be altered and whether there are additional environmental or health concerns about an MRS that should be mitigated. We expect to adjust our recommendations as information becomes available.

This report contains statements and discussions of concerns, status summaries, and detailed mitigation suggestions. A summary of the recommended mitigations is given as a list of conditions for acceptance of the MRS facility, beginning on the next page. Some of these conditions should be included specifically in any legislation drafted to authorize an MRS. Others can best be assured by contract between DOE and local or state government under a "Consultation and Cooperation" clause like that in the Nuclear Waste Policy Act of 1982; however, the importance of the issues demands that the authorizing legislation or the documented legislative history clarify that inclusion of the listed items in the completed C & C contract is required. A few recommendations should be adopted by DOE prior to submission of an MRS proposal to Congress. Finally, for some concerns no new conditions on DOE are indicated.

SUMMARY OF RECOMMENDED CONDITIONS FOR ACCEPTANCE

The indicated priorities are based on the need to establish conditions that may not already be covered by existing institutional arrangements. The priorities are categorized by the Environmental Study Group in the following manner:

* Important enough to require mitigation measures;

** A higher concern requiring a concerted effort by DOE to instill public confidence in the operation; and

*** The highest priorities of the study group; critical to achieve and maintain local confidence in the protection of public health and safety.

* 1. To Mitigate Construction Impacts:

a. Buffer strip around site, to be zoned for land use consistent in the area.

b. Sound and sight barriers to protect neighbors.

c. Monitoring results to be made public information. Requirements on contractors to ensure compliance with noise, blasting, dust, water quality, and other standards.

*** 2. For Management at Plant Operations To Protect Health and Safety:

a. Use local environmental and demographic parameters to evaluate consequences of air or liquid releases (environmental impact statements and safety analysis reports).

b. To protect public health and the environment, develop performance standards with graded action levels for evaluating pollutant releases.

c. Require sufficient redundancy in control and monitoring systems to assure that performance standards are met.

d. Require a vigorous "As Low As Reasonably Achievable" (ALARA) program to control radiation exposures at the plant.

e. Report to a local review board on radiation exposure levels and environmental releases.

f. Provide information on the levels of radiation exposure at various distances that would be associated with an unshielded cannister of spent fuel elements. Beyond this, a thorough study of the probability and consequences of severe accidents with spent fuel at the proposed site will be required, taking into account the specific site and planned facilities. Economics as well as health consequences should be considered.

Summary of Recommended Conditions for Acceptance (Continued)

* 3. To Assure That There Are No Long-Term Local Health Impacts from the MRS Project:

a. The possibility that radioactive materials may be released to the ground and migrate off-site should be considered during site selection process.

b. All nuclear waste from the MRS, including low-level waste, should be disposed of outside Tennessee.

c. On decommissioning, site should be decontaminated for unrestricted public use. Any significant deviation should be permanently placarded and documented.

*** 4. To Assure Some Local Control Over MRS Regulation Relative to Health and Safety:

a. A citizen board for MRS environment, safety, and health review should be appointed, for example, three by State, three by City, and three by County, to meet openly on a regular schedule. Responsible Federal agencies should enter into a formal arrangement with this board. The board should not replace statutory regulatory agencies. It should utilize existing reports whenever possible so as not to unnecessarily increase the regulatory burden.

b. The Board should participate in the development of performance standards and criteria for the facility, and help prescribe a system of monitoring and a set of co ective actions to be taken when standards are not met. The Board's guidelines and work plans should be consistent with national standards but tailored to take into account any unique site features. New scientific data should be reviewed periodically to consider updates to these standards.

c. All data on effluent monitoring should be made available to the Board on a regular basis. Inspectors responsible to the Board should have the authority to be present during inspections and calibrations of monitors, to inspect operational and monitoring records and to interview operating staff to the extent needed to verify reported information.

d. The Board should have access to sufficient information on worker exposure, accidents, and plant upset incidents to verify the accuracy of the reported information.

e. The Board may issue abatement orders if releases are above action levels that warrant such action.

Summary of Recommended Conditions for Acceptance (Continued)

*** 4. To Assure Some Local Control Over MRS Regulation Relative to Health and Safety:

f. If a lack of corrective action or clear present danger to public health should occur, the Board may issue a desist order to halt incoming fuel and all plant operations other than corrective ones.

g. Board appointments, staff support and costs should be administered in a manner to minimize conflict of interest.

** 5. For Successful Public Emergency Management:

Authorizing legislation should require agreement on emergency management including covering of extra local costs by the waste fund.

** 6. To Demonstrate Good-Faith DOE Concern for Public Health and Environment:

a. DOE should publicize significance of on-going clean-up efforts.

b. Identify clearly the contaminated areas on the Reservation in relationship to the proposed MRS sites.

c. Adherence to a comprehensive clean-up schedule for the DOE Reservation should be linked to the MRS development schedule.

d. A community environmental monitoring program should be instituted so people will know and trust the level of safety.

e. For full public evaluation, all existing environmental assessment information about the DOE Reservation should be made available to the public.

*** 7. To Assure That MRS Will Not Become a De Facto Permanent Repository

a. No more than 300 metric tons of spent fuel at MRS prior to repository construction license.

b. No more than 10,000 metric tons of spent fuel at MRS before repository starts to accept MRS output on a definite schedule.

c. Any proposed extension of MRS capacity beyond 15,000 metric tons to be treated like the present decision with option for notices of disapproval.

d. Any spent fuel left on site substantially longer than plans (15 years) subject to a large "overdue removal penalty."

STATEMENT OF CONCERNS

The outline of concerns below is addressed in detail in the remainer of this report. Detailed mitigation suggestions are provided where appropriate or necessary to protect the health and safety of local residents. Note that the listed concerns are intended to include those of the local area public.

I. Concerns about environmental damage and about the safety and health of workers and the public, based on current knowledge and engineering standards.[1]

   A. From construction activities.

   B. From plant operation including off-normal incidents.

   C. From synergistic emergencies triggered by identified natural events.

   D. From long-term site management.

II. Concerns that current formal assessments of environmental and safety impacts may prove to be far too optimistic. "Things won't work the way they say."[2]

   A. Inspections may be inadequate or ineffective.

   B. Current federal and state regulations may not be sufficiently tight in light of future knowledge.

   C. The frequency and/or severity of plant upset events are being underestimated because real workers may not perform as plant designers imagine. These performance failures may arise because of worker laxity and/or ineffective management.

   D. Self-protective institutional actions may prolong hazardous plant conditions that may develop from design or operating failures.

   E. Jurisdictional competition may prevent a clear chain of command for response to a hazardous material accident.

   F. Past DOE and predecessor agency programs demonstrated too little concern for the environment and public health.

   G. Construction of the MRS may delay indefinitely the geologic high-level waste repository; therefore, MRS will become a *de facto* long-term storage site.

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[1]These impacts will be analyzed in the required safety and environmental impact reports and receive considerable regulatory attention.

[2]By definition, these issues would not receive agency review under current practice.

1. MRS Construction Impacts

Concern: That noise, floodlight, dust, groundshock, and surface and groundwater pollution connected with MRS construction may unduly impact nearby residents.

Comments: Nearby residents (less than 0.5 mile) believe that they incurred blast damage as well as unnecessary noise and dust during Clinch River Breeder Reactor site preparation. The former Breeder Reactor site falls in an industrial zone of Oak Ridge, while the adjacent land across the river has residential use but no zoning status. This boundary and site remoteness make it unclear whether municipal standards will be enforced as if the residents were within the city, and Tennessee blasting standards are readily ignored in the absence of ongoing monitoring. The Bear Creek site is more remote from residents outside Oak Ridge, but would be somewhat closer to the populated part of Oak Ridge (less than one mile). It is unclear what impacts will be associated with on-going storage cask construction.

Status: Requires mitigation if the Clinch River site is selected. If the alternative Bear Creek site is selected, mitigation measures may yet be required.

Recommended Mitigation: The following measures are requested to control environmental impacts of construction (and operation) activities:

- To ensure that City of Oak Ridge standards shall apply for noise, water, etc. pollution associated with plant and storage cask construction, DOE is asked to provide a buffer strip of land between the TVA land along the river and the facility, to be zoned for land use consistent with that across the Clinch River outside the city (presently RG-1).

- DOE is requested to provide for visual and sound barriers within its MRS construction specifications to assure that neighboring residential properties experience noise levels from construction (and operation) that are consistent with residential standards. Trees, berm, and other attractive means should be used for this purpose.

- DOE is asked to provide Roane County and the City of Oak Ridge monitoring reports that demonstrate adherence to noise, dust, floodlight, surface and groundwater and other pertinent pollution standards applicable to construction work. Moreover, DOE is asked to commit to explicit inclusion of applicable standards in bid invitation packages and to require compliance plans and performance bonds to ensure that contractors will meet these standards.

2. Damage to the Ecosystem from Construction

Concern: Construction of an MRS facility may unacceptably disrupt local ecology that is of value to man, including forests, wildlife, fish, and endangered species.

Comments: The concern must be addressed separately for the three sites that have been identified: the Clinch River site, the Bear Creek Valley site, and the recently-suggested ORGDP (K-25) site, because the degrees of present ecological integrity differ. The two alternative designs, above-ground and below-ground, also require separate consideration because the areas of land to be occupied differ.

The Clinch River site is currently in a highly disturbed state and undergoing reclamation. Although additional amounts of presently-uncleared land will be needed subject to detailed site design, most space needed for above-ground storage is already as disrupted as it would be in MRS construction. Below-ground storage would require somewhat more cleared land. The potential for reclamation would be the primary loss if the MRS were built there. Forested ridges typical of the pre-Breeder Reactor site condition are an abundant resource locally, so reclamation would not create a highly valued resource. Scenic values from properties across the Clinch River will be degraded by both the present condition and an MRS facility until adequate tree growth can accumulate (assuming the MRS facility includes a wooded buffer zone).

The Bear Creek site, in contrast, is now almost totally wooded, and MRS construction would remove a large block of forest ecosystem. This block amounts to about 0.53 square miles for above-ground storage and about 0.8 square miles for below-ground storage, both including an access road to Highway 95 (but not the possible widening of that highway). Although detailed site surveillance has yet to be done, the ecosystem seems to be predominantly second-growth hardwood and pine typical of most of the DOE Reservation. Some sections have been cleared and planted as pine plantation by the DOE forestry unit, and a power line right-of-way is maintained as low brush and small trees. Bear Creek, a small, spring-fed woodland valley stream, traverses the site. The forested area probably supports a diverse flora and fauna typical of East Tennessee's ridge and valley province. The general area has been described in the Breeder Reactor impact statement, reports for the proposed EXXON reprocessing plant, and local DOE reports. It does not appear to contain unique features such as endangered species, special biotic assemblages, or rare habitat types not available in abundance locally. The creek harbors a depressed biological community of fishes and other aquatic life due partly to headwater pollution from the Y-12 Plant and its associated burial grounds, and partly to variable (often low) water flow. The whole site, with the exception of that bordering Highway 95, is an area currently for official use only and not available to the public; little of it is seen from publicly-accessable areas. More detailed study will be necessary to quantify losses due to MRS clearing and site preparation.

Should the ORGDP site be used for an MRS, existing cleared and developed land may be available. This site would use space that is already disturbed, within a fenced exclusion area, and not now available for public use. Few, if any, ecological resources or scenic values would be lost.

2. Damage to the Ecosystem from Construction (Cont'd)

It is assumed that industry standards for erosion and dust control would be implemented at any of the three locations to minimize effects on ecosystems away from the actual construction site. These procedures would require supervision and monitoring.

Status: Ecosystem damage does not appear to be so important as to be an overriding factor in deciding about an MRS facility locally. The most ecological damage and the least amount of information pertain to the Bear Creek site. Detailed site surveys, coupled with detailed site designs for the facility, will be necessary before losses at each site can be quantified.

Recommended Mitigation: Some mitigation for ecological and scenic losses would be possible using state-of-the-art landscape design around the MRS facility. A buffer zone of tall trees could shield the facility from view, after a period of growth.

3. Special Nuclear Risks of Construction

Concern: Construction of an MRS may entail special hazards because of the nuclear nature of the facility.

Comments: Facility construction will not entail the use of nuclear materials. The facilities themselves will be no more complex than many conventional manufacturing processes, and far less complex than a commercial nuclear power station. A high level of quality control and inspection will be necessary for licensing by the Nuclear Regulatory Commission. Facilities of a related nature have been constructed and operated at Oak Ridge facilities in the past (e.g., test reactors, fuel reprocessing pilot plant, hot cells).

Special attention to construction may be required if the ORGDP (K-25) site is to be used. Some community proposals have suggested use of areas having facilities that already contain significant amounts of materials that could pose hazards to construction workers.

Status: The hazards of constructing an MRS facility at either the Clinch River or Bear Creek site should not be an issue, beyond normal construction safety. Construction at the ORGDP (K-25) site may entail special safeguards due to the present uses of the area.

Recommended Mitigation: No measures appear necessary since DOE has eliminated the ORGDP site as a practical location for a MRS facility.

4. Highway Construction Impacts

Concern: Upgrading of State Highways 95 and 58 to four-lane in association with MRS construction might cause significant environmental impacts.

Comments: State of Tennessee highway standards require rural highways to have 150-foot minimum rights-of-way, with a 102-foot roadbed (if grassed median) or 76-foot roadbed (if paved or painted median). If either or both Highways 95 and 58 are rebuilt to rural four-lane standards to accommodate MRS traffic from the interstates, as proposed by the Transportation Study Group, there would be considerable alteration of the nearby environments.

Highway 95 currently is a winding, two-lane road that would require significant relocation in the six miles between Interstate 40 and the four-lane cloverleaf at Highway 58. However, the adjacent environment is largely second-growth mixed hardwood forest on the Oak Ridge Reservation that has no known unique features in the likely right-of-way. At a maximum, 0.17 square miles of forest ecosystem would be converted to grassed roadsides that also have wildlife value.

Highway 58 currently has a wide, straight right-of-way between the cloverleaf with Highway 95 and Interstate 40. Between the cloverleaf and the Clinch River (3.5 miles) rural four-lane standards are already met; the remaining four-mile stretch is two-lane and passes through medium density commercial and residential development. It is believed that the State owns the needed right-of-way. Relocation of highway access would be necessary for many residences and businesses along the four-mile distance, and the new roadway would be significantly closer to structures.

Status: Although environmental impacts would occur -- mainly ecological for Highway 95 and mostly social for Highway 58, they do not seem to constitute an irreparable loss that is not balanced by advantages in highway safety.

Recommended Mitigation: Design and construction of four-lane upgrades of Highways 95 and 58 should follow accepted good U.S. Department of Transportation practices in all phases for maximizing environmental impact.

5. Radiation Protection of Workers and the Public

Concern: Workers may be exposed to unacceptable levels of radiation during the handling of spent fuel elements, especially during periods of maloperation. The public may be exposed to radiation from a variety of sources, including direct radiation (as from unshielded spent fuel), inhalation of airborne radioactivity, and ingestion of food and water contaminated through releases to the environment.

Comments: Radiation levels near unshielded spent fuel assemblies are extremely high, even after they have been out of the reactor for five years. Therefore, great care must be exercised in transferring spent fuel from the heavily shielded shipping casks and in other transfer operations. Such operations must be conducted in heavily shielded "hot cells" and adequate controls must be used to ensure that workers do not inadvertently or purposely enter high radiation zones.

Status: The releases of radioactivity at the Hot Fuel Examination Facility (HFEF) in Idaho have been very small and the levels of radioactivity in the surrounding environment are at background levels. No accidents have occurred at this development facility that have released significant quantities of radionuclides and no credible accidents have been postulated that would dispense large amounts of radionuclides. Deliberate attempts to disperse radionuclides from spent fuel casks were unsuccessful in releasing any significant fraction of the radionuclides.

From the worker's standpoint, the experience at HFEF in Idaho indicates that such operations can be conducted safely. The collective annual radiation dose for a work force of 114 persons, handling about 100 spent fuel subassemblies (300 kg. fissile material), is about 10 person-rem per year. No individual received a radiation dose in excess of 1 rem. A typical maximum individual exposure during a cask handling operation is of the order of 10 mrem. The major contribution to the collective dose (57 percent of the total) was due to cask handling (29 percent), repair of remote handling equipment (18 percent), and experimental studies (10 percent). There are no significant sources of internal exposure to the workers.

The HFEF is no longer state-of-the-art. There have been major advances in remote handling systems during the past few years, and the use of robotics should even further reduce the levels of radiation exposures in future facilities.

Recommended Mitigation: DOE should:

- Require a vigorous "as low as reasonably achievable" (ALARA) program to control radiation exposures. This should include maintaining individual exposure records and records of the exposures received during various types of operations. The operations making the largest contributions to collective dose should be reviewed periodically to determine if exposures could be further reduced;

5. Radiation Protection of Workers and the Public (Continued)

- Develop performance standards with graded action levels to control worker radiation exposures to acceptable levels;

- Continue to postulate and evaluate the probabilities and consequences of a broad range of accident scenarios;

- Provide information to the public on the estimated levels of radiation exposure at various distances from an unshielded canister of spent fuel elements;

- Periodically report to the public information on collective and individual radiation doses, including actual airborne and liquid releases, and translate the radiation doses into estimates of the probability of causation of health effects.

6. Airborne Effluents

Concern: Radioactive gases, vapors, and particulates may be released during plant operations and impact both public health and environmental quality. The major concern is the level of releases and resulting consequences that might occur if control systems fail and the operator is unable to take mitigative actions.

Comments: Based on experience at a similar operating facility, the Hot Fuel Examination Facility (HFEF) at Idaho National Engineering Laboratory, it is anticipated that small amounts of radioactive krypton, tritium, and iodine will be released to the air during normal operations. These gaseous radionuclides will pass through the High Efficiency Particulate Air (HEPA) filters, but particulates are retained with an efficiency of 99.97 percent. The hot cells are operated under negative pressure to prevent any releases to the atmosphere except through the filter system. The beta-gamma exposure doses in the area surrounding the HFEF are less than 0.02mR/h.

Recommended Mitigation: DOE should:

- Use local environmental and demographic parameters to evaluate the consequences of anticipated and inadvertent releases;
- Develop performance standards with graded action levels designed to protect public health and environmental quality for use in evaluating releases during operations;
- Require sufficient redundancy in control and monitoring systems to ensure that performance standards are met; and
- Periodically report to the public the quantities of specific radionuclides released and discuss the likely consequences.

7. Aqueous Releases

Concern: Various operations at the MRS may result in the generation of significant volumes of slightly contaminated liquid effluents. The contaminants may include both radionuclides and chemically hazardous materials. Releases of the liquid effluents may constitute a potential risk for contaminating ground or surface water.

Comments: Liquid effluents are produced at the HFEF facility in Idaho from laboratory and decontamination operations at a total rate of about 16,000 gallons per year. At the MRS additional liquid waste streams may include cooling water, steam and condensate returns from evaporators and heat exchangers, and treated water from the mixed-bed ion exchanger.

The DOE response to an inquiry by the Environmental Study Group indicates that all of these waste streams will be treated by the liquid radwaste system and will be recycled after treatment. Other liquid effluents from the oily sewer, process sewer, and sanitary sewer systems will be monitored for radioactivity prior to release to the drainage field.

Status: The surface water hydrology at the proposed MRS site is well documented (i.e. the flow rates of the Clinch and Tennessee Rivers are well known as are the location of intakes for public water supplies); however, the regional ground water regime is not so well documented. The near-surface ground water is limited in lateral extent due to frequent interception by surface water streams. The presence and extent of potential deep regional ground water aquifers has not been investigated thoroughly. This is of some public concern even though contamination of deep aquifers due to the operation of an MRS is highly unlikely.

Recommended Mitigation: DOE should:

1. Use local environmental and demographic parameters to evaluate the consequences of anticipated and inadvertent releases;

2. Develop performance standards with graded action levels designed to protect public health and environmental quality for use in evaluating releases during operations;

3. Describe processes and operations which will be used to to treat and monitor effluents prior to release to the environment to ensure that they comply with the performance standards.

4. Periodically report to the public the quantities released and discuss the likely consequences during operations.

8. Magnitude of Hazard from a Cask Rupture

Concern: There have been a number of questions concerning effects of a "serious" accident with spent fuel elements to be handled at the MRS facility. An accidental rupture of a transport cask or storage cask might lead to significant consequences. The concerns deal with possible accident scenarios, degree of contamination, need for evacuation, doses of radiation to the public, and property decontamination. Although usually stated as a concern for transport of spent fuel, it is also a potential concern for the MRS site and environs.

Comments: Much attention has been given to the likelihood of cask rupture, but we have seen little data on radionuclide inventories or quantified hazard of the materials contained in a cask. Risk assessments typically must consider information on both exposure probability and the inherent hazard of the materials. The Nuclear Regulatory Commission reported on a hypothetical accident with a water-cooled cask in a metropolitan area (not analogous to our region) that is cited by the MRS opposition as the basis for their concern.

In a generic sense, the worst analogies raised by the MRS opponents have been shown to be not applicable. Spent fuel will not undergo a chain reaction. All of the fuel pellets will not be turned to dust and disperse radioactive materials. Health and property damages of a worst case situation calculated for a metropolitan area are not likely to pertain to a rural setting in East Tennessee. Nonetheless, a detailed study of the effects of a credible cask rupture has not been done for the local situation.

Status: DOE anticipates conducting such an evaluation as part of the Environmental Impact Statement process. However, the likelihood of complete rupture of casks with dispersal of fuel element materials appears to be exceptionally low, and the risks acceptable for continued MRS planning to proceed.

Recommended Mitigation: We need a thorough study of probabilities and consequences for possible accidents at the MRS site or on local roads or rivers, that uses:

- Dry casks actually planned for the MRS;
- EPA's recommended residual contamination levels after the accident;
- Realistic times and manpower required for the cleanup, including cleaning of insides of buildings contaminated through ventilation;
- A variety of weather scenarios using local meteorological data;
- Deposition on vegetation and soils typical of the local rural environment; and
- Food chain accumulation and transfer of residual radioactivity.

9. Earthquakes

Concern: Based upon existing seismic records of the general locations which have been chosen as the preferred and alternate sites for the MRS facility in East Tennessee, DOE has concluded that damage from earthquakes is ". . . highly unlikely to occur." However, recently the United States Geological Survey (USGS) has released data suggesting a strong probability of a major quake in the New Madrid fault zone near the northern boundary of West Tennessee. The projected effects of the quake and resulting aftershocks are expected to be catastrophic in West Tennessee near the epicenter, and large enough to cause displacements in East Tennessee that may cause damage to foundations and other rigid structures.

Comment: Two points are worthy of mention. First, experience in California and elsewhere suggests that in a very large quake there is probably no such thing as an "earthquake-proof" structure. Fortunately, the likelihood of extreme displacement in East Tennessee is probably minimal. Second, and perhaps more germane, is that structures built directly on bedrock usually will be damaged less by quakes than those built on less consolidated, easily deformed material such as natural or artificial fills, because the softer material slows the waves, causing an increase in amplitude.

With the above comments in mind, the following questions are pertinent:

A. Do the DOE projections include seismic data from the latest USGS findings regarding the New Madrid fault zone?

B. Since the MRS facility will be built almost entirely on unconsolidated fill material at the old Breeder Reactor site, what is the degree of certainty that displacement of the facility by amplified surface waves from a major quake in the New Madrid zone would not cause rupturing of water pipes in the RH unit and/or fractures to the structure of the facility, thus compromising containment capability?

Status: According to information provided by DOE, it appears that the MRS facility has been designed with adequate provisions for earthquake displacements as calculated by USGS. Further, critical parts of the facility (R & H Building and Cask Storage Yard) will not be located in the fill area.

Therefore, environmental hazards at the MRS site brought about by earthquakes do not appear to pose a realistic threat to the facility.

Recommended Mitigation: None.

10. Flooding

Concern: The preferred MRS site (former Clinch River Breeder Reactor location) is contained within a large meander ("bend") of the Clinch River. River meanders are often unstable, and, in the event of flood conditions, a river sometimes will cut across the neck of the meander thus by-passing the meander and creating extensive inundations to adjacent areas.

Comments: Using the DOE elevation-to-flood figure, the likelihood of flooding of the Clinch River site under foreseeable flood conditions seems unlikely. However, an off-normal circumstance that specifies a failure of Norris Dam (and possibly Melton Hill) conceivably could create flood conditions at the Clinch River site.

The alternate site lies adjacent to a small stream and could be subject to local flooding.

The following information is pertinent:

A. The predicted maximum flood crest that would occur at the preferred MRS site in the event of a catastrophic flood brought by failure of Norris-Melton Hill dams;

B. The projected impact of the catastrophic flood mentioned above, or of a large but "normal" flood, on rail and highway transport into the MRS facility.

Status: According to information provided by DOE, the structures of the MRS facility at the Clinch River site are to be constructed at several different elevations: support building at EL 813 MSL; R & H Building at EL 820 MSL; and the storage area at EL 870 MSL. The 100-year flood level for the Clinch River is EL 750 MSL; the Probable Maximum Flood level is EL 782.6 MSL. A catastrophic flood surge which includes the failure of Norris and Melton Hill dams, plus wind, wave, and run-up would reach a predicted level (Flood Surge Level) of EL 809.2 MSL. Interceptor ditches on both the north and west sides of the facility will be designed to divert runoff from local rainfall and surrounding uplands.

Thus, since the structures of the MRS facility — especially the critical R & H Building and storage area — are to be sited well above flood levels under projected catastrophic conditions, the likelihood of flooding is extremely small, probably negligible.

In regard to rail access, elevations of the track would exceed the 100-year flood level of EL 750 MSL, according to DOE. While a part of the rail line would be more subject to flood than the MRS facility itself, the probability of flooding would be low. Should such flooding of the track occur, the resulting circumstance would probably prove to be an inconvenience more so than a hazard.

Localized flood projections for the Bear Creek site have not been provided.

Recommended Mitigation: None.

11. Long-Term Radionuclide Containment

Concern: The two sites for the MRS may differ in their capability for long-term containment of radionuclide spills and DOE may not have adequately considered this factor in site selection.

Comments: Processing of spent fuel elements at the MRS site may lead to some on-site contamination, although DOE's proposals show attempts to ensure that the potential is low. This contamination may reside in floors, walls, drains, etc. of structures, and may include environmental materials (e.g., soils). The possibility of long-term MRS site management including operation, decontamination, and maintenance/monitoring of the site (typically to 1,000 years) to contain any residual hazardous materials may differ among the alternative sites.

The Clinch River site, for example, is surrounded on three sides by river. There would be only a short pathway to widespread contaminant dispersal, primarily via water transport. The ORGDP site is traversed by Poplar Creek, and the contaminant disposal pathway could also be short, depending on actual MRS location (locations that offer suitable containment may be available). The Bear Creek site, although located in an isolated valley in the center of the Oak Ridge Reservation, is known to contain some zones of permeable geological substrate.

Experience at existing DOE sites included in its Surplus Facilities Management Program suggests that concern for this issue is warranted, even though DOE plans total containment and cleanup at the MRS site. Numerous sites across the country contain residual radioactive materials in concentration that require long-term management. Some loss of control is documented for many of the sites, even under conditions of maintenance and monitoring. Selection of a site where containment is easiest would seem prudent.

Status: There is no evidence that DOE has considered this issue.

Recommended Mitigation: The possibility that radioactive materials may be released to the ground and migrate off-site should be considered during the final site selection process.

12. Secondary Waste Stream

Concern: The rod consolidation and repackaging procedures associated with the MRS will produce a secondary radioactive waste stream consisting of fuel assembly hardware, shoe covers, air filters, decontaminating materials, etc. Responsibility for care of this waste might complicate the task of providing for proper disposal of Tennessee's low-level waste from nuclear medicine, university research, and power facilities.

Comments: The impact of this secondary radioactive waste stream must not jeopardize Tennessee's participation in a regional nuclear waste compact which it is currently negotiating with other Southeastern states. Neither should the waste put a burden on the other member states to accept radioactive waste from a facility that processes nuclear materials generated in non-compact states. The MRS host community, likewise, must not be burdened by permanent disposal of these wastes.

Status: DOE response (9/16/85) to Task Force inquiry indicated that no final decision has been made, but current assessments are based on sending all such material to the repository. An additional response (9/30/85) indicated that a previous DOE study determined that any low-level waste generated would be the responsiblity of DOE (i.e. federal waste rather than commercial waste). It would be expected to be buried in the permanent repository or in an approved site on the Oak Ridge Reservation.

Recommended Mitigation: The secondary radioactive waste streams should be disposed of outside Tennessee.

13. Documentation for the Future

Concern: There is fear that future societies may become unaware, through time or calamity, of nuclear activities of the present; future generations should have adequate documentation as a basis for action.

Comments: The MRS facility will handle approximately 70,000 metric tons of spent fuel over a more-than-25-year operation lifetime. It is conceivable that accidents involving radioactive materials could contaminate areas of the facility. It is also possible that records of contamination could be lost through personnel changes, incompetence, or willful neglect.

Status: DOE has not established a good record of documenting contaminants on the Oak Ridge Reservation. Current regulations under RCRA and CERCLA require site decontamination.

Recommended Mitigation: DOE should decontaminate the site for unrestricted public use. Should this be impossible, any significant radioactivity remaining on-site should be permanently posted and placarded, and permanent records kept of the levels, amounts and locations.

14. Influencing of Inspection/Regulation Teams

Concern: Inspection/regulation teams may identify with the MRS facility and personnel and thus not enforce compliance with regulations adequately.

Comments: Over time, such teams working closely with the facility tend to identify with the facility members. They find difficulty in enforcing some "gray-area" or "noncritical" infractions, and may be inclined to overlook them. Likewise, time, costs, and other limitations that block achievement of organizational goals over a period of time tend to focus attention on achieving the goals at the expense of the framework within which the goals were developed. In both cases, the public perception of the consequences of these behaviors is that the organization (MRS) as well as the watchguard (Inspection/Regulation TEAMS) will act in a protective-of-the organization rather than a protective-of-the-populace manner.

Status: A September 18, 1985 letter to Robert Peelle from Peter J. Gross (response to Task Force Memorandum #4) identifies standards by which an MRS will be designed, built, and operated. The response does not identify any plans or procedures to develop cooperation between the various interested parties in managing the oversight responsibilities. The assessment documents prepared to date have yet to indicate recognition of the organizational and human behavior aspects as a component to such situations. Further, they have yet to identify plans for developing a framework to anticipate and prepare for human and organizational behavior patterns as they relate to the interrelationship among the various participants: e.g., the MRS, the various governments, and the public.

Recommended Mitigation: DOE should:

Set up a study team of respected professionals in the areas of human behavior, organizational dynamics, organizational structure, government and institutional structure, public participation, education and perception, etc., to determine new participative structures that avoid the traditional polarizing that occurs between those within the organization and those without, those closely aligned with the institution and those who are affected by the institution.

15. Local Control

Concern: Local destiny is perceived as being usurped unreasonably by others. The MRS is viewed by many people as a facility with national significance (although debatable) but serving no or little local need. Local residents are being asked to accept environmental risks while others obtain the benefits.

Comments: Decisions about whether our risks should be acceptable are assigned to others — the Nuclear Regulatory Commission in Washington, D.C., for example. Such agencies can be seen as bureaucratic and unresponsive. Even the Tennessee Department of Health and Environment is seen as remote and inadequate, based for example on actual local performance in regulation of private radiological industries.

Recommended Mitigation: Any federal legislation authorizing an MRS or consultation and cooperation agreement should provide for an MRS Environment, Safety,and Health Review Board to be composed of citizens, for example, three each appointed by the Governor of Tennessee, the Legislative Body of Roane County, and the City Council of Oak Ridge. This Board should operate under the open meeting regulations of governmental entities in Tennessee.

The purpose of this Board is to provide for ongoing safety, public health, and environmental review of the MRS during the period following licensing. By this means the continuing safety of the facility can be assured throughout plant life considering local concerns, new knowledge, and without exclusive reliance on standard federal and state authorities. The board should not replace statutory regulatory agencies. It should utilize existing reports whenever possible so as not to unnecessarily increase the regulatory burden.

In consultation with DOE and other technical sources, this Board should establish a set of health, safety, and environment performance standards and criteria for the facility and prescribe a system of monitoring which will determine whether or not the performance standards are met. Additionally, the Board should prescribe a set of corrective actions to be initiated when performance standards are not met. These corrective actions should be commensurate with the risks involved. The performance standards, monitoring requirements, and corrective actions should be in general conformance with those prescribed by federal environmental and health authorities, but take into account any unique features of the site. Early warning levels may be prescribed by the Board to allow orderly preparation for any major plant maloperation and to provide for recognition of inadequate operation characteristics prior to any real emergency.

The authorizing legislation should provide that data on the monitoring of all effluents from the MRS be made available to the members of this Board, and thereby the public, at least quarterly. In addition, DOE should arrange that the Board have access to basic sources of information, including access to operating personnel, in order that they can independently verify the reported information. In the event that warning or emergency levels are recorded on any of the effluent monitors, complete data related to any such event should be provided the members of the Board within ten days. When corrective actions are indicated, regular public emergency staff should be notified immediately by the MRS management.

15. Local Control (Continued)

DOE and MRS management should consult with the Board at least annually to consider whether new scientific information or the observed pattern of releases warrants new operating specifications for the facility of early warning or emergency levels.

The legislation should also provide that the regular information releases to the Board include records of plant maloperation and worker accidents even when no recordable effluent releases are involved. Plant worker radiation exposure records should also be released for any workers who receive over half the annual dose limits in any quarter.

The authorizing legislation should also provide that if, following review of the record, the Board finds that the plant is operating in a mode that is apt to cause repeated releases of effluents above the established action levels, the Board shall issue a warning to DOE and MRS management calling for prompt abatement of the releases. If after 30 days the management cannot report that corrective action has been completed or that operations giving rise to the releases have ceased, or if continued operation of the MRS plant otherwise presents a clear and present danger to the public health, the Board may issue a desist order to terminate plant operations associated with the effluent releases, other than corrective actions. The Board shall cancel the desist order when corrective action has been completed, pending results of ongoing monitoring. During a period of a desist order no spent fuel should be shipped to the MRS facility.

16. Off-Site Emergency Response

Concern: That the number of state, federal, and local agencies that will be involved with an MRS may lead to indecision and uncertain performance if a plant incident should occur requiring off-site emergency response.

Comments: In addition to the agencies usually involved in local industrial accidents, the DOE and NRC would also be involved in any potential or actual emergency at an MRS. A very clear plan for the distribution of authority and responsibility will be required, even though the likelihood of emergencies with off-site significance presently appears to be quite remote. The plan, including financial responsibility for costs, needs to be defined in a consultation and cooperation agreement (C&C agreement) between DOE, Tennessee, and the nearby local governments.

Status: Scoping discussions on emergency planning have so far concentrated on transportation accidents.

Recommended Mitigation. Roane County and Oak Ridge should request in the MRS authorization legislation or through a "C & C agreement," a clear division of responsibility among agencies for planning and carrying out the public response to any plant emergency. The agreement should include immediate notification to the primary response authorities if any MRS incident occurs with potential to ultimately require action by public agencies. The agreement should provide that emergency response system costs incurred by public agencies to meet the terms of this agreement shall be borne by the nuclear waste fund.

17. Past Contamination of the Oak Ridge Reservation

Concern: Citizen groups have raised the issue of contamination of the Oak Ridge Reservation with heavy metals, organic solvents, and radioactive wastes as an obstacle to successful licensing of an MRS facility. In their minds, the MRS proposal is fully intertwined with past DOE and predecessor agency programs now viewed as having demonstrated too little concern for the environment and public health.

Comments: The history of contamination problems on the Oak Ridge Reservation associated primarily with defense activities during World War II and the cold war era has been clearly publicized in East Tennessee. Contamination of the Oak Ridge Reservation is limited to discrete zones in the 37,000-acre area. None of these contaminated zones coincides with the Clinch River Breeder Reactor site or the exact Bear Creek Valley site. Bear Creek Valley is contaminated upstream near the Y-12 area and there is some evidence of depressed biological populations in the creek near the MRS location. This is not the location of the principal metals contamination, however. There should be no interaction between development of the MRS and the contaminated zones if the Clinch River site is chosen; cognizance of some downstream movement of Y-12 contaminants will need to be taken in development of the Bear Creek site.

Whereas the MRS will be sited on uncontaminated land, the DOE's poor record for environmental stewardship on the rest of the Oak Ridge Reservation is cause for concern about its actual performance in developing, operating, and decommissioning an MRS. A philosophy of "contaminate and move to another site" is not acceptable today. Public confidence in the assurances by DOE regarding an MRS will be improved when the existing contamination of the Oak Ridge enviorns is rectified.

Status: Contamination issues related to the proposed MRS sites are resolved sufficiently for facility planning to proceed. Significant efforts toward clean-up of contaminated sites on the Oak Ridge Reservation are underway though they are poorly understood by many in the public. Oral information from DOE indicates that a community monitoring program is under consideration at present. A comprehensive groundwater monitoring program is planned.

Recommended Mitigation: An imperative for environmental acceptability of the MRS is an aggressive and fully explained effort by DOE to identify and clean up contaminated areas on the Reservation and the provision of monitoring results from off-site locations to demonstrate the presence of healthful conditions. A community monitoring program similar to that directed by EPA and funded by DOE around DOE's Nevada Test Site would meet part of the need. In particular, results should be given on the present status of aquifers used by neighbors of the proposed plant. Adherence to a comprehensive cleanup schedule should be linked to the MRS development schedule.

18. Environmental Data from the Oak Ridge Reservation

Concern: Although DOE criteria for selection of an MRS site included ready availability of environmental data, the Oak Ridge Reservation was developed before NEPA was passed and the area has no environmental impact statement.

Comments: Abundant environmental data exist for the Clinch River Breeder Reactor site because that project included preparation of an environmental report and impact statement. There are also considerable data available for the rest of the Reservation, even though there has been no impact statement prepared. These data have been collected for each of the three plants (ORNL, ORGDP, and Y-12) in anticipation of impact statement preparation and general environmental accountability. Much new data will be needed, both as updates to the breeder information and for areas not already covered. However, the reservation studies do provide an important head start.

Status: Resolved sufficiently for MRS to proceed with collection of additional data.

Recommended Mitigation: For full public evaluation of environmental assessments, all existing environmental information about the DOE Reservation should be made available to the public.

19. MRS Facility May Become Permanent Waste Storage Site

Concern: That if an MRS is constructed, the geologic high-level waste repository program may be delayed indefinitely and that the MRS might therefore become a de facto long-term storage site of ever-increasing capacity and hazard to the public safety.

Comments: The DOE plan is for a definite capacity limit of 15,000 metric tons of uranium, and congressional reauthorization would be required to extend that capacity. However, the fear that an MRS could relieve the pressure from nuclear utilities for a geologic repository and thereby sidetrack the latter has been expressed both locally and nationally. Many in our area believe that some storage containers will eventually leak contamination into the groundwater if loaded casks are held indefinitely on the MRS site.

Status: The site could be extended for greater capacity, and delay in removal of spent fuel to a permanent repository might seem cost effective to some future generation of leaders, so firm legal or contractual measures are believed to be required to ensure that the facility mission will not be changed without local assent. It is a high priority from the Roane County-Oak Ridge view that the facility's main purpose be spent fuel consolidation and handling rather than long-term waste storage.

Recommended Mitigation: The authorizing legislation or consultation and cooperation agreement for an MRS in Tennessee should be conditioned as below so that it will not become a site for long-term nuclear waste storage without full consideration of the views of Tennessee and the locales involved:

- No more than 300 metric tons of spent fuel (for equipment checkout) shall be received by an MRS prior to the time that a construction license is granted by the Nuclear Regulatory Commission for the long-term storage facility that will receive the spent fuel from the MRS.

- No more than 10,000 metric tons of spent fuel shall be stored at an MRS in Tennessee before the time that a long-term high-level waste repository begins to accept spent fuel from that MRS on a regular schedule.

- Any proposed extension of the maximum storage capacity of an MRS in Tennessee beyond 15,000 metric tons of spent fuel shall require a Presidential certification of need and an opportunity for Tennessee to issue a notice of disapproval. This opportunity shall be substantially of the same form as that provided in the Nuclear Waste Policy Act of 1982 for initial authorization of an MRS.

- A penalty mechanism should be established to discourage long-term storage of spent fuel at the MRS. For example, any spent fuel rods or related high level nuclear waste remaining at an MRS in Tennessee for more than 15 years should cause an overdue removal penalty of $10,000 (1986 dollars) per metric ton to be paid to the general fund of the State of Tennessee for each such full year of overdue outshipment. Each year the MRS should provide to the Department of Health of the State of Tennessee an inventory detailing any spent fuel and other nuclear waste that has been held at the MRS for longer than ten years.

SOCIOECONOMIC STUDY GROUP REPORT

FINAL REPORT

TO THE

CLINCH RIVER MRS TASK FORCE

from the

SOCIOECONOMIC STUDY GROUP

on the

PROPOSED

MONITORED RETRIEVABLE STORAGE FACILITY

IN ROANE COUNTY/OAK RIDGE, TENNESSEE

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October 15, 1985

EXECUTIVE SUMMARY

The Socioeconomic Study Group of the Clinch River MRS Task Force has examined the likely impacts of a monitored, retrievable storage facility (MRS) on the economy of Oak Ridge and Roane County. We identified a number of concerns and potentially negative impacts of the proposed MRS and also identified conditions that could offset the liabilities it presents to the local communities. On the basis of its careful consideration of the MRS proposal and of its very deliberate review of the role which DOE has played in bringing the affected communities to the present set of real and perceived social, economic and environmental circumstances, we recommend that the proposed MRS facility not be accepted in Oak Ridge/Roane County unless the following conditions are met:

1) That MRS authorizing legislation will

   (a) Include a section similar to Nuclear Waste Policy Act Section 116(c) to permit tax equivalency payments on real and personal property and other financial incentives to units of local government (payments to continue through decommissioning),

   (b) Impose a storage limit of 15,000 metric tons,

   (c) Specify that MRS cannot operate until a permanent repository site has been authorized and approved by Congress,

   (d) Specify that any future proposal to raise the 15,000 metric ton limit or to alter the authorized purposes and uses of the facility will grant to the State of Tennessee the same rights to consultation and cooperation and to issue a notice of disapproval as it currently has under the Nuclear Waste Policy Act,

   (e) Provide for decommissioning and decontamination immediately upon completion of MRS' mission,

   (f) Provide for agreements with units of local government similar to those authorized under Nuclear Waste Policy Act Section 117(c),

   (g) Specify that agreements must be completed before the state's right to issue a notice of disapproval expires (In authorizing the MRS, Congress should provide that the right to issue a notice of

disapproval expires at the end of the 60-day period specified by the Nuclear Waste Policy Act or six months after commencement of C&C negotiations with state and local governments, whichever is later.) and,

(h) Give DOE authority to make payments relative to MRS upon Congressional authorization of the project.

2) That the Department of Energy will enter into binding agreements with the State of Tennessee and local units of government, as appropriate, including, but not limited to,

(a) Specification of how tax equivalency will be administered, including valuation formulas, and provision for an arbitration board or alternative means for settling disputes,

(b) A pledge to include proximity to Oak Ridge as a decision factor in MRS procurement so that, to the fullest extent possible, all related research, development, goods, and services are acquired within the affected communities, region, or state,

(c) A pledge to make available for private industrial development either the Bear Creek site or the CRBR site, whichever is not chosen as the MRS site, or other comparable sites in Roane County,

(d) A schedule for bringing all DOE Oak Ridge facilities into compliance with state and federal environmental regulations, and a pledge to not accept an NRC construction permit for MRS until compliance has been achieved,

(e) Establishment of a joint state and local board with authority to monitor and enforce MRS compliance with all state and federal regulations and, for cause, to refuse additional shipments,

(f) A schedule of annual impact assistance payments to be made to state and local governments from authorization until operation, and from cessation of operations until full decommissioning and decontamination, for purposes of regional development (Roane County and Oak Ridge payments to be equal to the tax equivalency grants generated by a $1 billion MRS facility),

(g) A pledge to construct, support, and promote, upon MRS authorization, new exhibits in the American Museum of Science and Energy, for the purpose of explaining MRS and its role in the integrated nuclear fuel cycle and for explaining and interpreting existing DOE Oak Ridge facilities,

(h) A pledge to construct, staff, operate, and promote an MRS visitors center for the purpose of explaining MRS and its role in the integrated nuclear fuel cycle, and to aesthetically design and landscape the entire MRS complex,

(i) A simple and inexpensive procedure to guarantee property values of property owners near the MRS site and along the railway spur serving the facility,

(j) A pledge to establish training programs at local educational institutions to provide necessary employee training for MRS and the transportation system, including programs in health and safety monitoring, remote handling systems operation and maintenance, communications system operation and maintenance, storage cask manufacture and maintenance, transportation fleet service and maintenance, transportation cask service and maintenance,

(k) A pledge to move management of MRS design, construction, and operation to the Oak Ridge Operations office and to retain management of transportation operations for the entire waste management system at Oak Ridge Operations,

(l) A pledge to require, to the greatest extent possible, that all MRS- and transportation-related activities be conducted in the local private sector and on privately owned land,

(m) A pledge to require transportation system operators to establish MRS-related service and operations facilities in East Tennessee,

(n) A pledge to (1) include success in assisting Oak Ridge and Roane County toward their self-sufficiency goals as a factor in the contract structure for MRS and transportation system operators, (2) require those operators to locate other, non-DOE business in the Oak Ridge/Roane County area, and (3) require those contractors to encourage their employees to settle in Oak Ridge or Roane County,

(o) A pledge to finance a significant preoperational public education program, beginning upon authorization, conducted by the city and county to address progress being made by DOE in resolving environmental problems and to promote the communities' general quality of life,

(p) A pledge to reimburse the U.S. Environmental Protection Agency or appropriate state agency for a program to establish a network of monitoring stations in the local communities, prior to and during construction, and train non-employee citizens to operate the equipment and interpret its measurements, and

(q) A pledge to immediately take an aggressive role in support of the Roane County and Oak Ridge diversification efforts.

Unless these conditions are satisfied, the proposed monitored, retrievable storage facility will be a burden to the Roane County-Oak Ridge communities. We recommend that the Clinch River MRS Task Force disapprove the project, unless there is a satisfactory resolution of the above concerns.

INTRODUCTION

The Socioeconomic Study Group of the Clinch River MRS Task Force (Study Group) has examined the likely impacts of a monitored retrievable storage facility (MRS) on the economy of Oak Ridge and Roane County. Our investigation has included trips to Morris, Illinois and Barnwell, South Carolina, where other nuclear waste facilities are located, two public forums to solicit input and discussion from the community, independent research by Study Group members, and regular meetings to share information.

The Study Group's approach is to answer the following question: Under what conditions will MRS be an asset to the Roane County-Oak Ridge community? We believe that MRS can be an economic asset if and only if certain conditions are met. The MRS will be detrimental to the communities' economies if they are not. Identifying potential problems and specifying conditions that offset these problems is the task at hand.

Two major assumptions shape the boundaries of our effort. First, health and safety issues are outside the Socioeconomic Study Group's responsibility. These concerns are the specific responsibility of the other two Study Groups that comprise the Task Force and, while they must be a part of the deliberations of the entire Task Force, need not receive this Group's attention during this phase of the study. Second, the need for and purposes of MRS as stated by DOE are accepted as given. These issues are best left to the forums where they will ultimately be decided; our responsibility is to look after the economic interests of the Roane County-Oak Ridge community.

It should be noted that evaluation of the proposed MRS facility is being undertaken by the Study Group within a very limited time frame. The Department of Energy has not yet issued its environmental assessment (including socioeconomic impacts) of the proposed facility, and full environmental impact statement is not required until the MRS is authorized by Congress. The Socioeconomic Study Group contends that the Clinch River MRS Task Force should be afforded the opportunity to fully participate in the review of any environmental impact statement eventually prepared and reserves its right to modify positions taken on the MRS at this early stage based on information presented in that statement and other information that may become available.

FINDINGS

The Study Group identified a number of concerns or potentially negative impacts of MRS. These impacts and the conditions that would convert the facility's liabilities into assets are described below.

Business Recruitment and Expansion

Impact or Concern: MRS could hinder the community's efforts to diversify and expand its commercial/industrial base.

Discussion: DOE dominance of the Oak Ridge economy hinders both the stability and growth of that economy. Community assistance from DOE are far below what a comparably sized private firm would contribute to the local tax base. The size of the payments has been an unpredictable element of local government budgeting. The local economy is subject to large swings as its dominant industry shifts priorities. DOE controls much of the land suitable for large industrial users. While DOE has in the past sold some parcels to the city for specific private developments, the procedure is cumbersome and time-consuming. Lack of already available parcels has discouraged potential recruits. Consequences for private businesses are a high tax rate, considerable uncertainty about the level of future taxes and stability of the economy, and added impediments in making a location decision.

As presently constrained by the Nuclear Waste Policy Act (NWPA), MRS is another government facility that makes little, if any, contribution to the local tax base. MRS is funded off-budget by the Nuclear Waste Fund, but is still subject to ual Congressional appropriations. MRS is tied to the fortunes of energy supply and subject to many of the same cyclical forces that affect the level of DOE activity at existing facilities. Thus, MRS exacerbates the community's dependence on a single industry, while using one of the few large sites suitable for private industry. It renders diversification and expansion of the economy more difficult.

For repositories, but not MRS, the NWPA establishes a new concept, grants-equivalent-to-taxes. "The Secretary shall grant" payments from the

Nuclear Waste Fund to state and local governments in the amounts they would receive "were they authorized to tax" repositories as they tax "other real property and industrial activities." If Congress were to extend the tax equivalency concept to MRS, the project could become an asset to the community's diversification and recruitment efforts. It could expand the tax base and both lower and stabilize the tax rate. But the tax equivalence concept also raises many questions: How is the MRS' assessment value to be determined? How are disputes to be settled? Is personal property to be excluded? Grants-equivalent-to-taxes are of unknown value until these issues are resolved.

The relationship of MRS to the local business community will have a significant bearing on its ultimate local impact. Local business relationships and community service are to be encouraged to the maximum possible extent. For instance, proximity to the project is an established precedent in federal procurement practice. In the very important and relevant example of its Hanford operations, DOE required operating contractors to also locate some non-DOE business in the community. DOE can and should apply both principles to MRS procurement and contracting. MRS and the related transportation system operations will require extensive employee training programs; use of the area's established educational institutions for this purpose can help the local communities attract additional private investment.

Offsetting Conditions:

DOE should

1) Extend the grants-equivalent-to-taxes concept to MRS in the authorizing legislation,

2) Extend the grants-equivalent-to-taxes concept to all MRS-related property, real and personal,

3) Reach a binding agreement with the State of Tennessee and local governments, as appropriate, detailing how tax equivalency will be administered, including valuation formulas and provision for an arbitration board or alternative means for settling disputes,

4) Include proximity as a decision factor in MRS procurement so that, to the fullest extent possible, all related research and development, goods, and services are acquired within the affected community, region, or state,

5) Make available for other industrial uses the Oak Ridge/Roane County site not chosen for MRS,

6) Move management of MRS design, construction, and operation to Oak Ridge Operations,

7) Retain management of transportation operations for the entire waste management system at Oak Ridge Operations,

8) Require, to the greatest extent possible, that all MRS- and transportation-related activities are conducted in the local private sector and on privately owned land,

9) Require transportation system operators to establish MRS-related service and operations facilities in East Tennessee,

10) Include success in assisting the Oak Ridge/Roane County community toward its self-sufficiency goals as a factor in the contract structure for MRS and transportation system operators,

11) Require MRS and transportation system operators to locate other, non-DOE business in the Oak Ridge/Roane County area, and

12) Establish training programs at local educational institutions for training MRS and transportation employees, including programs in health and safety monitoring, remote handling systems operation and maintenance, communications system operation and maintenance, transportation fleet service and maintenance, and cask service and maintenance.

Residential Recruitment and Retention

Impact or Concern: MRS could make more difficult the community's efforts to recruit and retain new and younger residents.

Discussion: High and uncertain tax levels discourage potential residents from locating in Oak Ridge just as they discourage potential business location. Lack of diversification in the economy forces many of the young people who grew up here to move elsewhere for employment. Oak Ridge population has been declining for some time and the community wishes to reverse this trend.

Residential recruitment is even more difficult in light of recent years' revelations of DOE's past environmental practices. The perceptions that Oak Ridge is dangerously polluted and that DOE is insensitive to environmental concerns will be very hard to alter. Adding spent nuclear fuel to the local inventory of hazardous substances can only intensify concern about the local environment.

MRS' impact on residential populations has both economic and perceptual roots and DOE must deal with both. The economic remedy is, in part, tax equivalency. Lower, more stable tax rates and greater economic diversity will help attract and retain residents. Efforts by operating contractors to encourage local residency can also be helpful. To help counter the perceptions that Oak Ridge is polluted and that DOE is insensitive, DOE must clean up existing problems and concede some monitoring and enforcement authority to state and local governments.

Offsetting Conditions:

DOE should

1) Extend the grants-equivalent-to-taxes concept to MRS in the authorizing legislation,

2) Extend the grants-equivalent-to-taxes concept to all property, real or personal,

3) Reach a binding agreement with the State of Tennessee and local governments, as appropriate, detailing how tax equivalency will be administered, including valuation formulas and provision for an arbitration board or alternative means for settling disputes,

4) Require MRS operating contractors to encourage employees to settle in Oak Ridge and/or Roane County, and

5) Take immediate steps to clean up existing environmental problems and to reestablish trust in its sensitivity to local and regional environmental concerns.

Institutional Trust

Impact or Concern: DOE's environmental record has severely eroded trust in federal institutions and has damaged the regional and national reputation of Oak Ridge; MRS would add to these burdens the public anxiety over spent nuclear fuel.

Discussion: As DOE's environmental record has come to light in recent years, its credibility and trustworthiness have been damaged nationally, regionally, and even in the Oak Ridge/Roane County communities. In turn, the local communities' reputations also suffered.

Trust in DOE must be restored before a facility so controversial as MRS is acceptable in Oak Ridge and Roane County. Reestablishing trust will involve correcting current problems, a willingness to share authority, and innovative information-sharing mechanisms.

DOE has begun a major effort to clean up its environmental problems at Oak Ridge facilities. But the program's goals, schedule, and results are neither publicly understandable nor enforceable. Cleanup proceeds at the discretion of the current administration. Clear goals and an enforceable schedule are needed so the public can understand what the program is to accomplish and can be assured that it will be continued.

Public education about the progress of DOE's environmental cleanup is essential. This function should be performed by the local governments. DOE is not institutionally suited to the role nor does it have as large a stake in the outcome as do Oak Ridge and Roane County.

An innovative approach to public environmental information is found at DOE's Nevada Test Site, where monitoring stations are located in surrounding communities and operated by non-employee citizens. This program affords local citizens direct access to environmental data. Such a program should be established in communities around DOE's Oak Ridge facilities.

Offsetting Conditions:

DOE should

1) Bring local facilities into compliance with state and federal environmental regulations before NRC construction permit for MRS can be granted,

2) Reach a binding agreement with the State of Tennessee and local governments, as appropriate, granting to a joint state/local board (a) access to MRS and its compliance records, (b) authority to monitor compliance with state and federal regulations, (c) authority to enforce those regulations, and (d) authority, with cause, to refuse additional shipments,

3) Finance a significant preoperational public education program, beginning immediately, conducted by the city and county to address progress being made by DOE in resolving environmental problems and to promote the communities' general quality of life, and

4) Reimburse the U.S. Environmental Protection Agency or appropriate state agency for a program to establish a network of monitoring stations in the local communities and train non-employee citizens to operate the equipment and interpret its measurements.

Preoperational and Postoperational Impacts and Costs

Impact or Concern: The prospect of MRS could impede business and residential growth before the facility begins operation.

Discussion: The list of local, large projects that never were built or operated is distressingly long. The Clinch River Breeder Reactor is only the most recent and prominent example of the uncertainty of federal commitment to large nuclear projects. While MRS would be funded off-budget, by the Nuclear Waste Fund, the project would still be subject to an annual Congressional appropriation process and its completion is not assured.

Even with certain commitment and funding, MRS will not be operational for a decade. During this decade, uncertainty about the ultimate impact of MRS on the local communities will be greatest and perceptions of their economic and environmental future will be most subject to a negativism that could become a self-fulfilling prophesy.

It is imperative that the MRS prospect be a positive force in shaping perceptions of the local and regional economic and environmental future. These communities cannot accept MRS today, with all the negative perceptions that accompany any nuclear waste facility, solely on the basis of future benefits. MRS must make a real contribution to the local environment and economy during the decade between authorization and operation.

Similarly, when the MRS ceases operations in the distant future, it must not be allowed to sit vacant for several years producing no economic benefit for the communities. The MRS will occupy a valuable site that might have been used for alternative industrial purposes.

Offsetting Conditions:

DOE should

1) Make significant progress toward cleanup of existing environmental problems including (a) a definite and observable schedule for bringing all local facilities into full compliance with state and federal regulations, and (b) a commitment to achieve compliance before accepting an NRC construction permit,

2) Reach a binding agreement with the State of Tennessee and local governments, as appropriate, to pay annual impact assistance payments, in specified amounts (Roane County and Oak Ridge payments to be equal to the tax equivalency grants generated by a $1 billion MRS facility), during the period between authorization and operation and again between cessation of operations and full decommissioning, for use by these entities for development purposes, and

3) Begin immediately to take an aggressive role in support of the communities' diversification efforts.

Tourism and Aesthetics

Impact or Concern: Conventional wisdom indicates that the MRS will most likely produce a negative image of Oak Ridge/Roane County and discourage local and regional tourism.

Discussion: Present DOE facilities in Oak Ridge are not well understood, even in surrounding communities. The aura of mystery and secrecy unique to Oak Ridge's origin has never been completely dispelled. Much that exists in Oak Ridge today is of broad interest and could help to make tourism a more important contributor to the local economy if DOE restrictions on its facilities, including the American Museum of Science and Energy, were relaxed.

The negative connotations of nuclear waste are likely to affect Oak Ridge's and Roane County's image and further discourage tourism. Yet perceptions of MRS can be significantly affected by the relationship between the project and the public. If MRS becomes another mysterious project hidden in an East Tennessee hollow, negative public perception will be supported. An aesthetically pleasing and highly visible facility can help

to make those perceptions positive and it is imperative that DOE make MRS accessible and visible.

Offsetting Conditions:

DOE should

1) Construct, support, and promote new exhibits in the American Museum of Science and Energy to interpret and explain existing DOE Oak Ridge facilities, beginning immediately,

2) Construct, support, and promote new exhibits in the American Museum of Science and Energy to explain MRS and its role in the nuclear fuel cycle, beginning immediately, and

3) Construct, staff, operate, and promote a visitors center at the MRS facility, and aesthetically design and landscape the entire MRS complex.

Site Neighbors

Impact or Concern: MRS construction, operation, and decommissioning may severely inconvenience residents located near the site and the facility might cause significant property values loss for nearby landowners.

Discussion: Noise and dust associated with the heavy construction required by MRS will create a considerable nuisance for nearby residents, especially if the construction workday extends beyond a single shift. Neighbors of the CRBR site have already suffered through digging of the hole and now must endure its refilling. Some landowners are concerned about loss of property value during construction, operation and decommissioning.

Conventional legal remedies are costly and uncertain for the affected parties, yet the potential value of loss is small compared to total MRS cost. DOE can assume some of this potential cost at negligible financial risk. Insuring property values against loss caused by nearby development is an established precedent. Compensation for construction, operation and decommissioning nuisances should be arranged.

Offsetting Conditions:

DOE should

1) Reach a binding agreement with the appropriate units of government (a) guaranteeing property values of site neighbors, (b) arranging for compensation of site neighbors for construction, operating, and decommissioning nuisances, and (c) establishing procedures (e.g., binding arbitration) for conflict resolution.

Legislative Issues--Financial Authority

Impact or Concern: The Nuclear Waste Policy Act restricts the authority of DOE to grant the conditions Roane County and Oak Ridge wish to place on acceptance of MRS.

Discussion: The NWPA authorizes certain incentives for repository siting but, by omission, restricts the scope of incentives available for MRS siting. This deficiency must be corrected in order for DOE to accede to the conditions Roane County and Oak Ridge place on MRS acceptability.

Section 116(c), Financial Assistance, applicable for repository siting, authorizes payments under three categories: impact mitigation, grants-equivalent-to-taxes, and grants "authorized by written agreement entered into pursuant to subsection 117(c)." By contrast, the parallel section applicable to MRS siting, Section 141(f), Impact Assistance, permits only narrowly defined impact mitigation. These payments are restricted to "planning, construction, maintenance, and provision of public services related to the siting of such facility." Unless MRS authorizing legislation includes wording similar to 116(c) in addition to the currently applicable wording of 141(f), DOE will have no authority to accede to the conditions Roane County and Oak Ridge place on MRS acceptability.

The Act neglects to mention agreements between DOE and units of local government, yet impacts are most strongly felt at the local level. Direct agreements with local governments are needed.

Offsetting Conditions:

Congress should, in the MRS authorizing legislation

1) Include wording similar to Section 116(c),

2) Enable negotiation of agreements with units of local government similar to those authorized under Section 117(c), and

3) Specify that agreements must be completed before the state's right to issue a notice of disapproval expires (In authorizing the MRS, Congress should provide that the right to issue a notice of disapproval expires at the end of the 60-day period specified by the Nuclear Waste Policy Act or six months after commencement of C&C negotiations with state and local governments, whichever is later.) and,

4) Give DOE authority to make payments relative to MRS upon Congressional authorization of the project.

Legislative Issues - Permanence

Impact or Concern: Concern that MRS will become a de facto permanent repository may hinder economic growth and development.

Discussion: The possibility that extended delays in siting permanent repositories would de facto convert MRS into a permanent storage facility is a negative factor influencing business and residential location decisions. Oak Ridge is not suitable for permanent geological storage. Firm legal limitation of the purpose of MRS could allay fears that the eventual use of the facility could differ from uses presently proposed by DOE.

Offsetting Conditions:

Congress should, in the MRS authorizing legislation

1) Impose a storage limit of 15,000 MTU,

2) Specify that MRS cannot operate until a permanent repository site has been authorized and approved by Congress,

3) Specify that any future proposal to raise this limit or alter the use and purposes of the facility by DOE or Congress would grant to the State of Tennessee the same rights and privileges afforded by the NWPA, namely the right to issue a notice of disapproval and rights to consultation and cooperation, and

4) Provide for decommissioning and decontamination of all MRS facilities immediately upon completion of its mission.

Miscellaneous Issues

The Study Group understands that the NWPA requires DOE to provide or pay for all necessary infrastructure improvements and security services (utilities, roadway improvements, fire protection, police services). Therefore these items have been omitted from consideration at this stage. Some items, particularly roadway improvements, will require the attention of local governments at the appropriate point in the MRS planning process.

The Study Group also understands that the tax equivalency provision of the NWPA applies to existing and future taxes. Should the state legislate a new tax at some future data applicable to a private business performing the function of the MRS, it is the Study Group's understanding that DOE would pay grants-equivalent-to-taxes in the equivalent amount.

RECOMMENDATIONS

Historical behavior of DOE in the local area has led to a situation of distrust. Regardless of the cause, past DOE policies and activities have placed the community in a situation of serious economic disadvantage relative to the surrounding area. Current local disadvantages include abnormally high tax rates, the majority of developable land unavailable for development because of federal ownership, and a national reputation of the community as an environmental disaster. The current economic forces controlling the community provide a higher than normal level of uncertainty which makes industrial recruitment and local industrial expansion inordinately difficult. If any further DOE activity in the community is to be a viable undertaking, DOE must now accept an aggressive leadership role in dealing with the economic problems of the community that have resulted from their past and current activities. In concert with local authorities these economic problems must be resolved. Only through such cooperation can confidence in DOE be restored. It cannot wait for the deployment of the MRS or that deployment will never take place.

The Socioeconomic Study Group of the Clinch River MRS Task Force views the MRS as unacceptable unless subject to the following conditions:

1) That MRS authorizing legislation will

   (a) Include a section similar to Nuclear Waste Policy Act Section 116(c) to permit tax equivalency payments on real and personal property and other financial incentives to units of local government (payments to continue through decommissioning),

   (b) Impose a storage limit of 15,000 metric tons,

   (c) Specify that MRS cannot operate until a permanent repository site has been authorized and approved by Congress,

   (d) Specify that any future proposal to raise the 15,000 metric ton limit or to alter the authorized purposes and uses of the facility will grant to the State of Tennessee the same rights to consultation and cooperation and to issue a notice of disapproval as it currently has under the Nuclear Waste Policy Act,

(e) Provide for decommissioning and decontamination immediately upon completion of MRS' mission,

(f) Provide for agreements with units of local government similar to those authorized under Nuclear Waste Policy Act Section 117(c),

(g) Specify that agreements must be completed before the state's right to issue a notice of disapproval expires (In authorizing the MRS, Congress should provide that the right to issue a notice of disapproval expires at the end of the 60-day period specified by the Nuclear Waste Policy Act or six months after commencement of C&C negotiations with state and local governments, whichever is later.) and,

(h) Give DOE authority to make payments relative to MRS upon Congressional authorization of the project.

2) That the Department of Energy will enter into binding agreements with the State of Tennessee and local units of government, as appropriate, including, but not limited to,

(a) Specification of how tax equivalency will be administered, including valuation formulas, and provision for an arbitration board or alternative means for settling disputes,

(b) A pledge to include proximity to Oak Ridge as a decision factor in MRS procurement so that, to the fullest extent possible, all related research, development, goods, and services are acquired within the affected communities, region, or state,

(c) A pledge to make available for private industrial development either the Bear Creek site or the CRBR site, whichever is not chosen as the MRS site, or other comparable sites in Roane County,

(d) A schedule for bringing all DOE Oak Ridge facilities into compliance with state and federal environmental regulations, and a pledge to not accept an NRC construction permit for MRS until compliance has been achieved,

(e) Establishment of a joint state and local board with authority to monitor and enforce MRS compliance with all state and federal regulations and, for cause, to refuse additional shipments,

(f) A schedule of annual impact assistance payments to be made to state and local governments from authorization until operation, and from cessation of operations until full decommissioning and decontamination, for purposes of regional development (Roane

County and Oak Ridge payments to be equal to the tax equivalency grants generated by a $1 billion MRS facility),

(g) A pledge to construct, support, and promote, upon MRS authorization, new exhibits in the American Museum of Science and Energy, for the purpose of explaining MRS and its role in the integrated nuclear fuel cycle and for explaining and interpreting existing DOE Oak Ridge facilities,

(h) A pledge to construct, staff, operate, and promote an MRS visitors center for the purpose of explaining MRS and its role in the integrated nuclear fuel cycle, and to aesthetically design and landscape the entire MRS complex,

(i) A simple and inexpensive procedure to guarantee property values of property owners near the MRS site and along the railway spur serving the facility,

(j) A pledge to establish training programs at local educational institutions to provide necessary employee training for MRS and the transportation system, including programs in health and safety monitoring, remote handling systems operation and maintenance, communications system operation and maintenance, storage cask manufacture and maintenance, transportation fleet service and maintenance, transportation cask service and maintenance,

(k) A pledge to move management of MRS design, construction, and operation to the Oak Ridge Operations office and to retain management of transportation operations for the entire waste management system at Oak Ridge Operations,

(l) A pledge to require, to the greatest extent possible, that all MRS- and transportation-related activities be conducted in the local private sector and on privately owned land,

(m) A pledge to require transportation system operators to establish MRS-related service and operations facilities in East Tennessee,

(n) A pledge to (1) include success in assisting Oak Ridge and Roane County toward their self-sufficiency goals as a factor in the contract structure for MRS and transportation system operators, (2) require those operators to locate other, non-DOE business in the Oak Ridge/Roane County area, and (3) require those contractors to encourage their employees to settle in Oak Ridge or Roane County,

(o) A pledge to finance a significant preoperational public education program, beginning upon authorization, conducted by the city and county to address progress being made by DOE in resolving environmental problems and to promote the communities' general quality of life,

(p) A pledge to reimburse the U.S. Environmental Protection Agency or appropriate state agency for a program to establish a network of monitoring stations in the local communities, prior to and during construction, and train non-employee citizens to operate the equipment and interpret its measurements, and

(q) A pledge to immediately take an aggressive role in support of the Roane County and Oak Ridge diversification efforts.

Unless these conditions are satisfied, the proposed monitored, retrievable storage facility will be a burden to the Roane County-Oak Ridge communities. We recommend that the Clinch River MRS Task Force disapprove the project, unless there is a satisfactory resolution of the above concerns.

TRANSPORTATION STUDY GROUP REPORT

FINAL REPORT

TO THE

CLINCH RIVER MRS TASK FORCE

from the

TRANSPORTATION STUDY GROUP

on the

PROPOSED

MONITORED RETRIEVABLE STORAGE FACILITY

IN ROANE COUNTY/OAK RIDGE, TENNESSEE

Chairman:
Shirley P. Hendrix

Vice-Chairman:
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October 15, 1985

CONTENTS

SUMMARY

After several weeks of collecting information and intensive study, the Transportation Study Group has defined areas of major impact that need action to make an MRS acceptable.

(1) Assuming that a "gold star" inspection (defined as inspection for rigid adherence to standards for radiological safety, vehicle safety, and personnel safety) is performed on each shipment of spent reactor fuel at the place of origin, another "gold star" inspection should be made by a non-DOE agency at the MRS site on each transport vehicle entering and leaving the MRS. Any violations of regulations or standards should be dealt with swiftly and effectively, up to and including suspension of shipments.

(2) Railroad tracks for the system to be used at either proposed Oak Ridge site must be upgraded to Class IV for use to and from the MRS. In addition, these questions need to be addressed by DOE:

. How close are the tracks to high-density facilities such as hospitals, schools, shopping centers, prisons, etc.?

. What are the volumes of hazardous materials the line transports each year?

. What is the mainline track quality from Oak Ridge to repository sites and to utilities with rail service?

(3) Preferred truck routes to either proposed MRS site in Oak Ridge should be State Road 95 or State Road 58, but neither highway is acceptable as a route in its present condition. Another possible route is a new exit built from I-40 onto the southern tip of the CRBRP peninsula, a distance of about 1/2 mile. Routes that should be excluded except for emergency use are (a) exits from I-75 into Lake City, Clinton, and Oak Ridge (SR 61) and (b) any exit onto Pellissippi Parkway (I-162).

(4) One escort vehicle should accompany each shipment to provide safety and redundant communication. More than one highway escort is a traffic hazard, as are flashing lights on the escort vehicle and the enforced maintaining of a highway speed limit less than the maximum allowable under prevailing conditions. (Note: reduced speed limits for dedicated trains are valid safety precautions.)

(5) An emergency response plan for transportation should be in place before an MRS becomes licensed, and it should include the entire scope of operations in Tennessee.

(6) A plan for emergency response training should be in place before an MRS becomes licensed, and emergency responders from across the state should be trained, funding to be from the Waste Management Fund.

(7) Carriers moving shipments to and from the MRS should adhere to all state and federal regulations to which any commercial carrier is subject.

In addition to these major issues, the Study Group also addressed accident probability, barge transport, cask safety and cask contents, prenotification, and safeguards. Summaries, conclusions, and recommendations are presented.

INTRODUCTION

One of the aspects of an MRS that concerns the public is the transportation of spent reactor fuel. Of the 100 million packages of hazardous materials shipped in the United States each year, spent fuel constitutes less than 1%. Spent fuel of varying sizes, types, origins, and ages has been safely transported in the United States, including Tennessee, for over 30 years. During that time, no transportation accident involving a release of radioactivity causing death or injury has ever occurred.

Nevertheless, no facility has ever been built with the transportation requirements of the magnitude proposed for the MRS. And while the MRS would reduce the overall number of cask miles to a repository for spent fuel, it would increase shipments of radioactive materials into a state with an MRS, concentrating them in the area immediately surrounding the facility.

Citizens are concerned, and rightly so, with hazardous materials shipped through their communities. What are the risks related to the transport of nuclear materials to an MRS? How do these compare with the transport of nonnuclear hazardous materials? What are the measures that can be taken to prevent accidents? Who will be responsible for making safety regulations, and how will they be enforced? What are the chances of a major radioactive release in transit? How will those who might be hurt in an accident be taken care of, and who will pay for injuries and property damages?

The Study Group attempted to answer these questions, first by categorizing transportation concerns as follows:

(1) Materials handled by or shipped through an MRS facility.

(2) Routing of trucks, trains, and barges.

(3) Infrastructure requirements.

(4) Vehicle configuration and operation, including cask safety.

(5) Inspections.

(6) Emergency response.

The group confined its study of these issues to the four counties that would be immediately impacted by transport of nuclear materials to and from an MRS located in Oak Ridge. These are Roane (in which the facility would be located), Anderson, Loudon, and Knox.

Study Group members then searched the literature, including reports opposing an MRS; examined state and federal regulations; viewed films, attended meetings sponsored by US-DOT and NRC; consulted with authorities in the field through personal contacts and by arranging a public workshop; queried DOE; accepted comments and suggestions from the public; and visited the following sites with activities germane to an MRS:

. Fuel handling and storage facilities at Morris, Illinois.

. Fuel handling and storage facilities at DOE's Idaho National Engineering Laboratory.

. Fuel handling and storage facilities at DOE's Nevada Test Site.

. High Flux Isotope Reactor and fuel storage, Oak Ridge National Laboratory (ORNL).

. Cask testing at the Tower Shielding Facility, ORNL.

. Cask testing at Sandia National Laboratory, Albuquerque.

. Fuel Recycle Division remote technology facilities, ORNL.

. Radiation Emergency Assistance Center/Training Site, Oak Ridge Associated Universities.

Complete answers to all of the group's questions are not available. For example:

. While the Price-Anderson Act covers liability for accidents involving spent fuel in transit, it is not clear what agency is responsible for covering the costs of a preventive evacuation carried out by local first responders to an accident. This concern needs to be addressed by DOE.

. Studies by DOE contractors, such as accident analyses on transportation casks, will continue.

. Detailed procedures and criteria, such as those for inspections and emergency response training, will be developed further by national and regional organizations.

Consequently, our study is preliminary, and the group recommends that communication be continued between the appropriate federal agencies and local governments as the MRS concept develops. If an MRS is approved by Congress, any additional recommendations from the affected local governments concerning the transport of spent fuel should be given first priority by DOE.

The following sections examine the impacts of transportation of high-level wastes to and from an Oak Ridge MRS and present conclusions and suggestions for mitigation of these impacts. Where information is not yet available, notice is given.

The statement of mission and issues adopted by the Transportation Study Group is included as Appendix B.

THE PROBABILITY OF A TRUCK ACCIDENT RESULTING IN A SIGNIFICANT RELEASE OF RADIOACTIVE MATERIAL

Discussion

For the last 10 years or so, the truck accident rate has remained relatively constant at about 2.5 truck accidents per million miles. These accidents range from fender benders to very serious. Assuming that the average distance from the reactors to the MRS is 1000 miles, and that the MRS received five truck shipments per day for 200 working days per year, then we would "expect" 2.5 accidents per year. (An accident is defined by the US-DOT as causing at least $2000 damage.)

Given an accident, what is the probability of a significant release? While the probability of a particular impact force is relatively well known, the hard part of the question is what impact force is required to cause the cask to fail. Preliminary results from studies underway at the Electric Power Research Institute and at the Lawrence Livermore National Laboratory indicate that the impact from the 30-foot regulatory test is more severe than at least 99.9% of all accidents. Thus, of the 2.5 accidents per year, only one in a thousand has the opportunity for any release, i.e., one chance in 400 per year.

From a statistical standpoint, this means that if the MRS operated 400 years, it can be "expected" that an accident equivalent to the regulatory test would occur sometime during the 400-year interval. But since an accident equivalent to the regulatory test would not result in a significant release, the probability of a significant radiological accident is even smaller, probably in the range of one chance in 10,000 years.

If all trucks are inspected, then the accident rate would be expected to decrease because accidents due to faulty equipment on the trucks transporting the fuel would be drastically reduced. Accidents that are caused by faulty equipment on other trucks and cars, however, would not be reduced.

Preliminary results indicate that the probability of a serious release from a rail accident is less than that from a truck accident. Serious fires are less likely than serious impact events for either trucks or trains.

Actual experience with Type B casks (those required to pass the 30-foot drop test, etc.) indicates a very low probability of a release. Four accidents have occurred that involved spent fuel casks (two were empty), and 46 other Type B casks have been involved in accidents. No Type B casks have released radioactivity in any accident!

Conclusion

The probability of a release is difficult to quantify, but it appears to be no more likely than one chance in 400 per year and probably is in the range of one chance in 10,000 per year. This means that if the MRS operates 10,000 years, a significant accident would be "expected" to occur. Studies underway at the Electric Power Research Institute and Lawrence Livermore National Laboratory will better quantify this probability. One hundred percent inspection of trucks should reduce the accident rate, but it does not appear that the possibility of a serious accident should be a major concern.

DEFINITION OF SHIPMENTS

Issue

DOE projects about 5 trucks a day and 10 train cars a month carrying spent fuel will be sent to an MRS. The contents of these shipments have been generally described in the documents prepared by DOE on the proposed facility. More defined information on the age and radioactivity of the spent fuel, the degree of fuel consolidation, and nonfuel materials was requested of DOE.

Discussion

The age of spent fuel — and consequently the thermal heat and radioactivity which are directly related to age — is important because it affects new cask designs. Current shipping casks are designed to hold relatively young fuel (e.g., 180 days), whereas the MRS will receive shipments of spent fuel five years old or older. The current intent is for the MRS to accept spent fuel on an "oldest fuel first" basis. Within 10 years, some spent fuel from utilities will be over 30 years of age, and there will be large amounts of 10-year-old fuel. New shipping casks can thus have reduced shielding and use the "saved" space to carry more fuel assemblies.

The following table presents a conservative estimate of typical thermal power and radioactivity of spent fuel coming to an MRS.

Time Since Discharge from Reactor (years)	Typical Thermal Power (watts/fuel assembly)		Typical Radioactivity (curies/fuel assembly)	
	PWR	BWR	PWR	BWR
20	420	160	120,000	45,000
10	560	220	190,000	72,000
5	1000	400	320,000	130,000

Some consolidation of fuel is anticipated at utilities (up to 10%), and that fuel would be shipped to an MRS along with the radioactive spacers, fittings, and other nonfuel materials resulting from consolidation.

It is estimated that about 0.19 shipments of compacted structural parts for every shipment of consolidated fuel will leave the MRS for a repository.(1)

Conclusion

New cask designs will be licensed by NRC before use. Transportation routes, infrastructure requirements, emergency response, and inspections will be independent of the contents of the casks shipped to an MRS.

Recommended Mitigation

DOE's Environmental Impact Statement should address the disposal of low-level wastes generated on site.

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(1) E. R. Johnson and N. B. McLeod, "Assessment of Centralized Spent Fuel Packaging and Storage Facilities," presented at the Conference on Solutions to Nuclear Transportation Issues, Atomic Industrial Forum, Inc., Monterey, CA, June 17, 1985.

THE SIGNIFICANCE OF THE REQUIREMENT THAT ONLY SPENT FUEL THAT HAS BEEN REMOVED FROM THE REACTOR AT LEAST FIVE YEARS BE TRANSPORTED

Discussion

Five-year-old fuel has a maximum heat output of about 1000 watts, which is the equivalent of 75-watt light bulbs spaced a foot apart on the 14-foot-long fuel assembly. This amount of heat can be accommodated without using water as a cask cavity coolant. Thus, current and anticipated future fuel shipments are said to be "dry" shipments, and postulated scenarios involving a loss-of-coolant accident would not lead to rapid heating of the fuel. Furthermore, there is no radioactive water to be released in an accident.

All casks have some material used specifically for neutron shielding. Many of the currently licensed casks, and possibly new casks to be designed specifically for five-year-old (and older) fuel, may have an external tank of water as a neutron shield. This water contains no radioactive material. Thus, if this shield tank water were to be lost due to an accident, no radioactive material would be released. Loss of the neutron shield means that the dose at a distance of 10 feet would increase from the regulatory limit of 10 mr/hr to something in the range of 50 to 100 mr/hr — not a significant hazard!

Conclusion

Five-year-old fuel has a heat output equivalent to 75-watt light bulbs spaced every foot along the 14-foot length of a fuel assembly.

Thus, no water coolant is required for fuel shipped to or from the MRS, and the debate about radioactive releases from accidents is largely moot.[1]

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[1] Office of Technology Assessment, Congress of the United States, "Managing the Nation's Commercial High-Level Radioactive Waste," OTA-O-171, March 1985.

ADEQUACY OF A TEST THAT RESULTS IN AN IMPACT SPEED OF 30 MPH

Issue

Spent fuel casks must be shown to withstand a 30-foot drop (in the most vulnerable position) onto an unyielding surface without significant leakage of the cask contents. A vertical drop from a height of 30 feet results in an impact velocity of 30 mph.

Discussion

An important factor is that, in the test, the cask impacts an unyielding surface. This requirement was specified because it is completely reproducible and is not subject to any interpretation differences which modeling of "real" or "typical" structures would involve. Thus, while the regulations specify an unrealistically low velocity, they also specify an unrealistically hard target. In a mathematical model, an unyielding surface is easily achieved. This means that all of the energy must be absorbed by the package. An unyielding surface occurring in a real accident would be an extraordinary situation.

For cask testing purposes at the Oak Ridge National Laboratory, an essentially unyielding surface is achieved with a 1,200,000-pound pad of reinforced concrete set on bedrock. To prevent energy absorption by cracking of the concrete surface when the cask hits it, two 10-inch plates of hard steel from old battleships cover the concrete. A combination of tests and analyses produced ratios of effective velocity

into yielding surface to the test velocity into an unyielding surface of 7 for soft soil, 3.4 for hard soil, and 2.2 for hard rock.[1] Thus, dropping the cask onto hard rock at 66 mph is expected to produce the same damage to the cask as dropping it at 30 mph onto an unyielding surface. Furthermore, if there is intervening material between the cask and the hard rock, such as the tractor truck cab, the trailer frame, etc., then the effective test velocity would have to be increased further to produce the same energy absorption by the cask itself as in the 30-foot drop test.

An unyielding surface in an actual accident is very unlikely. In a head-on crash, for example, the truck tractor would provide significant energy absorption; thus, the effective crash velocity experienced by the cask itself is reduced. To verify that engineering calculations accurately predict crash results, and to demonstrate that the 30-mph impact into an unyielding surface encompasses many real accidents at much higher velocities, four tests were conducted at Sandia National Laboratory:

(1) A tractor-trailer rig carrying a cask was crashed into a massive wall at 61 mph. The massive wall was 626 metric tons of concrete backed by 1580 metric tons of earth.

(2) Another tractor-trailer rig carrying the same cask was crashed into a massive wall at 84 mph.

(3) A locomotive going at 81 mph crashed into the side of a truck cask on a trailer (simulating a railroad crossing accident).

(4) A railcar carrying a rail cask was crashed into a massive wall at 81 mph.

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[1] J. D. McClure, et al., "Relative Response of Type-B Packages to Regulatory and Other Impact Test Environments," Proceedings Sixth International Symposium on Packaging and Transportation of Radioactive Materials, Berlin, FRG, November 1980.

In the first test, the tractor trailer impacted the wall at 61 mph, completely destroying the tractor and allowing the trailer to move forward and solidly impact the wall, crushing the front part of the trailer also. The cask velocity just as it impacted the wall was approximately 27 mph. Thus, the 61-mph test resulted in less impact to the cask than did the regulatory drop test (at 30 mph) due to the absorption of energy in the vehicle structure.(2)

In another test, a cask was dropped from 2000 feet onto very hard, undisturbed desert soil. The cask impacted at 235 mph and penetrated the soil a total of 52 inches. There was no observable damage to the cask.(3) Later, an identical cask was dropped at the Oak Ridge cask testing facility from a height of 30 feet, causing some cask deformation.(4) Thus, the 30-mph regulatory test produced more damage than the 235-mph test.

Conclusion

A 30-mph impact (i.e., a 30-foot drop) of a cask onto an unyielding surface is equivalent to, or worse than, an impact of the cask onto hard rock at about 66 mph or a 235-mph impact into hardpan soil. When the effects of the intervening structural material of the transport vehicle

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(2) M. Huerta, et al., "Impact Analysis of Spent Nuclear Fuel Shippimg Casks," SAND77-0466, July 1978.

(3) I. G. Waddoups, "Air Drop Test of Shielded Radioactive Material Containers," SAND75-0276, September 1975.

(4) L. B. Shappert, et al., "The Obsolete Cask Test Program: Test Number 2," ORNL-TM-1312, April 1975.

are considered, the crash speed of a tractor trailer or a railcar required to produce energy absorption by the cask equivalent to the 30-foot drop test is also much higher than 30 mph, even into unyielding surfaces. Studies[1,5] have estimated that the regulatory test conditions are more severe than at least 99 to 99.9% of all truck and train accidents.

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[5] Larry E. Fisher, et al., "An Evaluation of Current Regulations and Real Accident Conditions," Proceedings of Waste Management '85, Tucson, AZ, March 1985.

ADEQUACY OF A FIRE TEST AT 1475°F FOR 30 MINUTES

Issue

The NRC regulations specify that a spent fuel cask must be exposed to not less than a totally engulfing thermal radiation environment of 1475°F for 30 minutes.

Discussion

The NRC regulations are criticized for the following reasons:

(1) The average temperature of a hydrocarbon fueled fire is 1850°F.

(2) Fires last longer than 30 minutes.

(3) A torch fire test similar to that required for railroad tank cars should be required.

(4) The 1982 Caldecott Tunnel fire was more severe than the regulatory tests.

A key factor is the requirement for a totally engulfing fire because fires tend not to heat the same place all the time. The importance of this factor is that with an engulfing fire, the cask cannot transfer heat away. If only a portion of the cask is heated (as in a torch situation or most real fires), then heat is conducted along the cask in a direction away from the source of heat and then transferred to the atmosphere or to the ground.

The presence of a large cold body in a fire depresses the flame temperature so that, generally, fire temperatures must be at least 1850°F to effectively transfer heat equivalent to the regulatory requirement. A typical 30-minute fire test requires about 10,000 gallons of fuel, and to get the required exposure to an engulfing high flame

temperature, the cask must be elevated about 4 feet above the burning fuel. It is not easy to achieve the regulatory requirements.

It is true that some fuels may burn hotter than 1850°F and that some fires burn longer than 30 minutes. However, it is difficult to identify a fuel source that can produce a large and long fire without special burners and oxygen supplies. For example, a torch produced by a hole in an LPG railroad tank car could result in a 4-foot-diameter flame at 2190°F. Both analyses and tests have shown that such a fire lasting 30 minutes results in an inner cask wall temperature rise about one-half that of the required regulatory engulfing fire at a much lower temperature.[1]

In 1982, a fire occurred in the Caldecott Tunnel in California which burned about 8500 gallons of gasoline from a gasoline tank trailer. By analyzing the damage to the vehicle glass, aluminum, copper, and brass components and the tunnel concrete and steel components, Sandia National Laboratory investigators (on the scene before the debris was removed) concluded that the maximum fire temperature was about 1850°F for 28 to 40 minutes, and it was nearly uniform for a distance of 100 to 200 meters. The probability of such a fire in a tunnel is estimated as about 0.045 per year, and the probability of such a fire including any radioactive materials is about 0.000001 per year.[2]

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[1] M. G. Vigil, et al., "Measured Thermal Response of Full-Scale Spent Fuel Cask to a Torch Environment," Nuclear Technology, Vol. 61, June 1983.

[2] D. W. Larson, et al., "The Caldecott Tunnel Fire Thermal Environment Regulatory Considerations and Probabilities," Proceedings Seventh International Symposium on Packaging and Transportation of Radioactive Materials, New Orleans, LA, May 1983.

If a spent fuel cask had been exposed to the Caldecott Tunnel fire, the extent of thermal energy absorbed by the cask would have depended on the cask design. It could have ranged from less than the thermal test requirement to about twice the thermal test requirement.[2] Exceeding the cask test requirement, however, does not imply a serious radiation release. In 1978, a cask was exposed to an engulfing fire for 122 minutes, requiring 65,000 gallons of fuel. The cask absorbed about six times the thermal energy as would have occurred in the required thermal test; however, although the cask coolant relief valve relieved internal pressure (as it was designed to do), the amount of radioactivity which could have been released to the environment would not have been severe.[3]

It has been estimated that the combined fire temperature and duration required by the regulatory test envelopes 99.9% of all train fires and 99.83% of all truck fires.[4]

Conclusion

The required regulatory test envelopes all but a few fires, about one in a thousand. However, if the test thermal requirements were exceeded, no significant releases would be expected, even for thermal energy absorption several times that required by the test.

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(3) H. R. Yoshimura, "Full Scale Simulations of Accidents on Spent-Nuclear-Fuel Shipping Systems," Proceedings Fifth International Symposium on Packaging and Transportation of Radioactive Materials, Las Vegas, NV, May 1978.

(4) A. W. Dennis, "Predicted Occurrence Rate of Severe Transportation Accidents Involving Large Casks," Proceedings Fifth International Symposium on Packaging and Transportation of Radioactive Materials, Las Vegas, NV, May 1978.

Recommended Mitigations

Taking into account the large quantities of materials normally associated with rail transportation, considering the inherent difficulties that would be associated with controlling and extinguishing large fires in tunnels, and combining these with the lack of information from experience with railroad tunnel accidents involving fire, the recommended mitigations are as follows:

(1) Regulations governing rail shipments should prohibit trains carrying spent nuclear fuel from including cars carrying other hazardous materials, especially placarded flammable liquids or gases.

(2) Regulations should also prohibit trains carrying spent fuel shipments from being in railroad tunnels with other trains carrying placarded flammable liquids or gases.

RECOMMENDATION FOR AN INSPECTION FACILITY

A facility is recommended for inspecting incoming and outgoing shipments of radioactive materials at the MRS site. The facility would be operated by state or local officials (or possibly contractors) who would inspect for both compliance to federal regulations for transport of radioactive materials (e.g., external dose rate) and for compliance to state nonradiological regulations (e.g., properly working brakes). Thorough inspections would be made to assure rigid adherence to standards for

- radiological safety (e.g., radiological readings of vehicle loads,
- vehicle safety (e.g., maintenance of vehicles), and
- personnel safety (e.g., driver training and performance).

A point system will be established which would trigger various action levels. For example, five minor infractions would result in a letter from the inspection facility operator (with copies to state and local officials) to DOE as the shipper, to the private firm(s) employing the driver and/or owning the tractor trailer (railcar or barge) equipment, and to the utility from which the shipment originated, informing them that shipment privileges will be suspended if corrective action is not taken within 30 days. Similarly, 10 minor infractions or 1 major infraction would result in immediate suspension for six months of shipment privileges of the utility and/or the equipment owner and/or other responsible parties. The responsible (state) agency, in consultation with US-DOT or NRC, would define the infraction types, the action levels, etc.

It is intended that the inspection be sufficiently rigorous and the action levels sufficiently severe that additional inspection by the state at entry points into Tennessee and inspection by corridor states at their respective points of entry would not be considered a useful expenditure of taxpayer funds.

Although the general routes to be used will be determined by state officials following US-DOT guidelines, the specific route for a particular shipment will not be provided to state officials in advance. Rather, the planned route and confirmation that the route was used will be provided by DOE to the affected state(s) afterwards. The safeguards (e.g., prevention of sabotage) reasons for not revealing the exact route in advance are understood, but once the shipment arrives at the inspection facility, the reasons become moot. Therefore, as an immediate and independent verification, it is proposed that the planned route and the route confirmation be obtained by the inspection facility personnel.

In addition to copies of the warning and sanction letters (and responses), the operators of the inspection facility will provide reports to local, corridor state, and state officials every six months.

It is proposed that the facility be funded by the DOE, but it shall not be put under DOE control. Operating funds are to be provided from the Waste Management Fund.

INSPECTIONS

Issue

An MRS requires development and implementation of a comprehensive transportation system encompassing the nation's highways, rails, and, potentially, inland waterway systems and requires special personnel, equipment, and procedures to transport high-level radioactive materials. DOE intends to use private industry as much as possible. Quality assurance for the long-term transportation program requires rigorous and clearly defined inspections on a regular and continuing basis.

Discussion

Inspections will be needed at the utilities to assure that only NRC-approved casks are used and that they are loaded properly. Inspections will also be needed to assure compliance with regulations regarding the securing of casks to approved truck trailers, railcars, and barges. Compliance with transportation regulations at all government levels will need verification.

At present, federal and state departments of transportation and state agencies such as public service commissions provide training and personnel for inspections of equipment, vehicles, personnel, log books, etc., while truck and rail shipments are en route. For waterways, the U.S. Coast Guard provides inspection and monitoring services. Illinois and South Carolina currently require state inspections and escorts for all vehicles carrying high-level radioactive materials, and some other states are considering similar legislation. All states now require permits and some type of warning escort to transport unusual or potentially dangerous loads, such as oversize equipment, mobile homes, etc.

Tennessee. A Public Service Commission task statement proposes inspection at the state border of all trucks and trains carrying high-level radioactive materials. A TPSC motor carrier enforcement officer would escort a highway shipment to the nearest fixed inspection facility which would be manned by federal and state DOT and TPSC personnel. Safety inspections of each vehicle and hazardous material inspections of each shipping cask would be conducted, after which a TPSC vehicle would precede and a second would follow the shipment to the MRS. At the MRS permanent inspection site, each vehicle and shipping cask would be inspected by TPSC personnel. Trains would be met at the border by TPSC personnel qualified in inspection of rail equipment and transportation of high-level nuclear waste who would conduct an extensive inspection of shipping casks, railcars, road bed, and track, using the latest inspection equipment available. An escort vehicle would follow the train at a distance sufficient to assure that it would not be involved in an accident, should one occur. At the MRS, an inspection of shipping casks and railcar equipment would be made.

Conclusion

Currently, barge shipments are not anticipated. DOE has stated that it would comply with appropriate NRC and US-DOT regulations for truck and rail shipments. Enforcement of regulations beyond those proposed by NRC and US-DOT are an unnecessary expenditure of ratepayers' money.

Recommended Mitigations

As owner of the spent fuel, DOE should provide qualified inspectors and training similar to that currently provided for carriers of hazardous materials. DOE should also provide and train escort personnel to accompany each shipment from the point of origin to the MRS.

With regard to state regulations, the Study Group endorses the concept of highway vehicular escort. Flashing lights should be used only for emergencies, and trucks and their highway escorts should be allowed to travel up to the maximum posted speed limits, as safety dictates. Trains (and escorts) should observe a 35-mph speed limit for increased safety.

See also the section on shipment escorts.

ROUTING: OUTGOING RAIL

Issue

Shipments of consolidated spent fuel and other high-level wastes will leave an MRS for permanent repository primarily, if not entirely, by rail. DOE proposes to use dedicated trains for this purpose.

Discussion

See discussion of routing and infrastructure for incoming rail.

In addition, dedicated trains to a repository will need an adequate number of buffer cars and engineers, and speed limits and schedules will need to be established. Delays should be minimal, and dedicated trains stopped in switchyards should not be in the proximity of other placarded cars. Special training and qualification by responsible agencies will be required for engineers and other train personnel.

Impact Mitigations

The Study Group supports the concept of adequately equipped dedicated trains, priority scheduling and speed limits not to exceed 35 mph for shipments from an MRS to a permanent repository. Such trains, meeting the needs discussed above, should move at a steady rate over qualified track toward their destination by routes that are as short as possible. There should be a minimum of delay time for crew changes, and while in switchyards, a dedicated train should not be kept near other placarded cars. Further, trains to a repository should be scheduled to leave the MRS at times that do not conflict with local

school bus and plant traffic schedules. The Norfolk Southern Corporation would be an acceptable line for an Oak Ridge MRS if conditions cited for incoming rail shipments are in effect.

The Study Group supports the concept of qualification for engineers and other train personnel who transport high-level waste, and the group supports the concept of constant communication between train, escort, and communication center.

The rail line used would be expected to meet all FRA regulations.

ROUTING: TRUCK AND HIGHWAY INFRASTRUCTURE

Issue

Some 100 trucks per month of radioactive materials can be expected to traverse I-40 and I-75 coming to an Oak Ridge MRS. There are currently three major exits from I-40 leading to the proposed sites: State Road 58, State Road 95, and State Road 162 (Pellissippi Parkway). One major exit from I-75 leads to State Road 61. DOE plans to abide by the state's recommendations for primary and secondary routes to and from the MRS sites (while keeping within US-DOT routing criteria).

With recent improvements that have been made or that are currently under construction, I-75 and I-40 will meet design standards with one possible exception. The bridge over a county road at log mile 362.27 does not meet current standards for shoulder width.

Discussion

The CRBRP site is about five miles and the Beak Creek site is about nine miles from I-40 via SR 58. SR 58 from I-40 to the MRS sites has several deficiencies as it now stands. It has a 1984 ADT (Average Daily Traffic) count of 7910 vehicles. Minimum design standards for a traffic count of more than 5000 vehicles per day in a rural section require a four-lane highway with a depressed median (DWN No. RD-S-5, Standard Roadway Drawings TENN.DOT). This route was originally constructed in 1944 as a two-lane road with 8 inches of base stone and a D.B.S.T. surface. It has been resurfaced a couple of times since then with a total depth of asphalt of about 6 inches. In comparison, the interstate was constructed with 8 inches of base stone and 14 to 16 inches of asphalt.

This stretch of SR 58 includes two-laned Gallaher Bridge and a three-laned overpass. It has homes, businesses, and one center for handicapped children and adults close to the roadway. Road shoulders are narrow.

SR 95 from I-40 to Bear Creek is about six miles, and from there to CRBRP via Bear Creek Road is four more miles. SR 95 also is deficient according to current standards. It has a 1984 ADT count of 4920 vehicles. This would require only a two-lane highway at this time. However, the increased traffic to the MRS could easily put it above 5000 vehicles per day which would require four lanes. This stretch of highway has many sharp curves and steep hills that exceed current standards for maximum curvature and maximum grade. A portion of this route, from I-40 to 0.8 mile north of the Loudon County line, was built in 1961 and has adequate base and surface. The remaining section (to the intersection of SR 58) was built much earlier and does not meet standards for heavy loads. SR 95 includes two-laned VandenBulck Bridge. Only a church and two small businesses are near the roadway. The road traverses federal property.

SR 162 (Pellissippi Parkway) would meet all standards. However, it is a much longer distance from the interstate system to the proposed sites. SR 162 passes through a community business center backed by housing developments on both sides. Routing onto Bethel Valley Road to SR 95 or routing from Bethel Valley onto Bear Creek Road via Scarboro Road would put shipments near major

federal facilities with thousands of employees. Scarboro Road is a city road; Bethel Valley and Bear Creek Roads are on federal property. These latter three roads are primarily two-laned. A city industrial park is located along that portion of Bear Creek Road between the two proposed sites.

Bethel Valley and Bear Creek Roads are maintained by DOE, but they would probably require upgrading to accommodate the additional truck traffic. Other local roads that are maintained by the county or the city are not indicated as transport routes, but the use of the MRS could increase their traffic density. Some upgrading of certain roads might also be needed.

Conclusions

The increased truck traffic would probably cause a serious maintenance problem if additional base stone and asphalt were not added to state and local routes. Additional traffic could create a safety hazard unless routes are improved with new alignment and grade.

Impact Mitigation

The Transportation Study Group finds routing for MRS-bound trucks via Pellissippi Parkway and via I-75 exits to be unacceptable as either preferred or alternate routes; they should be used only if preferred and alternate routes are not available.

Further, the group believes that both SR 58 and SR 95 should be upgraded to TENN.DOT standards, which would be a new four-lane highway and a twin bridge across the Clinch River for SR 58. SR 95 should be upgraded with a new alignment and grade constructed to current standards.

If the traffic count is projected to increase to 5000 ADT, SR 95 should be four-laned and a new twin bridge constructed as well. SR 95 is the closest portal to either site for trucks from the east, and SR 58 is the closest for trucks from the west. Either improved road could become the preferred route, with the other serving as alternate.

A map on page 33 shows I-40, I-75, and State Roads 58 and 95 leading to both proposed MRS sites.

Local government bodies should expect and receive aid in making the needed improvements to these routes. The Study Group recommends that DOE cooperate to the fullest extent with the state in seeing that funds are provided for improvement of routes as indicated.

If the CRBRP site is chosen, an alternate route, though it seems less desirable, could be a new road of approximately 1/2 mile from I-40 to the southern tip of the peninsula. A cost-benefit analysis may be indicated if this route initially looks promising. Such a road would keep trucks on interstates for the longest time.

The Transportation Study Group believes that, as a rule, trucks to and from the MRS should avoid major traffic flows of the surrounding work population, and, to the extent possible, travel in adverse weather conditions should be avoided.

The Study Group supports the concept of constant communication between truck driver, escort, and communication center.

The Study Group also supports the implementation of a program for training and qualifying drivers of transports of high-level wastes, to be funded by DOE.


[map]

ROUTING: BARGE AND MIXED MODE

Issue

The former CRBRP site is directly accessible by barge. Truck service would have to be added to reach the Bear Creek site for an Oak Ridge MRS. The possibility exists for utilities sending spent fuel to an Oak Ridge MRS to use a combination of barge, railroad, and highway transport.

Discussion

Barge transport advantages are safety related: Routes do not cut through dense populations, speeds are slow, and water is readily available in case of fire.

Barge transport disadvantages are economic: Some of the affected utilities and proposed repository sites do not have ready access to waterways. Several large casks (i.e., rail-type) at one time would be required to make barge transport cost-effective. Casks would be limited in number and expensive to build and to lease. To commit several to slow travel would reduce their availability and increase their use charge.

A combination of barge and rail or truck transport to an Oak Ridge MRS seems unlikely because of the costs involved. With both rails and roads onto both proposed sites, the use of more than one mode of transport for shipments within the four-county area seems remote.

DOE does not propose to ship any high-level waste by air.

Conclusions

It does not appear that barge transport for a proposed MRS facility in Oak Ridge would be a high priority for development, nor does it seem likely that Anderson, Roane, Loudon, and Knox counties would be concerned with more than one mode of transport for any given shipment. The Transportation Study Group did not make a study of barge systems, barge routes, or the impacts of mixed-mode transport.

SHIPMENT ESCORTS

Issue

A proposed rule change by the Nuclear Regulatory Commission would eliminate the requirement for armed escorts to accompany shipments of spent nuclear fuel that is more than 150 days out of a reactor.

Discussion

In the past, NRC regulations have required that shipments of spent nuclear fuel and other materials of high radiation levels be accompanied by armed escorts, usually in separate vehicles, when passing through urban environs and other locations of high population concentrations. The principal rationale for vehicular escort is related to the assurance of safeguards against possible terrorist attacks or other acts of sabotage. Notwithstanding these original bases for escort requirements, it is the opinion of the Transportation Study Group that the principal benefit derived from an escort of spent fuel shipments is the ensured capability of early alarm in case of a transportation accident. Assuming that a critical element to successful mitigation of a transportation accident is the earliest possible intervention of emergency response resources, a requirement that escorts be provided in separate vehicles would ensure such early intervention.

Alternative methods of tracking shipment vehicles, discussed in concept, would rely on recent technological advances and involve schemes such as radio communications and possibly satellite tracking.

Recommended Mitigation

Until alternative methods of maintaining fail-safe tracking of shipment vehicles (e.g., satellite transponders), which are not dependent on action by vehicle personnel, can be fully developed and demonstrated, a DOE-provided, adequately trained escort in a separate vehicle should be provided for each shipment as an operational requirement for MRS transportation. The escort will assure continuous contact with the transportation control center and provide early emergency response.

EMERGENCY PLANNING

Issue

The expected frequencies of spent nuclear fuel shipments into, through, and out of Roane County/Oak Ridge will require enhanced levels of emergency planning, preparedness, and training.

Discussion

Documents on emergency response planning indicate the need for guidance in developing emergency response plans for accidents involving radioactive materials is not a recent problem. While responsibility for immediate protection for public safety rests with the local and state governments, it is clear that the potential need is high for technologically sophisticated resources to effect incident mitigation if transportation accidents occur that involve spent nuclear fuel.

As concluded by the Federal Emergency Management Agency through analysis of response to transportation accidents:[1]

> Response to some transportation accidents has been excellent but in other cases there have been problems. Some of the recurring problems include the following:
>
> - Inadequate coordination between organizations with assigned responsibilities;
> - Failure to predesignate a single organization for on-scene control and coordination;
> - Ineffective communication between on-scene groups and their emergency operations centers, public officials and the public through the media; and
> - Lack of active involvement of shippers and carriers in planning and preparedness activities with state and local governments.

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[1] Federal Emergency Management Agency, "Guidance for Developing State and Local Radiological Emergency Response Plans and Preparedness for Transportation Accidents," FEMA Rep-5, March 1983, p. 1.

Knowledge of these problems prior to construction of an MRS facility provides the opportunity to plan for their mitigation in a timely manner to assure that the experiences cited by FEMA are not replicated in Tennessee.

NRC licensing procedures require that approved emergency plans be developed for reactor sites. These emergency plans must include plans for addressing transportation accidents involving radioactive materials. NRC procedures also require periodic drills to ensure that personnel involved are properly trained and to provide evaluation of emergency plans.

Recommended Mitigation

NRC licensing, as proposed for the MRS facility, should include requirements for fully coordinated emergency plans in a fashion similar to those required for nuclear power reactors. In addition, because of the higher number of spent fuel shipments in the vicinity of the MRS, planning for transportation accidents along the shipping routes should be given special consideration. These plans should explicitly require involvement of both the shipper (i.e., DOE) and carriers. Involvement of the latter should be included as a clearly stated criterion in DOE shipping contracts.

TRAINING FOR EMERGENCY FIRST RESPONDERS

Issue

Local first responder groups and organizations impacted by shipments of spent fuel to an MRS should be adequately trained and equipped to protect the public's safety and themselves in the event of a transportation accident.

Discussion

The increased number of shipments associated with the siting of an MRS facility in Oak Ridge carries an increased probability for transportation-related accidents. This increased probability creates an increased potential for local-level fire service, rescue squad, and law enforcement agencies to become involved as first responders. Indications are that local-level first responder organizations along the proposed routes through Tennessee lack adequate training and basic equipment to address an accident in the most efficient and effective manner.

While the obvious answer to this concern is the provision of the necessary training and basic equipment, what is not so obvious is from what source funding will be provided. One approach is to conduct a simple risk-benefit analysis regarding funding. Such an analysis should be conducted at the level of the MRS operation rather than at the emergency response training and equipment level. Appropriate questions are:

. Who benefits from the siting of an MRS?

. Who is at risk as a result of that siting?

. Is the relative burden between benefactors and those at risk disproportionate?

PRENOTIFICATION OF SHIPMENTS

Issue

Federal regulations governing spent fuel shipments require notification to states prior to shipments through those states. Research indicates that little, if anything, is done with this prenotification and that in only a very few instances is the prenotification information shared with emergency service agencies at the local level.

Discussion

The original intent of prenotification seems to have been to allow states and their involved agencies to make planning decisions regarding resource allocations. The assumption was that prior notification would lead to better preparation and thus result in safer shipments, or at least enhanced accident response. Although it is generally agreed that local-level emergency service units would be likely to arrive first at the scene of a transportation accident, it is interesting to note that this "mitigation" type of information is not shared with the jurisdictions most likely to benefit from it.

The question, then, is: Does prenotification of shipments coming through a local jurisdiction enhance its capability to respond to a transportation accident? This question was raised at the emergency planning session of the Transportation Workshop held on September 6, 1985.[1]

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(1) Sponsored by the Transportation Study Group of the Clinch River MRS Task Force and held at Roane State Community College, Harriman, TN.

A majority of the panelists agreed that passing prenotification to the local level posed a time constraint problem and caused concern over the confidentiality. Moreoever, session attendees agreed that prenotification information should not be shared with the general public. Reasons ranged from security safeguards to traffic congestion from "rubber-neckers" to "reinforcement of the false stigma that spent fuel is more hazardous than any other hazardous material." Thus, the answer must be that it makes no different whether prenotification enhances local-level response capabilities, as such information is not likely to be provided through current structures.

Another consensus from session panelists was that the best means for enhancing local-level response capabilities is development of good emergency plans, proper initial and follow-up training of the response personnel, and provision of specialized equipment. If all of these components are in place, response to a transportation accident will be adequate.

Conclusions

Because the numbers of shipments estimated to enter an MRS are on the order of five trucks per day (in addition to about 10 trains per month), this effectively constitutes prenotification; i.e., as long as an MRS is operating, there will be shipments. The Transportation Study Group believes that as long as the recommended mitigations related to emergency planning activities and training are provided, prenotification to the local jurisdictions surrounding the MRS will not be required.

APPENDIX A

LIST OF RECOMMENDATIONS

(1) Communication should be continued between the appropriate federal agencies and local governments as the MRS concept develops. If an MRS is approved by Congress, any additional recommendations from the local governments concerning the transport of spent fuel should be given top-priority consideration by DOE.

(2) A "gold star" inspection (defined as inspection for rigid adherence to standards for radiological safety, vehicle safety, and personnel safety) should be made by a non-DOE agency at the MRS site on each transport vehicle (including trains) entering and leaving the MRS. Compliance to regulations should be strictly enforced. Any violations of regulations or standards should be dealt with swiftly and effectively, up to and including suspension of shipments. Operating funds for the inspection facility should be provided from the Waste Management Fund.

DOE should provide qualified inspectors at the point of shipment origin and at the MRS as well as training similar to that currently provided for carriers of hazardous materials.

(3) The Study Group supports the implementation of programs for training and qualifying drivers of transports of high-level wastes, such programs to be funded by DOE. The group also supports the concept of qualification for engineers and other train personnel who transport high-level wastes.

(4) Railroad tracks to be used at either proposed site should be Class IV. DOE should assure the upgrading to Class IV of current track within the four counties where necessary to accommodate freight trains carrying radioactive materials to and from the MRS, even if financial assistance to railroads is required.

DOE should assure that strengthening or replacement of railroad bridges, if required, will be carried out.

The Study Group supports the concept of adequately equipped dedicated trains with priority scheduling and speed limits not to exceed 35 mph for shipments from an MRS to a permanent repository. Such trains should move at a steady rate over qualified track toward their destination by routes that are as short as possible. There should be minimum delay time for crew changes, and while in switchyards, a dedicated train should not be kept near other placarded cars. Trains to a repository should be scheduled to leave the MRS at times that do not conflict with local school bus and plant traffic schedules.

Regulations should prohibit trains carrying spent nuclear fuel from including cars carrying other hazardous materials, and trains carrying spent fuel should not be in railroad tunnels with other trains transporting placarded flammable liquids or gases.

(5) Carriers moving shipments to and from an MRS should adhere to all state and federal regulations to which any commercial carrier is subject.

(6) The Study Group supports the concept of constant communication between truck driver, escort, and transportation communication center.

(7) Until a method of maintaining fail-safe tracking of shipment vehicles can be developed and demonstrated, DOE should train and provide an escort (in a separate vehicle) for each shipment from the point of origin to the MRS. Flashing lights on the escort should be used only for emergencies.

(8) State Road 58 should be upgraded to TENN.DOT standards, which include four lanes and twin bridges. SR 95 should be aligned and graded to current standards, and, if the traffic count is projected to increase to 5000 ADT, become four-laned and have a new twin bridge. DOE should cooperate to the fullest extent with the state in providing funds for these improvements.

Exits from I-75 and exits from I-40 onto SR 162 should be used only if preferred and alternate routes are not available.

As a rule, trucks to and from the MRS should avoid major traffic flows of the surrounding work population and, to the extent possible, travel during adverse weather conditions.

If the CRBRP project site is chosen, the feasibility of a new road of approximately 1/2 mile from I-40 to the southern tip of the peninsula should be investigated.

(9) NRC licensing of the MRS should include requirements for fully coordinated emergency plans similar to those required for nuclear power plants. Planning for transportation accidents along the shipping routes should be given special consideration. Plans should explicitly require involvement of both the shipper and the carriers, the latter having this requirement clearly stated in their shipping contracts.

(10) DOE should establish a training program for first responders in Tennessee similar to the Nevada program. Training should be at a site provided by DOE Oak Ridge Operations and be for fire service, emergency medical service, rescue squad, and law enforcement agencies from those jurisdictions along the approved transportation routes. Basic radiological equipment, funded through the Waste Management Fund, should be provided to agencies trained through the DOE program.

(11) DOE's Environmental Impact Statement should address the disposal of low-level wastes generated on site at the MRS.

APPENDIX B

TRANSPORTATION STUDY GROUP MISSION AND ISSUES

Geographic Area of Study Group Focus

It is assumed that statewide transportation issues will be dealt with by the Tennessee Department of Transportation and/or the Public Service Commission. The Study Group will focus specifically on transportation within a four-county area consisting of Anderson, Knox, Loudon, and Roane Counties.

Transportation Modes

The Study Group will consider truck, rail, and barge transportation modes.

Breadth and Depth of Study Efforts

The major objective of the Study Group is to ascertain how shipments in and out of the proposed MRS facility would be transported safely through the four-county target area. Except to the extent that such information must be generally considered in evaluating transportation safety issues, it will not be the Study Group's task to engage in detailed technical analyses of shipping and storage cask design, testing, and handling practices.

Perceptions of Safety

It is recognized that, whether based on fact or myth, public perception regarding safe transport of radioactive wastes will be a key consideration in its acceptance of the proposed MRS facility.

Conditions of Acceptance

The Transportation Study Group's contribution to the Task Force effort will be to evaluate local MRS transportation safety issues and note (1) transportation problems that would preclude local acceptance of the proposed MRS facility or (2) suggest conditions associated with the transportation of materials under which the proposed facility might be accepted.

Study Group Issues

Based on the considerations stated above, the Study Group will address the following issues:

1. Materials handled by or shipped through the proposed MRS facility
   - Substances transported — what fuel and nonfuel materials would be handled at, or shipped through, the facility?
   - Age, heat, and radioactivity of fuel — what ranges might be expected?
   - Degree of consolidation — would fuel or other materials be consolidated before delivery to the MRS?
   - Packaging — how would materials be packaged within the shipping casks?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

2. Routing of trucks, trains, and barges
   - Primary and alternative routes — would they be designated jointly by the federal, state, and local governments? Would there be only one designated route from the interstate system to the MRS facility?
   - Marshalling areas — if used, where would they be located and how would they be administered?
   - Notification of shipments — would state and local governments be notified of spent fuel and other material shipments to the MRS?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing and regulation by other federal agencies? Which would be governed through enacting legislation?

3. Infrastructure requirements
   - Design and condition of roadways, rail lines, river locks — what standards would apply?
   - Infrastructure maintenance impacts — what impact would shipments have on roadways and rail lines? Who would finance improvement and maintenance costs? Has DOE provided such assistance in the past in other locations?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

4. Vehicle configuration and operation
   - Size and design of trucks and trailers, trains, and barges — who will set standards?
   - Safety design of shipping casks — have safety tests been adequate and do they indicate satisfactory technology?
   - Position of fuel casks, cask cars, barges, etc. — will "buffer cars" be used between fuel cars in rail shipments? Will dedicated trains be used to bring fuel in and out of the facility?
   - Speed limits — will special speed limits be established and enforced?
   - Security — how will security be maintained and by whom?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

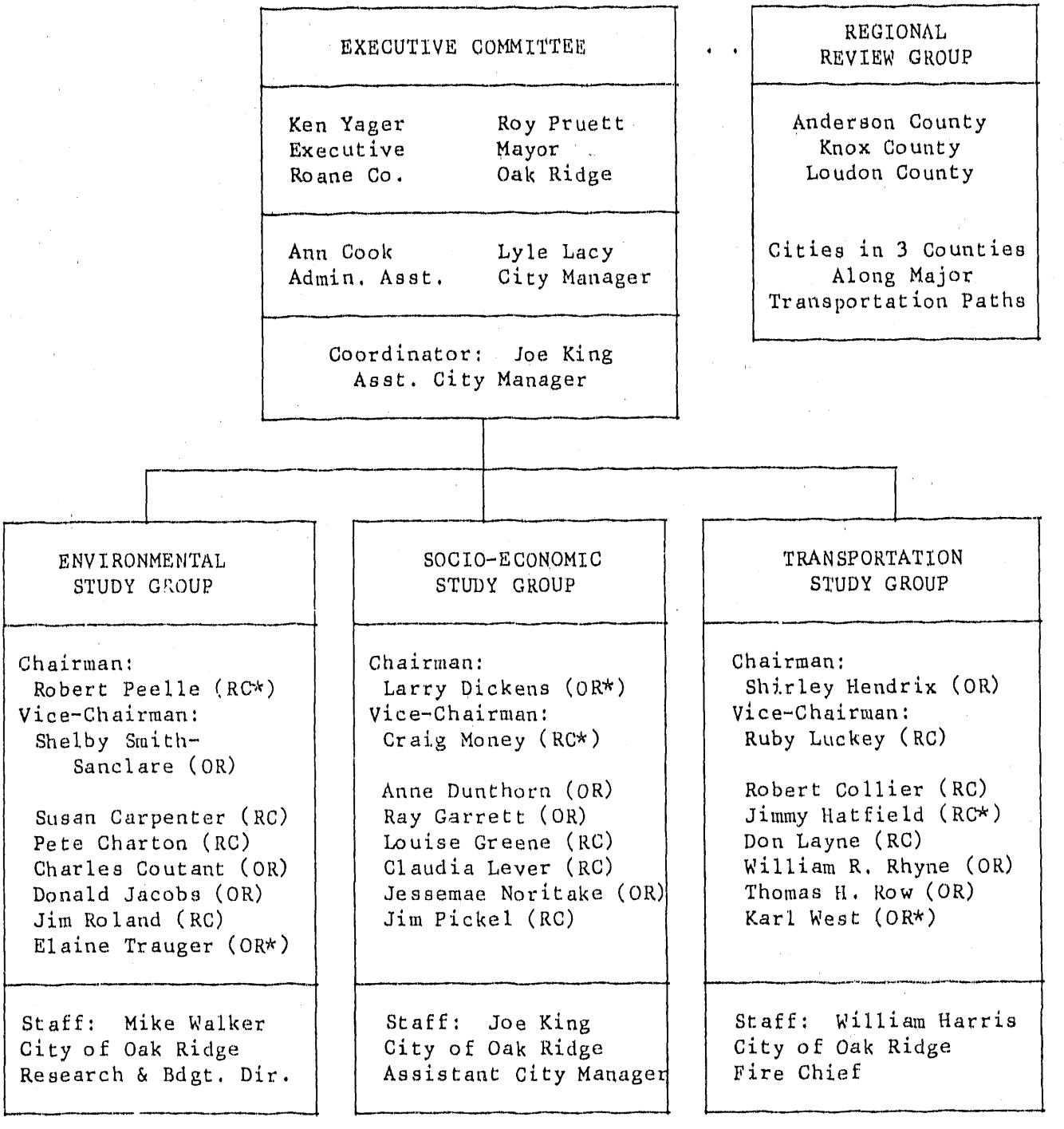
5. Inspections
   - Locations — will inspections be performed at state borders, at the site, or both? Who will perform them?
   - Types of inspections — will inspections cover condition of the vehicle and driver as well as radioactivity levels?
   - State and local responsibilities — how will responsibilities be divided?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

6. Emergency response
   - Intergovernmental relationships
   - Manpower, training, and equipment needs — what will local responsibilities be? How will funding be provided?

- Liability – will the Price-Anderson Act cover any transportation related accidents? What will the impact be on insurance rates in the area due to the operation of the MRS facility?
- Licensing – which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

TASK FORCE MEMBERSHIP AND ACTIVITIES

CLINCH RIVER MRS TASK FORCE



(RC = Roane County Member; OR = Oak Ridge Member; * = Elected Legislator)

CLINCH RIVER MRS TASK FORCE

EXECUTIVE COMMITTEE LIST OF MEMBERS

Mayor Roy Pruett
City of Oak Ridge
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Oak Ridge, Tennessee 37831-0001 483-5671

Kenneth E. Yager
Roane County Executive
Roane County Courthouse 435-7211 or
Kingston, Tennessee 37763 376-5578

Ann Cook
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Oak Ridge, Tennessee 37831-0001 W:483-5671 Ext. 351

CLINCH RIVER MRS TASK FORCE

ENVIRONMENTAL STUDY GROUP LIST OF MEMBERS

Chairman:

Mr. Robert Peelle		
130 Oklahoma Avenue	H:483-8974	*RC
Oak Ridge, Tennessee 37830	W:574-6113	

Vice-Chairman:

Ms. Shelby J. Smith-Sanclare		
111 Connors Drive		
Oak Ridge, Tennessee 37830	483-4079	OR
Ms. Susan Carpenter		
145 Greystone Drive		
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Mr. Pete Charton	H:882-7589	RC
#27 Vincinda Lane		
Harriman, Tennessee 37748	W:354-3000 (RSCC)	
Mr. Charles C. Coutant		
120 Miramar Circle	H:483-5976	
Oak Ridge, Tennessee 37830	W:574-7386	OR
Mr. Donald G. Jacobs		
123 Wendover Circle	H:482-3519	OR
Oak Ridge, Tennessee 37830	W:483-0248	
Ms. Elaine C. Trauger		
510 Delaware Avenue		
Oak Ridge, Tennessee 37830	483-1006	*OR
Mr. Jim Roland		
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(RC = Roane County Member; OR = Oak Ridge Member; * = Elected Legislator)

CLINCH RIVER MRS TASK FORCE

SOCIOECONOMIC STUDY GROUP LIST OF MEMBERS

Chairman:

Mr. Larry M. Dickens 107 Dayton Road Oak Ridge, Tennessee 37830	483-0289	*OR

Vice Chairman:

Mr. Craig Money 807 Bowden Wyatt Drive Kingston, Tennessee 37763	576-1463	*RC
Ms. Anne Dunthorn 908 W. Outer Drive Oak Ridge, Tennessee 37830	483-6296	OR
Mr. Ray Garrett 101 Windham Road Oak Ridge, Tennessee 37830	483-4466	OR
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Ms. Claudia Lever 132 Newell Lane Oak Ridge, Tennessee 37830	483-8340	OR
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(RC = Roane County Member; OR = Oak Ridge Member; * = Elected Legislator)

CLINCH RIVER MRS TASK FORCE

TRANSPORTATION STUDY GROUP LIST OF MEMBERS

Chairman:

Ms. Shirley Hendrix 112 Woodridge Lane Oak Ridge, Tennessee	482-1277	OR

Vice-Chairman:

Ruby Luckey 511 Patton Ferry Road Kingston, Tennessee 37763	376-9578	RC
Mr. Robert Collier Route 8, Box 199 Harriman, Tennessee 37748	882-9782	RC
Mr. Jimmy W. Hatfield P.O. Box 342 Harriman, Tennessee 37748	574-1245	*RC
Mr. Don Layne Route 3, Box 93 Rockwood, Tennessee 37854	882-3618	RC
Mr. William R. Rhyne 140 Windham Road Oak Ridge, Tennessee	483-1712	OR
Mr. Thomas H. Row 231 Louisiana Avenue Oak Ridge, Tennessee	482-3309	OR
Mr. Karl W. West 114 Cumberland View Drive Oak Ridge, Tennessee 37830	482-2328	*OR

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Clinch River MRS Task Force and Study Groups

BIOGRAPHICAL INFORMATION

(RC = Roane County Member; OR = Oak Ridge Member)

Executive Committee

Roy F. Pruett, 149 S. Purdue Avenue, Oak Ridge, Tennessee 37830, (615) 483-5671, Ext. 311. City Councilman, District XI, and Mayor, City of Oak Ridge since 1981. Fifteen years' employment with Oak Ridge National Laboratory, presently Assistant Capital Assets Manager. Member of Tennessee Municipal League Board of Directors; National League of Cities' Energy, Environment and Natural Resources Policy Committee; and Board of Directors, East Tennessee Development District. (OR)

Kenneth E. Yager, 116 Westcliff Drive, Harriman, Tennessee 37748, (615) 376-5578. Roane County Executive since 1982. Previously, Roane County Attorney. Member of the Executive Committee, East Tennessee Development District. Bachelor and Masters degrees from the University of Tennessee and J.D. degree from Memphis State University. (RC)

Ann Cook, 29 Westshore Drive, Harriman, Tennessee 37748, (615) 376-5578. Administrative Assistant to Roane County Executive. Participates in TEMA Radiological Emergency Preparedness Training. Fifteen years' management experience. Undergraduate degree in Business Administration, Belmont College, Nashville.

M. Lyle Lacy, III, 119 Baltimore Drive, Oak Ridge, Tennessee 37830, (615) 483-5671, Ext. 316. City Manager, City of Oak Ridge. Sixteen years' municipal government experience. Undergraduate degree from Hampden Sydney College, Virginia, and a Masters degree in Public Administration from Texas Christian University.

Joseph C. King, Task Force Coordinator, 102 E. Malta Road, Oak Ridge, Tennessee 37830, (615) 483-5671, Ext. 351. Assistant City Manager, City of Oak Ridge. Eight years' municipal government experience. Bachelor and Masters degrees in Urban Affairs from Virginia Tech. Staff representative to the Socioeconomic Study Group.

Environmental Study Group

Robert W. Peelle, Chairman, MRS Environmental Study Group, 130 Oklahoma Avenue, in the Roane County portion of Oak Ridge, Tennessee 37830, (615) 574-6113. Member of Roane County legislative body since 1972. Physicist, leads section in Engineering, Physics, and Mathematics Division at Oak Ridge National Laboratory. Ph.D. from Princeton University. A founder of Tennessee Citizens for Wilderness Planning and leader 1969-73 of its effort to help strengthen state and initiate federal regulation of surface mining. (RC)

Shelby J. Smith-Sanclare, Vice-Chairman, MRS Environmental Study Group, 111 Connors Drive, Oak Ridge, Tennessee 37830, (615) 483-4079. President, Sanclare Associates. Former Assistant to the Director, Environmental Quality Staff, Tennessee Valley Authority. Ph.D. in Environmental/Regional Planning, University of New Mexico. Experienced in environmental impact assessment. (OR)

Susan A. Carpenter, 145 Greystone Drive, Roane County portion of Oak Ridge, Tennessee 37830, (615) 483-4678. Consultant for technical communications and design, Marda Associates. Formerly, Associate Editor of Conservation, technical abstracting in fields of energy economics and energy policy. President, League of Women Voters. Undergraduate degree in Physical Science from Memphis State University. (RC)

Frank L. (Pete) Charton, #27 Vicinda Lane, Harriman, Tennessee 37748, (615) 354-3000. Professor, Department of Science and Mathematics, Roane State Community College. Nineteen years' teaching experience including physical, cultural, and regional geography; natural resource conservation and management; atmospheric science; introductory physical and historical geology. Ph.D. from Michigan State University. (RC)

Charles C. Coutant, 120 Miramar Circle, Oak Ridge, Tennessee 37830, (615) 574-7386. Senior Research Ecologist, Environmental Sciences Division, Oak Ridge National Laboratory. Fifteen years with the Environmental Sciences Division at ORNL. Ph.D. from Lehigh University, Pennsylvania. Member of numerous professional societies including the American Association for the Advancement of Science, American Society for Testing and Materials, Ecological Society of America, and Water Pollution Control Federation. (OR)

Donald G. Jacobs, 123 Wendover Circle, Oak Ridge, Tennessee 37830, (615) 483-0248. Senior Program Manager, H & R Technical Associates, Inc. Project Manager for the support contract to DOE's Office of Terminal Waste Disposal and Remedial Action, provides technical support to waste management activities at ORNL. Ph.D. from the University of Illinois. Member of the Health Physics Society and the International Radiation Protection Association. (OR)

Elaine C. Trauger, 510 Delaware Avenue, Oak Ridge, Tennessee 37830, (615) 483-1006. Elected Oak Ridge City Council, District III, 1977 and 1981. Serves on the Tennessee Municipal League, Environmental Resources Committee; National League of Cities, Energy, Environment and Natural Resources Policy Committee; and the Tennessee Committee for the Humanities. Teaches foods and nutrition classes. A.B. degree from Greensboro College, North Carolina, M.A. degree from Columbia University, and graduate courses from the University of Tennessee. (OR)

Environmental Study Group (Continued)

James T. Roland, Route 5, Box 229, Harriman, Tennessee 37748, (615) 882-1259. Director of the Roane County Office of Emergency Management. Fifteen years' emergency management experience. Retired from Union Carbide Corporation after 30 years' service. Represents the Emergency Management Office on the Roane County Fire Board. Courses taken in Hazardous Material Handling and Disaster Work. (RC)

Michael W. Walker, Staff Representative to the Environmental Study Group, 138 Grandcove Lane, in the Roane County portion of Oak Ridge, Tennessee 37830, (615) 483-5671, Ext. 350. Research and Budget Director for the City of Oak Ridge. Serves as the City's liaison to various federal and state agencies involved with the review and cleanup of contamination within Oak Ridge. Staff representative to the City's Environmental Quality Advisory Board. Undergraduate degree in History and Political Science, High Point College, North Carolina; Masters degree in Public Administration from the University of Tennessee, Knoxville.

Socioeconomic Study Group

Larry M. Dickens, Chairman, MRS Socioeconomic Study Group, 107 Dayton Road, Oak Ridge, Tennessee 37830, (615) 574-3678. City Councilman, District IV, and Mayor Pro Tem since 1983. Assembly Engineer III at Y-12 Plant. Undergraduate degree in Engineering Operations/Production from North Carolina State University, and an M.S. degree in Business Administration from Boston University. (OR)

B. Craig Money, Vice-Chairman, MRS Socioeconomic Study Group, 807 Bowden Wyatt Drive, Kingston, Tennessee 37763, (615) 576-1463. Roane County Commissioner and member of In Lieu of Tax Committee. Section Supervisor, Purchasing, Martin Marietta Energy Systems. Formerly Roane County Purchasing Agent. Undergraduate degree in Economics from Middle Tennessee State University. (RC)

Anne E. Dunthorn, 908 West Outer Drive, Oak Ridge, Tennessee 37830, (615) 483-6296. Business Manager and consultant with C F Systems, technical consulting services since 1977. Formerly with the University of Tennessee at Oak Ridge National Laboratory, Energy Division, Regional and Urban Studies. Undergraduate degree in Business Administration and M.A. degree in Economics from the University of Tennessee. Member of the Oak Ridge Planning Commission, President of "Committee of 50." (OR)

W. Ray Garrett, 101 Windham Road, Oak Ridge, Tennessee 37830, (615) 574-6232. Chemical Physics Section Head (Physicist), Oak Ridge National Laboratory. Nineteen years with ORNL. Formerly Research Professor with the University of Alabama. Chairman of the Community Development Committee and on the Board of Directors, Oak Ridge Chamber of Commerce. Ph.D. in Physics from the University of Alabama. (OR)

Louise R. Greene, P.O. Box 4, Kingston, Tennessee 37763, (615) 354-3000. Twelve years with Roane State Community College, presently Assistant Dean, Educational Services. Ed.D. in Educational Administration and Supervision, University of Tennessee. Member, Governor's Task Force on Public Education. (RC)

Jessemae Noritake, 115 Wendover Circle, Oak Ridge, Tennessee 37830, (615) 483-9979. Executive Secretary with the Roane-Anderson Economic Council. Formerly Economic Development Specialist with the Oak Ridge Chamber of Commerce. Undergraduate degree from Carleton College, Northfield, Minnesota. (OR)

James W. Pickel, 501 N. Kentucky Street, Kingston, Tennessee 37763, (615) 376-2321. Licensed general contractor and realtor. Seventeen years' engineering experience. Undergraduate degree in Engineering from Tennessee Tech. (RC)

Claudia S. Lever, 132 Newell Lane, Roane County portion of Oak Ridge, Tennessee 37830, (615) 483-8340. Past President, League of Women Voters. Formerly Research Associate, Statistics Section, ORNL Mathematics Division. Experience in analyzing and interpreting data and in risk assessment. Undergraduate degree in Mathematics from Wittenberg University and M.S. degree in Statistics from Florida State University. (RC)

Transportation Study Group

Shirley P. Hendrix, Chairman, MRS Transportation Study Group, 112 Woodridge Lane, Oak Ridge, Tennessee 37830, (615) 482-1277. Freelance editor and abstractor of energy-related reports and materials. Also, consultant to Marda Associates, specializing in writing, editing, abstracting, scripting, and program planning. Formerly ORNL Nuclear Safety Information Center information specialist, working in accident analysis. Former member of elected school board. Undergraduate degree in Liberal Arts from the University of Tennessee. (OR)

Ruby G Luckey, Vice-Chairman, MRS Transportation Study Group, 511 Patton Ferry Road, Kingston, Tennessee 37763, (615) 376-3799. Employed by Summer Youth Program, Job Training Partnership Act, Kingston. Kingston City Council and Mayor 1975-85. Member of the Board of Directors, Tennessee Municipal League; East Tennessee Development District. Associate degree from Roane State Community College and B.A. degree from the University of Tennessee. (RC)

Robert L. Collier, Route 8, Box 199, Harriman, Tennessee 37748, (615) 882-9782. Twenty-five years' continuous service with the Roane County Highway Department, 16 as the elected Road Supervisor. Member of the Tennessee Public Service Commission, Roane County Rescue Squad, and Tennessee County Services Association. Training in engineering, specialized mechanics, and metallurgy. (RC)

Jimmy W. Hatfield, P.O. Box 342, Harriman, Tennessee 37748, (615) 574-1245. Staff Engineer, Y-12 Plant. Approximately six years' service on local level as County Commissioner and Program Coordinator for the County Judge. Bachelors degree in Transportation from the University of Tennessee. (RC)

Donald C. Layne, Route 3, Box 93, Rockwood, Tennessee 37854, (615) 882-3618. Civil Engineering Supervisor II, Tennessee State Highway Department. Twenty-one years' experience with Tennessee Department of Transportation, currently serving as District Engineer in charge of maintenance and construction of state highways in nine counties. Undergraduate degree in Civil Engineering from the University of Tennessee. (RC)

William R. Rhyne, 140 Windham Road, Oak Ridge, Tennessee 37830, (615) 483-0248. Co-Founder and Vice President, H & R Technical Associates, Inc. Formerly, Manager, Transportation and Risk Assessment Division, Science Applications, Inc.; and Chief, Licensing Branch, Clinch River Breeder Reactor Plant Project. Undergraduate degree in Nuclear Engineering from the University of Tennessee, M.S. and D.Sc. degrees in Nuclear Engineering from the University of Virginia. Member of the Society for Risk Assessment, American Nuclear Society, American Society for Engineering Management. (OR)

Thomas H. Row, 231 Louisiana Avenue, Oak Ridge, Tennessee 37830, (615) 574-5974. Director of the Nuclear and Chemical Waste Programs at Oak Ridge National Laboratory. Employed at ORNL since 1959 where he worked in the Reactor Division in the Reactor Analysis Section, the Nuclear Safety Section, the Nuclear Safety Pilot Plant, and the Pressurized Water Reactor Containment Spray Program, and the Environmental Impact Section. Undergraduate degree in Physics from Roanoke College and an M.S. degree in Nuclear Engineering from Virginia Tech. Member of the American Nuclear Society. (OR)

Transportation Study Group (Continued)

Karl W. West, 114 Cumberland View Drive, Oak Ridge, Tennessee 37830, (615) 574-5584. Oak Ridge City Councilman, District I, since 1969. Thirty-four years at Oak Ridge National Laboratory. Group Leader, Reactor Systems Section, Instrumentation and Controls Division, ORNL. Undergraduate degree in Electrical Engineering from the University of West Virginia. Graduate work at the University of Tennessee. Presently, Vice-Chairman of the Anderson County Community Action Commission and Vice-Chairman of the Tennessee Municipal League, Transportation Committee. (OR)

William D. Harris, Staff Representative to the Transportation Study Group, 110 Orchard Circle, Oak Ridge, Tennessee 37830, (615) 483-5671, Ext. 420. Fire Chief, City of Oak Ridge. Sixteen years' fire service experience. Associate degree in Fire Science Technology from the University of District of Columbia, B.S. degree in Fire Science-Urban Studies and M.A. degree in Government Politics from the University of Maryland.

CHRONOLOGY

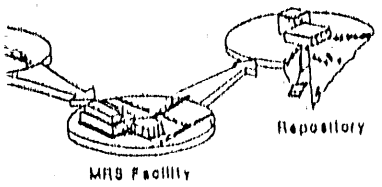
Formal Meetings of MRS Task Force and Study Groups

Date	Time	Location	Group	Activity
June 12	9:00am - 4:00pm	Nashville	Staff	DOE Briefing on MRS
June 26	11:00am- 1:00pm	Cookeville	Staff	Socioeconomic meeting with State and Local Officials
July 9-11		Nashville	Staff	DOE Briefing
July 12	12:00 - 3:15pm	Oak Ridge	All Study Groups	Orientation
July 16 ?	7:30am - 8:30am	Harriman	Executive Committee	Regular Meeting
July 18	7:00pm - 9:00pm	Oak Ridge	Task Force	Public Forum
	12:00 - 2:00pm	Oak Ridge	Socioeconomic	Regular Meeting
July 22	12:30pm- 4:15pm	Harriman	Transportation	Regular Meeting
July 24	12:00pm- 2:00pm	Harriman	Socioeconomic	Regular Meeting
July 25	5:30pm - 8:30pm	Oak Ridge	Transportation	Regular Meeting
	7:30pm - 9:45pm	Harriman	Environmental	Regular Meeting
July 30	7:40pm - 9:10pm	Oak Ridge	Environmental	Regular Meeting
July 31	12:00 - 2:00pm	Oak Ridge	Socioeconomic	Regular Meeting
August 1	5:30pm - 9:30pm	Harriman	Transportation	Regular Meeting
August 5	12:00 - 2:15pm	Harriman	Environmental	Regular Meeting
August 6	12:00 - 2:00pm	Oak Ridge	Socioeconomic	Regular Meeting
August 8	5:30pm - 9:00pm	Oak Ridge	Transportation	Regular Meeting
August 13	7:30pm -10:50pm	Oak Ridge	Environmental	Regular Meeting
August 14	12:00 - 2:00pm	Oak Ridge	Socioeconomic	Regular Meeting
August 15	6:00pm - 8:30pm	Harriman	Transportation	Regular Meeting
August 20	7:30am - 8:30am	Oak Ridge	Executive Committee	Regular Meeting
	7:30pm -10:00pm	Harriman	Environmental	Regular Meeting
August 21	12:00 - 2:00pm	Harriman	Socioeconomic	Regular Meeting

Date	Time	Location	Group	Activity
August 22	4:00pm - 6:40pm	Oak Ridge	Transportation	Regular Meeting
August 26	7:30pm - 9:30pm	Kingston	Task Force	Regular Meeting
August 27 ?	7:30pm - 9:30pm	Oak Ridge	Task Force	Workshop
August 28	6:15pm - 9:30pm	Oak Ridge	Socioeconomic	Regular Meeting
August 29 X		Morris, IL	Socioeconomic	Trip to fuel handling facility
	5:00pm - 9:30pm	Kingston	Transportation	Regular Meeting
August 30 X	7:00am - 8:30am	Oak Ridge	Study Group Chairmen	Called Meeting
September 3	5:00pm - 9:00pm	Kingston	Socioeconomic	Regular Meeting & Public Workshop on Socioeconomic Issues
	7:00pm - 9:00pm	Roane County	Environmental	Visit to property across Clinch River from MRS site. Neighborhood Meeting on Environmental Issues, Bradbury Community
September 4	12:00 - 2:00pm	Oak Ridge	Environmental	Regular Meeting
September 5	5:30pm -10:00pm	Harriman	Transportation	Regular Meeting
September 6	9:00am - 3:00pm	Harriman	Transportation	Public Workshop on Transportation Issues
September 9-13		Idaho, Nevada, New Mexico	Task Force Representatives & Staff	DOE Western Facilities Trip
September 10 ?		Barnwell, SC	Socioeconomic Members	Trip to radioactive waste disposal facilities
September 16	4:00pm - 9:30pm	Oak Ridge	Socioeconomic	Regular Meeting
September 19	5:00pm -11:00pm	Oak Ridge	Transportation	Regular Meeting
	7:30pm -10:00pm	Harriman	Environmental	Regular Meeting
September 21 ?	9:00am - 6:00pm	Oak Ridge	Socioeconomic	Develop Draft Report to Task Force

Date	Time	Location	Group	Activity
September 23	12:00 -6:00pm	Oak Ridge	Task Force Chairmen, Staff Representatives and DOE Representatives	Briefing for Area Legislators
September 24	7:30pm -11:00pm	Oak Ridge	Environmental	Regular Meeting
September 25	5:00pm -10:00pm	Oak Ridge	Transportation	Regular Meeting
September 26	1:30pm -10:30pm	Oak Ridge	Task Force	Joint Study Group Meeting to Review Draft Reports
September 30	5:00pm - 7:15pm	Oak Ridge	Environmental	Called Meeting
?	7:30pm - 9:30pm	Oak Ridge	Task Force	Regular Meeting, Panel of Representatives of Groups Opposing the MRS
October 2-3		Washington, D.C.	Study Group Chairmen & Staff Representatives	Trip to Brief DOE on Tentative Task Force Position
October 7	5:00pm - 8:30pm	Oak Ridge	Socioeconomic	Called Meeting
October 8 ?	5:00pm - 8:00pm	Oak Ridge	Transportation	Called Meeting
October 10 ?	7:30pm -11:40pm	Kingston	Task Force	Special Public Meeting, Final Deliberation on Executive Summary Report
October 21 ?	7:30pm -11:00pm	Oak Ridge	Task Force	Present Final Report to Oak Ridge City Council
October 22 ?	7:30pm -10:30pm	Kingston	Task Force	Present Final Report to Roane County Commission

TASK FORCE MEMORANDA AND DOE RESPONSES



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 • POST OFFICE BOX 1 • OAK RIDGE, TENNESSEE

Task Force Memorandum No. 1

Date: August 14, 1985

To: Peter Gross
ORO/MRS Office

From: Shirley Hendrix, Chairperson
Transportation Study Group

Subject: QUESTIONS FROM THE TRANSPORTATION STUDY GROUP

Please respond at your earliest convenience to the following questions:

A. Substances Handled at the MRS

1. What fuel and non-fuel substances would be transported through the proposed MRS facility?

2. It has been suggested that in addition to repackaging, storing, and shipping spent nuclear fuel, the proposed MRS facility might act as a marshalling point for defense wastes and other radioactive materials being shipped to the repository. What are DOE plans in this regard?

3. With regard to spent fuel, please provide answers to the following:
   - What would the minimum age of the fuel assemblies be?
   - What thermal heat and radioactivity levels could be expected of the spent fuel?
   - To what degree would arriving fuel rods be consolidated?
   - Would all fuel assemblies be shipped dry?

4. How would the items noted in the above questions be regulated? Would they all be subject to NRC licensing? Would they be formally addressed in Congressional authorization of the MRS facility?

B. Shipping Casks

1. What are the general specifications for design of shipping casks and tie-downs?
2. What analysis has been completed of actual accidents involving shipping casks?

C. Shipping Routes

1. What primary and secondary rail, road, and water shipping routes will be established through Anderson, Knox, Loudon, and Roane Counties?

2. Does DOE anticipate more than one access to the MRS facility from the interstate highway system?

3. How would routing be regulated? Would routes be subject to NRC licensing? Would they be formally addressed in Congressional authorization of the MRS facility?

D. Public Roadways

1. What characteristics will be required of roadways used as transportation routes for spent fuel trucks in terms of width, load bearing capacity, size, and structure of shoulders, bridges, and over/underpasses, unencumbered right of way, etc.?

2. If capital improvements are required to bring current roadways up to higher standards, is it DOE's intention to provide financial assistance to complete them prior to operation of the proposed MRS facility?

3. Would availability of adequate roadways be subject to NRC licensing? Would such issues be formally addressed in Congressional authorization of the MRS facility?

pb

Copies:

Clinch River MRS Task Force
Wayne K. Sharber, Tennessee Department of Health and Environmment
Ben L. Smith, Safe Growth Team
Sen. Ward Crutchfield, Special Joint Committee on MRS
Ben Rusche, DOE

Response to Task Force Memorandum No. 1

A. Substances Handled at the MRS

1. What fuel and non-fuel substances would be transported through the proposed MRS facility?

Answer

The MRS facility is intended for receiving spent nuclear fuel assemblies from civilian nuclear reactors in both consolidated and unconsolidated (intact) form. In the case of consolidated spent fuel, the MRS facility will accept the associated non-fuel assembly hardware (and fittings, guide tubes, spacers, etc.). Beyond this, there are currently no specific plans to receive non-fuel substances from civilian nuclear reactors or any other source.

2. It has been suggested that in addition to repackaging, storing, and shipping spent nuclear fuel, the proposed MRS facility might act as a marshalling point for defense wastes and other radioactive materials being shipped to the repository. What are DOE's plans in this regard?

Answer

As stated in the response to Question No. 1, DOE has no specific plans to receive non-fuel substances, including commercial or defense wastes, at an MRS facility. While the possibility that commercial or defense wastes may be routed through an MRS facility (to become part of a dedicated train shipment of spent fuel to a repository, perhaps) has not been ruled out, DOE has identified no compelling reasons or incentives to date for handling or storing commercial or defense wastes at an MRS facility.

3. With regard to spent fuel, please provide answers to the following:

- What would the minimum age of the fuel assemblies be?
- What thermal heat and radioactivity levels could be expected of the spent fuel?
- To what degree would arriving fuel rods be consolidated?
- Would all fuel assemblies be shipped dry?

Answer

The current intent for an MRS facility will be to accept spent fuel on an "oldest fuel first" basis and to not accept any spent fuel which has not been cooled in the spent fuel pool of

a nuclear power plant a minimum of five years (i.e., short-cooled fuel). This procedure is set forth in the Standard Contract for Disposal of Spent Nuclear Fuel and/or High Level Waste between DOE and the owners or generators of such fuel or waste (10 CFR Part 961). However, the contract also provides that in emergency cases where a nuclear power reactor has been shut down permanently, DOE may accept short-cooled fuel. The contract provides that DOE, and not the owners or generators of such fuel, shall decide if short-cooled fuel will be accepted by DOE. NRC regulations do not permit storage of spent fuel that is less than one year old at an independent spent fuel storage facilitv. Therefore, DOE may, in certain cases, knowingly accept short-cooled fuel.

It is important to bear in mind that by 1996, the projected first year of operation of an MRS facility, there will be an abundance of fuel well over ten years old. Some fuel will be over thirty years old by that time. Also, considering that the projected spent fuel acceptance rate of an MRS facility at full operational capacity is 3,000 MTU per year, there will continue to be a large supply of over ten year old fuel at nuclear power plants for "oldest fuel first" priority shipment to an MRS facility for many years after 1996.

Thermal Heat and Radioactivity Levels

The table below presents information on the approximate thermal power and radioactivity levels of spent fuel of different ages based on a burnup of 35,000 Mwd/MTIHM. (This is a high burnup estimate. Most spent fuel is expected to be subjected to a lower burnup and have lower values of thermal power and radioactivity than those presented in the table.)

TIME SINCE DISCHARGE FROM REACTOR (YEARS)	THERMAL POWER (w/MTIHM)	RADIOACTIVITY (ci/MTIHM)
20	900	250,000
10	1,200	400,000
5	2,200	700,000

W - Watts - thermal
Mwd - Megawatt - days, thermal
MTIHM - Metric Tons Initial Heavy Metal
Ci - Curie

(Typical PWR assembly has 0.463 MTIHM, BWR assembly has 0.181 MTIHM)

Rod Consolidation

Rod consolidation at nuclear power plants is not expected to occur on a widespread basis. The incentive for rod consolidation at nuclear power plants is increased storage capacity to permit longer plant operation before lack of storage capacity forces indefinite reactor shutdown. Rod consolidation is only one of several approaches that utilities may take to deal with dwindling spent fuel pool storage capacity. Reracking spent fuel pools to hold more intact fuel assemblies, transshipment of fuel from one spent fuel pool to another spent fuel pool owned by the utility, and storage in dry storage casks are other options that utilities may consider. In the report, "The Need for and Feasibility of Monitored Retrievable Storage - A Preliminary Analysis", DOE/RW-0022, April 1985, DOE projected that, with an MRS facility in the system by 1996, there would be a need for additional at-reactor storage capacity for 3,300 MTU of spent fuel if no utilities transshipped any fuel and reracking spent fuel pools (a less costly alternative than consolidation) occurred to the maximum extent. (This estimate has a high degree of uncertainty associated with it since it is based on projections of future nuclear fuel consumption.) If the storage of all of this excess spent fuel were to be accommodated by rod consolidation in spent fuel pools, then about 6,600 MTU of spent fuel would be consolidated. (This assumes a consolidation ratio of 2 to 1, an achievable ratio.) This amount of spent fuel is roughly ten percent of the total amount of spent fuel projected to be shipped to an MRS facility and then on to the first geologic repository. Since it is unlikely that all additional at-reactor storage capacity needs will be accommodated by rod consolidation, DOE expects that 6,600 MTU is a reasonable upper bound for the estimated amount of consolidated spent fuel which may be shipped to an MRS facility.

Fuel Assemblies

DOE is not pursuing and has no plans to pursue any shipping or storage cask design studies which require a liquid coolant. DOE intends to design and operate a completely dry MRS transportation, receiving and handling, and storage system.

4. How would the items noted in questions 1, 2, and 3 be regulated? Would they all be subject to licensing? Would they be formally addressed in Congressional authorization of the MRS facility?

Answer

For the MRS facility itself, everything inside the fence surrounding the MRS site, is subject to an NRC licensing requirement. NRC will consider all aspects of the operation of the MRS facility to assure that it can perform all intended operations in a safe manner. When NRC is satisfied that the MRS facility meets or exceeds all of its criteria for licensing, a license that specifically sets forth the operations that may and may not be performed at the MRS facility will be issued. NRC will then monitor the construction and subsequent operation of the MRS facility throughout the life of the facility.

With regard to transport of spent fuel from nuclear power plants to an MRS facility and from an MRS facility to a geologic repository, DOE intends to utilize a fully licensed system including NRC certified casks. (For additional information, see response to question B-3.) Regarding Congressional approval of an MRS facility, the Nuclear Waste Policy Act of 1982 (P. L. 97-425) does not set forth any criteria which is to be addressed by Congress in considering the MRS proposal. While DOE may suggest language, no assurance can be given that a particular item will be addressed by the Congress should they elect to approve this project. The searching technical and operational issues addressed by these questions would not normally be included in the Congressional approval.

B. Shipping Casks

1. What are the general specifications for design of shipping casks and tie downs.?

Answer

The regulations pertaining to the packaging and transportation of radioactive materials are found at 10 CFR part 71. Subpart F of 10 CFR part 71 sets forth specific transport performance criteria for package (cask) certification. These criteria are not transport mode specific. In other words, the same criteria applies to a cask whether it is intended for transport by truck rail, or barge. However, NRC does require, as part of the criteria for certifying a shipping ask, that the applicant specify the transport mode that the cask is intended for use in, i.e., truck, rail or barge. The Certificate of Compliance issued by NRC then stipulates that the cask is certified for use in that specified transport mode only.

Subpart F sets forth criteria for both normal conditions of transport and for hypothetical accident conditions. The criteria for normal conditions of transport address cask response to heat and cold, low and high external pressure, vibration, water spray, a short free drop, a sharp corner drop, a compressive load and penetration by a free falling weight. The criteria for hypothetical accident conditions are much more stringent in the areas covered. A single specimen (cask) must survive the following tests:

- a free drop of the cask through a distance of nine meters (30 feet) onto a flat, essentially unyielding horizontal surface, striking the surface in a position for which maximum damage is expected

- a free drop of the cask through a distance of one meter (40 inches) onto a vertical steel cylindrical bar 15 centimeters (6 inches) in diameter in a position for which maximum damage is expected

- exposure of the entire cask for not less than 30 minutes to a fire of at least 800°C (1475°F) temperature

- immersion under 0.9 meters (3 feet>) of water for a period of not less than eight hours.

A separate, undamaged cask must be subjected to a water pressure equivalent to immersion under 15 meters (50 feet) of water for a period of eight hours.

Subpart E of 10 CFR part 71 sets forth specific thermal and radioactive performance criteria for package (cask) certification. With regard to the shipping asks envisioned for use in transporting spent fuel to and from the MRS facility (i.e., "exclusive use" shipping casks), the following thermal and radioactive criteria apply:

- in still air at 38°C (100°F) and in the shade, no accessible surface of a package shall be at a temperature exceeding 82°C (180°F)

- the radiation level shall not exceed 200 millirem per hour on the accessible external surface of the package unless the following conditions are me, in which case the limit is 1,000 millirem per hour:

o the shipment is made in a closed transport vehicle
o provisions are made to secure the package so that its position within the vehicle remains fixed during transportation, and
o there are no loading or unloading operations between the beginning and end of the transportation.

- the radiation level shall not exceed 200 millirem per hour at any point on the outer surface of the vehicle including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical plaines projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle

- the radiation level shall not exceed 10 millirem per hour at any point two meters (6.6 feet) from the vertical plaines represented by the outer lateral surfaces of the vehicle or, in the case of an open vehicle, at any point two meters (6.6) feet from the vertical plaines projected from the outer edges of the conveyance. (This performance specification is, in practice, almost always the limited case for cask design, from a radiological standpoint. That is, a cask designed to satisfy this performance specification, will usually exceed the other radiological performance specifications handily.) The radioactive performance criteria for shipping casks found under Subpart E of 10 CFR Part 71 can also be found in Department of Transportation regulations pertaining to the packaging of radioactive materials for transportation set forth at 49 CFR 173.441.

2. What analysis has been completed of actual accidents involving shipping casks?

Answer

There have been numerous analyses of potential accidents from spent fuel shipments. Many of these analyses were done to support development of the NRC and DOT regulations that govern these shipments. In general, compliance with these regulations assures that the risks of these shipments are well within acceptable limits. The Nuclear Regulatory Commission is better able to provide a comprehensive list of past and current analyses in this regard. If after reviewing the information provided below you desire more information, we will be pleased to make them aware of your additional interests.

The general nature and approximate magnitude of the accident risk associated with the shipment of spent fuel from reactors to an MRS facility and from an MRS facility to a geologic repository is presented in "Siting of an MRS Facility: Identification of a Geographic Region that Reduces Transportation Requirements", PNL-5424, April 1985. The key findings of this preliminary analysis are presented below.

The risks resulting from accidents associated with the transportation of spent fuel include exposure of the public to radioactive materials that might be released from the shipping container in a very severe accident and fatalities and injuries produced in transportation accidents that do not release radioactive materials (i.e., risks that are independent of the cargo being carried). Locating the MRS facility to reduce shipment miles should result in the reduction of transportation related risks. This reduction is risks occurs primarily because truck shipments coming into the MRS are combined into a smaller number of outgoing rail shipments. However, the risks associated with the transportation operation are small, so the risk reduction is probably not significant from a public safety standpoint.

Radiological Risks from Accidents

The previously cited document identified several detailed studies of spent fuel transportation risks that have been performed.[1,2,3] These studies have shown that accident conditions so severe as to be hypothetical are required to breach the containment integrity of spent fuel shipping packages. Even in this case, the physical characteristics of spent fuel make it very difficult to disperse in even a very severe accident. Because of this, an accident that did compromise the shipping-package containment would most likely result in the release of only small amounts of radioactive material from the fuel. These releases could result in the population in the vicinity of the accident receiving relatively small radiation doses from radioactive materials that might be inhaled following the accident. These doses are not expected to be large enough to produce immediate health effects, but currently accepted dose response models predict that there would be a slight increase in the number of fatal cancers in the exposed population. These cancers would typically occur 15 years or more after the exposure.

Average radiological risks from accidents per mile of travel for truck and rail shipments of spent fuel have been developed in a recent study by the Transportation Technology Center.[4] Rail shipment risks were estimated to be 2.7 and 10^{-10} latent cancer fatalities per cask-mile and truck risks were estimated to be 2.4×10^{-11} latent cancer fatalities per cask-mile. Rail risks are higher because more severe accident environments are possible in train accidents and because a rail cask contains 6 to 9 times more fuel than a truck cask. The latter factor results in a larger predicted release from a rail cask if an accident severe enough to breach the casks occurs. However, since fewer shipments are required with the higher capacity train casks, these values indicate that the risks from rail shipments and truck shipments are roughly equivalent for the transportation of a given amount of fuel. The higher unit risks associated with rail shipments are offset by the reduction in the number of shipments required. Later, more precise analyses of rail vs. truck and treatment of dedicated trains carrying larger shipments of casks will be presented in the EA.

Nonradiological Risks from Accidents

Trucks and trains carrying spent fuel will be involved in transportation accidents at about the same rate as trucks and trains carrying other kinds of hazardous materials. These accidents can result in fatalities and injuries to people in other vehicles involved in the accident, even when no radiation exposures occur. Reference 4 contains estimates of 2.9×10^{-8} fatalities per shipment mile for accidents involving rail shipments and 8.8×10^{-8} fatalities per shipment mile for truck shipments. These factors indicate that nonradiological risks from accidents involving spent fuel shipments would be substantially less for rail shipment than for truck shipment of an equivalent amount of fuel. The modal shift resulting from operation of an MRS facility would substantially decrease the nonradiological risks from transportation accidents.

Consolidation of the fuel at the MRS facility would further reduce these risks. Use of multiple-cask shipments from the MRS facility to the repository would further reduce risks from nonradiological accidents. Nonradiological risks from rail shipments depend on train miles rather than cask miles. Multiple-cask shipments reduce train miles and therefore reduce the number of accidents that could produce nonradiological effects.

REFERENCES

1. Elder, H. K., et. al. 1978. An Assessment of the Risk of Transporting Spent Fuel by Truck. PNL-2588, Pacific Northwest Laboratory, Richland, Washington.

2. Elder, H.K., et. al. 1981. An Analysis of the Risk of Transporting Spent Nuclear Fuel by Train. PNL-2682, Pacific Northwest Laboratory, Richland, Washington.

3. NRC. 1977. Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes. NUREG-0170, U. S. Nuclear Regulatory Commission, Washington, D. C.

4. Neuhauser, K. S., et. al. 1984. A Preliminary Cost and Risk Analysis for Transporting Spent Fuel and High Level Waste to Candidate Repository Sites. SAND84-1795, Sandia National Laboratory, Albuquerque, New Mexico.

C. Shipping Routes

1. What primary and secondary rail, road and water shipping routes will be established through Anderson, Knox, Loudon, and Roane Counties?

Answer

DOE has just begun discussions with the Tennessee Public Service Commission to identify truck and rail access routes to the Candidate MRS sites. DOE plans to abide by the State's wishes regarding primary and secondary routes to and from the candidate MRS sites while keeping within the U. S. Department of Transportation's criteria regarding routing. At this time there are no plans for shipping waste to or from an MRS facility by water. Therefore, no waterway routes are being investigated.

2. Does DOE anticipate more than one access to the MRS facility from the interstate highway system?

Answer

This matter will also be covered in the discussions with the Tennessee Public Service Commission. DOE has no position on this matter at this time.

3. How much routing will be regulated? Would routes be subject to licensing? Would they be formally addressed in Congressional authorization of the MRS facility?

Answer

The Department of Transportation's (DOT) regulations regarding routing requirements for radioactive materials are found at 49 CFR 177.825. These regulations provide that the designated carrier selects the route from "preferred" routes specified by DOT or an alternative route may be selected by a State routing agency in consultation with affected States and local jurisdictions in accordance with DOT guidelines. The NRC regulates the containers and some other items related to transportation such as physical protection and prenotification but there is no NRC licensing related to routing.

The matter of the content of any Congressional approval for MRS is discussed in the response to question 4.

D. Public Roadways

1. What characteristics will be required of roadways used as transportation routes for spent fuel trucks in terms of width, load bearing capacity, size, and structure of shoulders, bridges, and over/underpasses, unemcumbered right of way, etc.?

Answer

The DOT regulations specify items relating to safety and minimizing radiological risk that the carrier must consider when choosing routes for radioactive material. They have not established standards for road width, load bearing capacity, etc. These characteristics, or limits, are established for each road or type of road and each bridge or overpass, etc. by State and local officials for application to all traffic including radioactive waste carriers. DOE will expect the carrier to observe State and local restrictions for all shipments of its waste.

2. If capital improvements are required to bring current roadways up to higher standards, is it DOE's intention to provide financial assistance to complete them prior to operation of the proposed MRS facility?

Answer

Section 117 of the NWPA addresses the consultation and cooperation (C&C) process, and the written C&C agreement that is required to be negotiated between DOE and the State following authorization of the MRS. Section 117(c)(5) states, among other things, that the written agreement shall specify procedures by which the Secretary shall assist the State and units of general local government in resolving offsite concerns, including, but not limited to, "...necessary road upgrading and access to the site..."

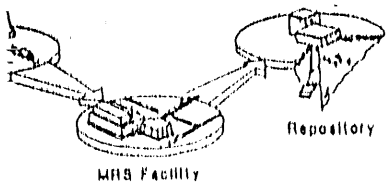
Based on this language in the NWPA, financial assistance for possible roadway upgrading would be negotiated, and if agreed to by DOE and the State, would become a provision in the written agreement.

3. Would availability of adequate roadways be subject to NRC licensing? Would such issues be formally addressed in Congressional authorization of the MRS facility?

Answer

NRC regulations to assure safe shipment of radioactive materials address packaging, safeguarding and the prenotification f State officials. NRC does not have regulatory responsibility for the adequacy of public roadways.

The matter of the content of any Congressional approval for MRS is discussed in the response to question 4.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

Task Force Memorandum No. 2

To: Peter Gross
ORO/MRS Office

Date: August 14, 1985

From: Shirley Hendrix, SPH Chairperson
Transportation Study Group

Subject: TRANSPORTATION STUDY GROUP MISSION AND ISSUES

Geographic Area of Study Group Focus

It is assumed that statewide transportation issues will be dealt with by the Tennessee Department of Transportation and/or the Public Service Commission. The Study Group will focus specifically on transportation within a four-county area consisting of Anderson, Knox, Loudon, and Roane Counties.

Transportation Modes

The Study Group will consider truck, rail, and barge transportation modes.

Breadth and Depth of Study Efforts

The major objective of the Study Group is to ascertain how shipments in and out of the proposed MRS facility would be transported safely through the four-county target area. Except to the extent that such information must be generally considered in evaluating transportation safety issues, it will not be the Study Group's task to engage in detailed technical analyses of shipping and storage cask design, testing, and handling practices.

Perceptions of Safety

It is recognized that, whether based on fact or myth, public perception regarding safe transport of radioactive wastes will be a key consideration in its acceptance of the proposed MRS facility.

Conditions of Acceptance

The Transportation Study Group's contribution to the Task Force effort will be to evaluate local MRS transportation safety issues and note (1) transportation problems which would preclude local acceptance of the proposed MRS facility, or (2) suggest conditions associated with the transportation of materials under which the proposed facility might be accepted.

Study Group Issues

Based on the considerations stated above, the Study Group will address the following issues:

1. Materials handled by or shipped through the proposed MRS facility
   - Substances transported — what fuel and non-fuel materials would be handled at, or shipped through, the facility?
   - Age, heat, and radioactivity of fuel — what ranges might be expected?

- Degree of consolidation — would fuel or other materials be consolidated before delivery to the MRS?
- Packaging — how would materials be packaged within the shipping casks?
- Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

2. Routing of trucks, trains, and barges
   - Primary and alternative routes — would they be designated jointly by the federal, state, and local governments? Would there be only one designated route from the interstate system to the MRS facility?
   - Marshalling areas — if used, where would they be located and how would they be administered?
   - Notification of shipments — would state and local governments be notified of spent fuel and other material shipments to the MRS?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing and regulation by other federal agencies? Which would be governed through enacting legislation?

3. Infrastructure requirements
   - Design and condition of roadways, rail lines, river locks — what standards would apply?
   - Infrastructure maintenance impacts — what would the impact of shipments have on roadways and rail lines? Who would finance improvement and maintenance costs? Has DOE provided such assistance in the past in other locations?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

4. Vehicle configuration and operation
   - Size and design of trucks and trailers, trains, and barges — who will set standards?
   - Safety design of shipping casks — have safety tests been adequate and do they indicate satisfactory technology?
   - Position of fuel casks, cask cars and barges, etc. — will "buffer cars" be used between fuel cars in rail shipments? Will dedicated trains be used to bring fuel in and out of the facility?
   - Speed limits — will special speed limits be established and enforced?
   - Security — how will security be maintained and by whom?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

5. Inspections
   - Locations — will inspections be performed at state borders, at the site, or both? Who will perform them?

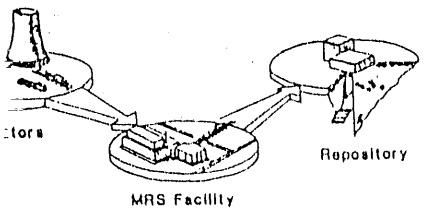
- Types of inspections — will inspections cover condition of the vehicle and driver as well as radioactivity levels?
- State and local responsibilities — how will responsibilities be divided?
- Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

6. Emergency response
   - Intergovernmental relationships
   - Manpower, training, and equipment needs — what will local responsibilities be? How will funding be provided?
   - Liability — will the Price-Anderson Act cover any transportation related accidents? What will the impact be on insurance rates in the area due to the operation of the MRS facility?
   - Licensing — which, if any, of the above items would be subjected to NRC licensing? Which would be governed through enacting legislation?

pb

Copies:

Clinch River MRS Task Force
Wayne K. Sharber, Tennessee Department of Health and Environmment
Ben L. Smith, Safe Growth Team
Sen. Ward Crutchfield, Special Joint Committee on MRS
Ben Rusche, DOE



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

TASK FORCE MEMORANDUM NO: 3

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: DESIGN AND CONSTRUCTION

The Environmental Study Group of the Task Force asks that you respond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. Please summarize the environmental/ecological justification for the MRS.

2. What additional land disturbance will be required if the preferred Clinch River site is utiliz[illegible] (road or train beds, enlarged disturbed area at the site, regradin[illegible] fter the present redress)?

3. Please provide a site plan for the Bear Creek site. Indicate, for example, the distance to populated areas, amount of freshly disturbed acreage that would be required, irreversable commitment of scarce resources, wind patterns, and surface and subsurface water drainage patterns. How many more miles of new railroad bed or upgraded highways would be required than if the Clinch River site were utilized?

4. Please identify (and list in brief form) the design and construction standards that will control MRS plant radiation (not radionuclide) emission. Include radiation that will penetrate the stored fuel containers and loaded transportation casks as well as penetration of the shields in the receiving and handling building. How will adherence to these standards be assured?

5. Please list the plant functional design and operation specifications that will control radionuclide release from the site for (a) normal plant operation, and (b) off-normal events. How will adherence to these standards be assured?

6. Which MRS design features have been specified to prevent accidental nuclear criticality of aggregates of spent fuel rods during handling, consolidation, and storage operations? What levels of review of these features are provided for by existing regulations or MRS office policies?

7. Why does capacity of an integral MRS need to be as large as 15,000 MTU?

8. Several potential waterborne pollutants from the MRS facility are discussed on Pages 4.11 to 4.15 of the "Reference-Site Environmental Document for Monitored Retrievable Storage Facility." Likely pollutants include corrosion inhibitors, biocides, and solvents. DOE concludes that these process chemicals will be totally contained and disposed of with no contamination of local ground or surface water. How will 100 percent efficiency be assured in the system?

9. What would be the height of the flood crest at each site if Norris Dam were to fail catastrophically? Melton Hill Dam alone or combined? To what depth has the Clinch River site peninsula flooded in the past? Could a large but "normal" flood affect rail transport into either site?

10. Do the DOE projections on risk from earthquakes include seismic data from the latest USGS findings on the New Madrid Fault Zone? What is the degree of certainty that displacement of the facility by surface waves from a major quake (8+ on the Richter scale) in the New Madrid zone would not cause rupturing of water pipes in the cooling system of the RH unit and/or fractures to the structure of the facility, thus compromising containment capability? Also, what impact would the surface waves of a large quake have upon Norris and Melton Hill Dams?

11. Since the MRS facility at the Clinch River site would rest on fill material, has amplification of surface waves at the site been considered both in siting and design of the structure?

cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 3

1. Please summarize the environmental/ecological justification for the MRS.

Answer

In establishing the U. S. nuclear waste disposal program, the Congress, in the Nuclear Waste Policy Act of 1982 found that "radioactive wastes create potential risks and require safe and environmentally acceptable methods of disposal" (Sec. 111a.(1)). The DOE was charged with administering the Federal program to deal with these wastes. Their management encompasses 1) transporting waste from where it is generated or stored, 2) preparing it for disposal, and 3) emplacing it in a geologic repository. Careful considerations of the options for performing these functions led to the conclusion that an integral MRS site central to the waste generators provides both operational and ecological advantages for performing the waste preparation function. Added system and ecological benefits accrue because the transportation impacts, based on cask miles, is reduced. Utilizing an MRS for the preparation function enhances our capability to receive waste at an early date, reducing risks at sites generating the waste where storage capacity may be under stress. The MRS must be shown to be environmentally and ecologically acceptable.

2. What additional land disturbance will be required if the preferred Clinch River site is utilized (road or train beds, enlarged disturbed area at the site, regrading after the present redress)?

Answer

The following is for the Clinch River site, using the storage cask concept.

Reference: Dwg H-3-56726 Sheet 1 of 1 -
Existing contours shown are after CRBRP redress.

Dwg H-3-56725 Sheet 1 of 1 -
Additional land disturbance:

$\sim 1800' \times 2200' = 3{,}960{,}000 \text{ ft.}^2$

$\sim 3000' \times 1000' = 3{,}000{,}000 \text{ ft.}^2$

$6{,}960{,}000 \text{ ft.}^2$

~160 acres

New road: ~4000 ft. (the majority of which has already been cleared and graded for the CRBRP.

New railroad: ~4 mi. (the majority of which is near existing roadways).

The area of CRBRP redress would have to be graded to the MRS plant grade but no major regrading of the redress area would be necessary. Excavations would have to be made for the new foundations.

3. Please provide a site plan for the Bear Creek site. Indicate, for example, the distance to populated areas, amount of freshly disturbed acreage that would be required, irreversible commitment of scarce resources, wind patterns, and surface and subsurface water drainage patterns. How many more miles of new railroad bed or upgraded highways would be required than if the Clinch River site were utilized?

Answer

Reference: Dwgs H-3-56739 Sheet 1 of 1 and
H-3-56740 Sheet 1 of 1

Site Area ~ 5800' x 2000' = 11,600,000 ft.^{2} - ~270 Acres
The majority of the area is wooded.

New railroad: ~4 mi (the majority of which is near existing roadways). About the same as CRBR site

New road: ~3500 ft. (new ungraded, uncleared)
Site area is 1 1/2 to 2 miles south of Oak Ridge Country Club Estates.

Surface water drainage would be to Bear Creek.

Currently there are no subsurface water drainage data for the site, but an effort is underway to obtain this and other geologic data for the ORO reservation.

Oak Ridge Area meteorological tower X-10 indicates a prevailing wind direction of south to southwest. (Reference CRBRP-PSAR Vol. 2, P. 2, 3-5) Currently there are no on-site wind data.

There is no use of scare resources expected in the MRS. However, resource requirements, including lumber, steel, concrete, water and land, will be addressed in the EA.

4. Please identify (and list in brief form) the design and construction standards that will control MRS plant radiation (not radionuclide) emission. Include radiation that will penetrate the stored fuel containers and loaded transportation casks as well as penetration of the shields in the receiving and handling building. How will adherence to these standards be assured?

Answer

The attached list provides the design and construction standards that are applicable to the MRS designs being prepared for submission to Congress. Many of the standards address both radiation and nuclide releases. Consequently, a single list of standards is provided to respond to both question 4 and 5. In addition, a list of standards that have general application to shipping casks (question 4 refers to loaded transportation casks also) has also been included; however, no procurement actions have yet been taken on shipping casks and the list of standards for use in this procurement has not been assembled. In the final design and interaction with the regulatory agencies, some standards may be deleted and others may be added.

In general, occupational and population dose will be controlled to limits specified in NRC regulations. Superimposed upon these limits is the concept of ALARA (As Low As is Reasonably Achievable) which requires the minimization of dose regardless of specified limits.

Adherence to the applicable standards will be assured by the architect engineer's project control procedures requiring intra- and interdiscipline reviews, project management reviews and a quality assurance system that complies with the requirements of NRC regulation 10 CFR 50, Appendix B, and review and audit by appropriate Federal and State regulatory agencies. Additional design review is performed by the Project Manager, the Oak Ridge Operations Office of DOE. A formal change control procedure involving all of these entities assures careful consideration of design changes. Oversight to all of this is provided by NRC, including an on-site construction inspection.

Operations will proceed under procedural controls backed up by instrumentation with audible alarms in work areas. Sealed storage casks in the outside storage area will be routinely monitored, including sampling to assure continued containment integrity.

CODES, STANDARDS, SPECIFICATIONS, DOE ORDERS AND FEDERAL REGULATIONS FOR MRS DESIGN

In addition to the requirements for licensing of a spent fuel (also assumed here for HLW and TRU) storage facility, as identified in Title 10 of the Code of Federal Regulations, Part 72 (10 CFR 72) and other regulatory requirements, the MRS Facility design shall comply with the appropriate requirements of the latest edition of the codes, standards, regulations, and specifications and guides listed herein.

CODES

AEC-ERDA RDT Standards for F8-6T - Hoisting and Rigging of Critical Components and Related Equipment

Air Moving and Conditioning Association, Inc. (AMCA)

American National Standards Institute (ANSI)

- ANSI B31.1 - Power Piping
- ANSI C2 - National Institute of Electrical and Electronic Engineers (IEEE), Motor Control Centers and Transformers
- ANSI N2.3 - Immediate Evacuation Signal for Use in Industrial Installations Where Radiation Exposure May Occur
- ANSI N2.19 - Guidelines for Establishing Site Related Parameters for Site Selection and Design of an Independent Spent Fuel Installation
- ANSI/ANS 57.9 - Design Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type)
- ANSI A.58.1 - Minimum Design Loads for Building and Other Structures
- ANSI AN58.3 - Criticality Accident Alarm System
- ANSI N13.1 - Sampling Airborne Radioactive Materials in Nuclear Facilities
- ANSI N.13.3 - Dosimetry for Criticality Accidents
- ANSI N.13.10 - Onsite Instrumentation for Continuously Monitoring Radioactive Effluents
- ANSI N16.1 - Safety Standards for Operations with Fissionable Materials Outside Reactors
- ANSI N16.2 - Criticality Accident Alarm
- ANSI N101.6 - Concrete Radiation Shields
- ANSI/NFPA No. 70 - National Electric Code (NEC)
- ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

American Refrigeration Institute (ARI)

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) - Standards for Heating, Ventilating and Air Conditioning

American Society of Mechanical Engineers (ASME) - Boiler and Pressure Vessel Code, Sections III and VIII
National Fire Codes
All as applicable
National Electrical Manufacturer's Association (NEMA) Standards
Occupational Safety and Health Administration (OSHA) Standards
Uniform Building Code (UBC)
Uniform Plumbing Code (UPC)

SPECIFICATIONS

American Association of State Highway and Transportation Officials (AASHTO)
American Concrete Institute (ACI-318) (ACI-349)
American Institute of Steel Construction (AISC)
American Petroleum Institute (API) "Recommended Rules for Design and Construction of Large Welded Low-Pressure Storage Tanks" - API 620, "Welded Steel Tanks for Oil Storage" - API 650
American Railway Engineering Association (AREA), "Manual of Recommended Practice," Vol. I and II
American Society for Testing Materials (ASTM)
American Water Works Association (AWWA) Standards for Water Pipe and Water Storage Tanks
American Welding Society (AWS)
Crane Manufacturers Association of America (CMAA), Spec. No. 70
Illuminating Engineering Society (IES) "The Standard Lighting Guide"
Steel Joist Institute (SJI)
Structural Clay Products Institute (SCPI)

DOE ORDERS

DOE 4320.1, Site Development and Facility Utilization Planning
DOE 5480.1A, Environmental Protection, Safety, and Health Protection Program for DOE Operations
DOE 5630.2, Control and Accountability of Nuclear Materials, Basic Principles
DOE 5632.2, Physical Protection of Special Nuclear Materials
DOE 5700.6, Quality Assurance
DOE 6410.1, Management of Construction Projects
DOE 6430.1, General Design Criteria

FEDERAL REGULATIONS

10 CFR 20, Standards for Protection Against Radiation
10 CFR 50, Appendix B (Quality Assurance) and Appendix E (Emergency Planning)
10 CFR 51, Licensing and Regulatory Policy and Procedures for Environmental Protection
10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories
10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste
10 CFR 70, Domestic Licensing of Special Nuclear Material
10 CFR 71, Packaging of Radioactive Materials for Transport
10 CFR 72, Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Storage Installation
10 CFR 73, Physical Protection of Plants and Materials
10 CFR 100, Appendix A, Seismic and Geologic Siting Criteria
10 CFR 170, Fees for Facilities and Materials Licenses and Other Regulatory Services
10 CFR 961, Standard Contract for Disposal of Spent Nuclear Fuel and/or High Level Radioactive Waste
40 CFR 191 (latest draft), Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes

REGULATORY GUIDES (NRC)

1.25, Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors
1.29, Seismic Design Classification
1.60, Design Response Spectra for Seismic Design of Nuclear Power Plants
1.61, Damping Values for Seismic Design of Nuclear Power Plants
3.32, General Design Guide for Ventilation. Systems for Fuel Reprocessing Plants
3.48, Standard Format and Content for the Safety Analysis Report for an Independent Spent Fuel Installation (dry storage)
3.50, Guidance on Preparing a License Application to Store Spent Fuel in an Independent Spent Fuel Storage Installation
3.53, Applicability of Existing Regulatory Guides to the Design and Operation of an Independent Spent Fuel Storage Installation

5.7, Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas
5.13, Conduct of Nuclear Material Physical Inventories
5.26, Selection of Material Balance Areas and Item Control Areas
5.44, Perimeter Intrusion Alarm Systems
5.45, Standard Format and Content for the Special Nuclear Material Control and Accounting Section of a Special Nuclear Material License Application
8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As is Reasonably Achievable
8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As is Reasonably Achievable

FEDERAL, STATE AND LOCAL STANDARDS

OSHA Standards
Other Federal, State and local standards, permits and licenses

CODES AND STANDARDS FOR SPENT FUEL SHIPPING CASKS

ASME BOILER AND PRESSURE VESSEL CODE

Section II, Part A-Ferrous Materials
Section II, Part B-Nonferrous Materials
Section II, Part C-Welding Rods, Electrodes, Filler Metals
Section III, Div. 1, Subsection NB-Class 1 Components
Section III, Div. 1, Subsection NCA-General Requirements
Section III, Div. 1, Appendices
Section V-Nondestructive Examination
Section IX-Welding and Brazing Qualification

ANSI

N5.12 Protective Coating for the Nuclear Industry
N14.5 Leakage Tests on Packages for Shipment of Radioactive Materials
N14.6 Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds or More for Nuclear Materials

ANSI/ASME

NQA-1, Basic and Supplementary Requirements for Quality Assurance Records
NQA-2, Part 2.1 Cleaning of Fluid Systems and Associated

Components for Nuclear Power Plants
NQA-2, Part 2.2 Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants

ASTM

A370 Mechanical Testing of Steel Products
D198 Static Tests of Timber
D2395 Tests for Specific Gravity of Wood
E208 Standard Method for Conducting Drop-Weight Tests

AWS

D1.1 Structural Welding Code-Steel

IAEA

Safety Series No. 6, "Regulations for the Safe Transport of Radioactive Materials," 1985 Edition

NRC REG GUIDES

7.4 Leakage Tests on Packages for Shipment of Radioactive Material, June, 1975

7.6, "Design Criteria for the Structural Analysis of Shipping cask Containment Vessels," March 1978

7.8, Load Combinations for the Structural Analysis of Shipping Casks, May 1977
7.9 Standard Format and Content of Part 71 Applications for Approval of Packaging of Type B, Large Quantity, and Fissile Radioactive Material, January 1980
7.10 Establishing QA Programs for Packaging Used in the Transport of Radioactive Material, January 1983

5. **Please list the plant functional design and operation specification that will control radionuclide releases from the site for (a) normal plant operation, and (b) off-normal events. How will adherence to these standards be assured?**

Answer

Effluent and survey monitoring and alarming instrumentation will be provided to measure exposures to offsite personnel in uncontrolled areas. The exposure rates and release limits of 10 CFR 20 will be used in designing and selecting the

radiation monitoring, alarming, and surveying instrumentation for the R&H Building.

Air-sampling capability will be provided in each leg of the exhaust systems by means of test ports. The exhaust air particulate distribution will be determined by laboratory analyses of these samples. Test ports will be located before and after the prefilter and for each stage of the HEPA filters. The first stage of testable HEPA filters from the shielded process cells will be equipped with radiation continuous area monitors. Locally indicating differential pressure gauges will be provided across each testable filter stage. All filtered exhaust air streams will be discharged to the environment through a common exhaust stack. The exhaust stream will be sampled and monitored for particulate radio-iodine and fission product noble gases, primarily KR-85, and for the flow rate. Highly sensitive gross gamma detectors, located in the six first-stage exhaust fan input plenums, are to be used to determine the source of any radioactivity detected by the main stack monitor.

Liquid Effluents

All contaminated liquid streams generated in the R&H Building will be routed to and treated by the liquid radwaste system. The water resulting from this treatment will be recycled and used, with additional makeup water and for the R&H Building process. Where noncontaminated liquid streams are used to support the treatment process, they will be monitored for potential contamination caused by accident conditions. These streams include cooling water, steam and condensate returns from evaporators and heat exchangers, and treated water from the mixed-bed ion exchanger.

Other liquid effluents originating in the R&H Building include the oily sewer, process sewer, and sanitary sewer systems. Although normally noncontaminated, all systems will contain radiation monitoring and alarm instruments to alert plant operations of a release to the drainage field.

Storage Area Monitoring

During normal operations, no gases or liquids will be released from the storage facilities. However, radiation monitors will be provided to ensure detection under accident conditions.

Adherence to the standards and regulations relating to radionuclide releases is assured by design controls and quality assurance procedures as discussed in the response to question 4. The principle barriers to these releases are redundant high efficiency particulate air (HEPA) filters which may be isolated and remotely changed. Backdraft dampers prevent releases during accident conditions that may temporarily pressurize the R&H building. Critical HEPA filters are testable and continuously monitored.

6. Which MRS design features have been specified to prevent accidental nuclear criticality of aggregates of spent fuel rods during handling, consolidation, and storage operations? What levels of review of these features are provided for by existing regulations or MRS office policies?

Answer

Spent fuel is handled, consolidated, and stored in the MRS Facility. Consequently, criticality analyses and preventive measures will be considered in the design. Within the R&H Facility, spent fuel will be handled and stored in the process cell lag storage areas, either as fuel assemblies or as sealed canisters containing fuel assemblies or consolidated fuel rods. Within the storage facility (sealed storage casks or drywell), the spent fuel is stored as fuel assemblies or consolidated fuel rods in sealed canisters.

The design features incorporated into the R&H Building to prevent criticality included the following:

(1) Except for decon connections, there are no liquid lines within the process cells and no liquid system connection to the cells.

(2) Decon piping connections to the cell have removable spools located exterior to the cells.

(3) Liquids are introduced into the cell only during decontamination operations. This operation is performed under administrative control and only when all stored spent fuel has been removed from the cell.

(4) The lag storage pits are provided with 6-in.-high curbs, drains, and liquid monitors.

(5) Consolidated fuel rods or fuel assemblies are contained in welded, stainless steel canisters with an inert atmosphere devoid of moisture.

(6) Gas sampling connections are provided for the casks and drywells, which will alert operators to the presence of interior moisture.

(7) All spent-fuel racks, canisters, and protective structures were designed for all accident conditions (natural phenomena, drops, etc.).

The MRS Facility design uses favorable geometry as the preferred method of criticality prevention. An alternate method, permanently fixed external absorbers, may be considered if the preferred method proved to be impracticable. The method of administrative control is considered only if the preferred or alternate method prove to be impractical.

The analysis is based on the following:

(1) The basis for the criticality prevention assessment is fresh fuel. No credit was taken for burnup.

(2) The SCALE computer code with a 27-group, cross-section set, was used.

(3) The K-eff +2 shall be less than 0.95, and a 2% bias (caused by the bias of the computer code and cross-section set used) is assumed.

(4) The storage areas are a dry environment (maximum 1% water by volume).

Based on the design features, the criticality analysis of the spent-fuel assembly lag storage areas is based upon storage in a dry (maximum 1% water by volume) environment. The preliminary criticality analysis indicates that the canistered spent-fuel rods or fuel assemblies can be safely stored in the lag storage, cask storage, or drywell storage design configurations.

The fuel assemblies in canisters are handled and transferred by computerized, remotely controlled overhead cranes. Therefore, operating procedures and subsequent programming can be incorporated to maintain a safe geometry during these operations.

During the consolidation operation, the fuel assemblies are first fixed in a safe geometry to the consolidation equipment bed. During consolidation, the rods are reconfigured from an open-square pitch to a close-packed triangular pitch. There is a change in the K-eff of the array. Because moderation is minimized or nonexistent, however, criticality is not possible during this operation.

7. Why does capacity of an integral MRS need to be as large as 15,000 MTU?

Answer

The 15,000 MTU MRS storage capability is a design criterion. It provides the necessary flexibility to the nuclear waste management system which has many variables such as waste generation rates, acceptance schedules and the repository construction schedule and emplacement capability. A 1,000 MTU in process vault storage capability designed into the MRS is expected to handle normal short-term variations providing smooth system operation. The larger storage capability is to be used to the extent necessary to accommodate schedule differences between startup of MRS and repository facilities (see acceptance schedule provided in response to Memorandum #4) and to allow for interruptions to repository operations without interrupting receipts from utilities.

8. Several potential waterborne pollutants from the MRS facility are discussed on Pages 4.11 to 4.15 of the "Reference-Site Environmental Document for Monitored Retrievable Storage Facility." Likely pollutants include corrosion inhibitors, biocides, and solvents. DOE concludes that these process chemicals will be totally contained and disposed of with no contamination of local ground or surface water. How will 100 percent efficiency be assured in the system?

Answer

Waterborne pollutants such as biocides and corrosion inhibitors are used in limited quantities in the cooling water system. Chemicals are also used in the steam system for corrosion and pH control. Blowdowns from both systems go to the process sewer system. After neutralization, standard sewer treatment technology (flocculation, clarification and filtration) is employed. Sludge is sent to commercial facilities and filtrate is discharged to a drain field.

Solvents, primarily proprietary decontamination solutions, are treated along with contaminated waste streams. Volatile material is boiled off and contaminated sludges are immobolized in grout to be disposed of as low-level waste.

The solvent used in the welding operation, R-113 or $C_2Cl_3F_3$, is recycled in a closed system. Any effluents are vapor escaping through the air exhaust system.

In addition, there is an oily drain system to collect waste primarily from fuel oil spills and tank overflows. This material goes to collection drums that are periodically pumped into commercial disposal trucks.

9. What would be the height of the flood crest at each site if Norris Dam were to fail catastrophically? Melton Hill Dam alone or combined? To what depth has the Clinch River site peninsula flooded in the past? Could a large but "normal" flood affect rail transport into either site?

Answer

The MRS Facility at the Clinch River Site is located well above the 100 year flood plain. It is also located above the Probable Maximum Flood (PMF) level and the Flood Surge Level. The Flood Surge Level is the maximum flood produced by the failure of the Norris Dam and the attendant failure of Melton Hill Dam, including wind, wave and runup. The 100 year flood level is at approximately EL 750 MSL, the PMF is EL 782.6 MSL, and the Flood Surge Level is EL 809.2 MSL.

The finished floor elevation of the R&H building is at EL 820 MSL, and the support buildings are all above EL 813 MSL.

In the primary storage concept, the storage area is at EL 870 MSL and above.

The interceptor ditch, located at the northern end of the facility, will divert any run-off from the higher ground to the north.

In the alternate storage concept, the storage area is at EL 827 MSL and above. The interceptor ditch, located on the western side of the facility, will divert any run-off from the higher ground to the west. The drainage system in all areas is designed to preclude flooding from on-site precipitation run-off.

March 1886, greatest flood known on the Clinch River, reached about EL 764 at Clinch River mile 18.

The rail access would be above the 100 year flood level of EL 750 MSL.

10. Do the DOE projections on risk from earthquakes include seismic data from the latest USGS findings on the New Madrid Fault Zone? What is the degree of certainty that displacement of the facility by surface waves from a major quake (8+ on the Richter scale) in the New Madrid zone would not cause rupturing of water pipes in the cooling system of the RH unit and/or fractures to the structure of the facility, thus compromising containment capability? Also, what impact would the surface waves of a large quake have upon Norris and Melton Hill Dams?

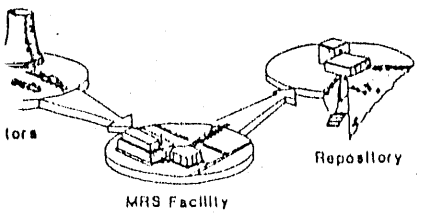
Answer

The .25g is used for the MRS conceptual design which agrees with the latest USGS findings on the New Madrid Fault Zone for the CRBR site. This value was determined in accordance with the most restrictive nuclear power evaluation process of 10 CFR 100. The cooling system for the low level liquid rad waste system cools hot liquids and condenses steam. This system is located within the seismic category I area of the R&H Building, but isolated from the hot cells containing spent fuel so that containment is assured for the most severe of the natural phenomena. Refer to question #9 for the flood effect of the catastrophic failure of Norris and Melton Hill Dams.

11. Since the MRS facility at the Clinch River site would rest on fill material, has amplification of surface waves at the site been considered both in siting and design of the structure?

Answer

Seismic conditions have been considered in the siting and design of the MRS structures. The Receiving and Handling building and the cask storage yard are not in an area of fill. Support facilities which are placed on fill will be designed appropriately.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

TASK FORCE MEMORANDUM NO: 4

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: HEALTH AND SAFETY CONCERNS

The Environmental Study Group of the Task Force asks that you respond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. Please provide increments of popu ation size at progressive distances from the MRS facility that DOE considers would be exposed to different levels of risk. (Exclude here any potential off-site transportation effects.)

2. Please list the expected releases of gases, liquids, and particulates from the plant site that will be of the most significance to public and environmental safety. Indicate the substances and the amounts expected to be released during normal plant operation as well as reasonably expected off-normal events. Indicate the most important pathways to man.

3. Should all protection features in the plant design fail, how serious could an accident be in terms of released radioactivity and worker safety?

4. Please provide data on the actual hazard and environmental cost of rupture of a transport cask or storage cask. We need a study comparable to that by NRC (for a metropolitan area) for an accident at the Clinch River and Bear Creek MRS sites or on local roads or rivers that uses:

a. dry casks actually planned for the MRS;
b. EPA's recommended residual contamination levels after the accident,
c. realistic times and manpower required for the cleanup including cleaning of insides of buildings contaminated through ventilation,
d. a variety of weather scenarios using local meterological data,
e. deposition on vegetation and soils typical of the local rural environment,
f. food chain accumulation and transfer of residual radioactivity.

5. What would be the effects of floods, earthquakes, wildfires, or other natural disasters on the MRS facility?

6. What are the prevailing wind and weather patterns at the proposed Clinch River and Bear Creek sites? What residential areas would be impacted in the general site areas? Are air monitors to be installed by DOE at nearby neighborhoods, and, if so, when, relative to the start-up date?

7. What is the form and amount of any high-level waste proposed for possible shipment to Oak Ridge sites other than civilian commercial power plants? Will it be processed and stored with the spent fuel rods or will there be another dedicated area on site for storage? How long will it be "stored" at the MRS facility?

8. Characterize gaseous radionuclides to be released, describe the planned control systems, and indicate residual hazards to workers and to the public.

9. Airborne particulate materials could be released through off-normal circumstances. The hot cells contain air filtering systems designed to remove radioactive materials, particularly built-up reactor corrosion products. In the event of power failure, filtering system failure, or incineration of the filters, would significant quantities of airborne wastes be released? What emergency procedures are planned? And, what level of exposure would employees and the public face?

10. The environmental assessment PNL-5476 (Page 4.13) states that no radioactive waterborne effluents originating from processing will occur. With large amounts of water for cooling being pumped through the RH facility would leaks or off-normal conditions that might rupture water pipes produce contamination and emergency conditions? Do other possible sources of waterborne radioactivity exist, such as precipitation on the exteriors of contaminated casks?

11. What type of activities would be suitable for lands next to the MRS facility?

cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 4

1. Please provide increments of population size at progressive distances from the MRS facility that DOE considers would be exposed to different levels of risk. (Exclude here any potential off-site transportation effects.)

   Answer

   Levels of risk to the population will be discussed mostly in terms of population dose which are expected to be a very small fraction of natural background even at the fenceline of the facility. This information will be provided in the EA.

2. Please list the expected releases of gases, liquids, and particulates from the plant site that will be of the most significance to public and environmental safety. Indicate the substances and the amounts expected to be released during normal plant operation as well as reasonably expected off-normal events. Indicate the most important pathways to man.

   Answer

   Preliminary estimates indicate that all pathways result in impacts much less than regulatory limits. Based on a preliminary analysis of normal MRS operations, the largest potential calculated exposure to a person living 2.5 miles from the border of the MRS facility site would be about one third of a millirem of radiation per year of operation. A millirem is a measurement of the effects of radiation on human tissue. Typical background radiation levels from natural sources are between 100 and 200 mrem per year. This information will be provided in the EA.

3. Should all protection features in the plant design fail, how serious could an accident be in terms of released radioactivity and worker safety?

   Answer

   Analysis of the failure of all protection features has not been done. The analyses in progress are trying to identify the consequences of credible events. At this stage of design, this approach is believed to be sufficient and consistent with previous studies. More detailed analyses will be performed during definitive design and licensing, if Congress approves the MRS proposal.

Similar analysis has been performed for the previously designed "backup" MRS, and is described in the "Reference-Site Environmental Document for a Monitored Retrievable Storage Facility: Backup Waste Management Option for Handling 1800 MTU Per Year" PNL-5476. Ten copies of this document are enclosed.

4. Please provide data on the actual hazard and environmental cost of rupture of a transport cask or storage cask. We need a study comparable to that by NRC (for a metropolitan area) for an accident at the Clinch River and Bear Creek MRS sites or on local roads or rivers that uses:

   a. dry casks actually planned for the MRS,
   b. EPA's recommended residual contamination levels after the accident,
   c. realistic times and manpower required for the cleanup including cleaning of insides of buildings contaminated through ventilation,
   d. A variety of weather scenarios using local meteorological data,
   e. deposition on vegetation and soils typical of the local rural environment, and
   f. food chain accumulation and transfer of residual radioactivity.

   Answer

   The transportation analysis now being conducted includes an analysis of population dose from potential transportation accidents. Analysis of dry storage cask accidents is also being performed. Results of these analyses will be presented in the Environmental Assessment. Contributions to population dose from food chain pathways is also included in this analysis. While analysis results are not available at this time, the results must be within regulatory limits or the facility will be unacceptable. Detailed analysis to the level required to answer all of these questions thoroughly will be performed during definitive design, if Congress approves the MRS.

5. What would be the effects of floods, earthquakes, wild-fires, or other natural disasters on the MRS facility?

   Answer

   The preliminary accident analysis determined seismic activity (earthquakes) to be the primary cause of two postulated

accidents: storage cask drop and drywell shearing during placement. The design criteria for the MRS are such that natural phenomena cannot pose a serious threat to safe operation. The EA will address natural phenomena, and if Congress approves the MRS proposal, the Safety Analysis Report will contain analysis to show the facility complies with all regulatory requirements in this regard.

6. What are the prevailing wind and weather patterns at the proposed Clinch River and Bear Creek sites? What residential areas would be impacted in the general site areas? Are air monitors to be installed by DOE at nearby neighborhoods, and, if so, when, relative to the start-up date?

Answer

Wind frequency distribution data are being used to calculate impacts. The requested information will be addressed in the EA. Air monitors in populated areas are not contemplated for facility or regulatory purposes. Monitoring instruments will be installed on all effluent streams, in the field, and at the site boundary. Dispersion of any radioactive gases would make the detection extremely difficult due to natural background except perhaps at the closest point of release.

7. What is the form and amount of any high-level waste proposed for possible shipment to Oak Ridge from sites other than civilian commercial power plants? Will it be processed and stored with the spent fuel rods or will there be another dedicated area on site for storage? How long will it be "stored" at the MRS facility?

Answer

The predominate material to be handled at an MRS would be spent fuel from commercial nuclear power plants. There is approximately 650 MTU equivalent of commercial high-level waste from West Valley which may come to MRS prior to shipment to the repository in the form of vitrofied solid glass logs packaged in steel containers. If this HLW material were to come to MRS, it would be for temporary storage in the same general area used for storage of spent fuel. However, we do not currently see a need for this material to come to the MRS. The defense HLW at Savannah River is planned to be shipped directly to the repository. However, there may be some advantage to shipping this material to the MRS to go to the

repository with the same dedicated train. That has not been studied or determined yet. No plans exist to do anything at MRS with defense HLW. No HLW would be shipped from its originating site until it had been solidified in glass and placed into a steel container.

Attached is Table 2-3 from the Mission Plan which shows the planned receipt of spent fuel at MRS and shipment on to a repository. Notice that current plans call for HLW to go direct to the repository.

8. Characterize gaseous radionuclides to be released, describe the planned control systems, and indicate residual hazards to workers and to the public.

Answer

During normal operations, small amounts of gaseous releases are anticipated and include krypton, tritium and iodine. Airborne particulate material from laser cutting of fuel assembly structural material will be retained on HEPA filters. Krypton, tritium and iodine are assume to pass through the HEPA filters. The amount of these releases to the public will be presented in the Environmental Assessment and are expected to represent a very small fraction of natural background dose.

With regard to occupational exposures, the facility is required to be designed to meet NRC regulations, including the "as low as reasonably achievable" requirements (ALARA). To meet ALARA requires frequent facility and system operation and maintenance reviews during the course of design to determine the number of workers required in any given area, the radiation level they might be exposed to, and the length of time it takes to perform the given work function. This is an activity which will be done during definitive design.

9. Airborne particulate materials could be released through off-normal circumstances. The hot cells contain air filtering systems designed to remove radioactive materials, particularly built-up reactor corrosion products. In the event of power failure, filtering system failure, or incineration of the filters, would significant quantities of airborne wastes be released? What emergency procedures are planned? And, what level of exposure would employees and the public face?

Answer

The hot cells are operated with a negative pressure differential to prevent release to the atmosphere except through the filtration system. In the event of power failure to the filter fan system, the negative pressure differential would be reduced temporarily until emergency power comes on line. This results in the lack of a driving force to move material from the hot cell atmosphere beyond containment. There are no credible mechanisms that could cause incineration of the filters or that result in failure of the designed containment system.

10. The environmental assessment PNL-5476 (Page 4.13) states that no radioactive waterborne effluents originating from processing will occur. With large amounts of water for cooling being pumped through the RH facility, would leaks or off-normal conditions that might rupture water pipes produce contamination and emergency conditions? Do other possible sources of waterborne radioactivity exist, such as precipitation on the exteriors of contaminated casks?

Answer

No credible accident scenarios were postulated that result in release of radioactive material to surface waters. Shipping casks with external contamination will be inspected and cleaned in a cask inspection area upon arrival. The decontamination solutions will be processed in the R & H facility and will not be released to surface waters.

11. What type of activities would be suitable for lands next to the MRS facility?

Answer

Based on the analysis performed for the Environmental Assessment, almost any activity could safely be placed near the MRS facility.

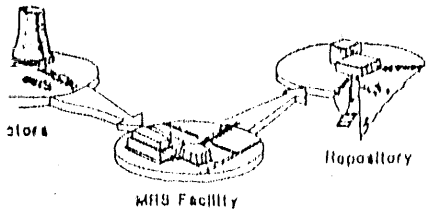
Table 2-3. Waste-Acceptance Schedule--Improved-Performance System
(Metric tons of uranium (MTU) per year)

Year	Spent-Fuel Generation[A] Annual	Spent-Fuel Generation[A] Cumulative	MRS Acceptance	MRS Inventory[B]	First Repository SF from MRS	First Repository High-Level Waste[C]	First Repository Total	First Repository Cumulative Total Waste	Second Repository Spent Fuel	Second Repository Cumulative	Cumulative Spent-Fuel Acceptance	Spent-Fuel Backlog
Pre 1998		40,100	2200	2,200								
1998	2900	43,000	3000	4,800	400		400	400			2,200	37,900
1999	3000	46,000	3000	7,400	400		400	800			5,200	37,800
2000	3000	49,000	3000	10,000	400		400	1,200			8,200	37,800
2001	3000	52,000	3000	12,100	900		900	2,100			11,200	37,800
2002	3000	55,000	3000	13,300	1800		1800	3,900			14,200	37,800
2003	3100	58,100	3000	13,300	3000	400	3400	7,300			17,200	37,800
2004	3300	61,400	3000	13,300	3000	400	3400	10,700			20,200	37,900
2005	3400	64,800	3000	13,300	3000	400	3400	14,100			23,200	38,200
2006	3800	68,600	3000	13,300	3000	400	3400	17,500			26,200	38,600
2007	4100	72,700	3000	13,300	3000	400	3400	20,900	900	900	30,100	38,500
2008	4700	77,400	3000	13,300	3000	400	3400	24,300	1800	2,700	34,900	37,800
2009	4500	81,900	3000	13,300	3000	400	3400	27,700	1800	4,500	39,700	37,700
2010	4500	86,400	3000	13,300	3000	400	3400	31,100	1800	6,300	44,500	37,400
2011	4000	90,400	3000	13,300	3000	400	3400	34,500	1800	8,100	49,300	37,100
2012	4100	94,500	3000	13,300	3000	400	3400	37,900	2400	10,500	54,700	35,700
2013	4200	98,700	3000	13,300	3000	400	3400	41,300	3000	13,500	60,700	33,800
2014	4200	102,900	3000	13,300	3000	400	3400	44,700	3000	16,500	66,700	32,000
2015	4300	107,200	3000	13,300	3000	400	3400	48,100	3000	19,500	72,700	30,200
2016	4300	111,500	3000	13,300	3000	400	3400	51,500	3000	22,500	78,700	28,500
2017	4500	116,000	2800	13,100	3000	400	3400	54,900	3000	25,500	84,700	26,800
2018	4700	120,700		10,100	3000	400	3400	58,300	3000	28,500	90,500	25,500
2019	4700	125,400		7,100	3000	400	3400	61,700	3000	31,500	93,500	27,200
2020	4900	130,300		4,100	3000	400	3400	65,100	3000	34,500	96,500	28,900
2021				1,100	3000	400	3400	68,500	3000	37,500	99,500	30,800
2022					1100	400	1500	70,000	3000	40,500	102,500	27,800
2023									3000	43,500	105,500	24,800
2024									3000	46,500	108,500	21,800
2025									3000	49,500	111,500	18,800
2026						8000			3000	52,500	114,500	15,800
2027									3000	55,500	117,500	12,800
2028									3000	58,500	120,500	9,800
2029									3000	61,500	123,500	6,800
2030									3000	64,500	126,500	3,800
2031									3000	67,500	129,500	800
									800	68,300	130,300	

[A]Data from Commercial Nuclear Power 1984: Prospects for the United States and the World, DOE/EIA 0438(84), November 1984. Includes discharge from decommissioned reactors.

[B]The MRS facility is assumed to reach a constant acceptance rate and discharge to the first repository as fast as the first repository can accept spent fuel. The MRS facility will stop accepting spent fuel when its inventory will fill the first repository.

[C]See footnotes b and c in Table 2-2.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

TASK FORCE MEMORANDUM NO: 5

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: EXPERIENCE/TRACK RECORD

The Environmental Study Group of the Task Force asks that you respond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. What basis in experience does DOE possess on off-site releases of radionuclides initiated by hot-cell consolidation of spent fuel comparable to that to be handled at the proposed MRS? Show how this experience is compatible with present estimates of releases to be expected from the MRS.

Questions 2 through 12 apply to both the relevant Idaho Falls and Las Vegas facilities to be visited by Task Force members in September.

2. What is the collective annual radiation dose to workers at the spent fuel handling facilities in Idaho Falls? How much spent fuel do they handle?

3. What is the distribution of doses to individual workers? What are the major activities which give rise to radiation exposures? What are the "typical" maximum exposures during any single work shift?

4. Are there any significant sources of internal exposure to workers?

5. What are the typical beta-gamma exposure rate levels in the various work areas? What are the levels of pollutants in work area air (monitored levels)?

6. What are the volumes and nature of liquid effluents? Are spent fuel elements handled in air or under water?

7. What are the atmospheric release rates for radioactivity? What specific radionuclides are typically released (if any)? What is the percentage of filter efficiency achieved?

8. What are the beta-gamma radiation levels in the surrounding area?

9. What are the specific radionuclide levels in air and biota.

10. What handling operations present special problems?

11. What is the industrial safety record? Are there any particularly hazardous operations with respect to frequency or severity?

12. Have there been any serious incidents with respect to transfer of cannisters during unloading of casks or during other operations?

13. What is the collective annual radiation dose to the nearby population groups? What are the highest individual committed doses?

14. If the above questions indicated any problems, what remedial actions have been determined to be feasible for implementation at the MRS?

cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 5

1. What basis in experience does DOE possess on off-site releases of radionuclides initiated by hot-cell consolidation of spent fuel comparable to that to be handled at the proposed MRS? Show how this experience is compatible with present estimates of releases to be expected from the MRS.

   Answer

   The answer to question #13, below, is representative of the off-site release experience which DOE possesses to give us confidence that the MRS consolidation work will not result in exposure to the public in excess of the regulatory requirements. Estimates of releases to the environment are currently being prepared and will be reported in the Environmental Assessment.

2. What is the collective annual radiation dose to workers at the spent fuel handling facilities in Idaho Falls? How much fuel do they handle?

   Answer

   The collective facility annual dose for 1984 was 10.125 REM. However, spent-fuel handling constitutes only a small part of HFEF's work with irradiated materials. Most of our efforts are in handling and examination of experimental irradiations, and support for EBR-II reactor operations. Spent-fuel handling probably accounts for about 10% of the total dose, or about one REM. The HFEF facility handles about 100 spent-fuel subassemblies per year, totaling about 300 kg fissile material.

3. What is the distribution of doses to individual workers? What are the major activities which give rise to radiation exposures? What are the "typical" maximum exposures during any single work shift?

   Answer

   The distribution of doses in Rem for all HFEF workers is shown below.

Exposure Range	0	.001 .099	.100 .249	.250 .499	.500 .749	.750 .999	1.0	Total
People	48	35	18	9	3	1	0	114

The major groups receiving 57% of the exposure (5.735 Rem) were as follows:

Group	Number	Exposure	Highest Individual
Cask Handling	6	2.885 Rem	0.790
Slave Repair	7	1.766 Rem	0.466
Experimental	6	1.085 Rem	0.305

A "typical" maximum exposure for an individual during a cask-handling operation would be around 10 mRem.

4. Are there any significant sources of internal exposure to workers?

Answer

None. Whenever there is a potential, workers are supplied with appropriate protective equipment.

5. What are the typical beta-gamma exposure rate levels in the various work areas? What are the levels of pollutants in work area air (monitored levels)?

Answer

Typical work area dose rate levels are less than 0.1 mR/hr and air concentrations are less than 1×10^{-14} μCi/cc for $\beta\gamma$ and less than 0.1×10^{-15} μCi/cc for α.

6. What are the volumes and nature of liquid effluents? Are spent fuel elements handled in air or under water?

Answer

The nature of liquid effluents are from laboratory and decontamination operations. The volume produced from laboratory operations is 7.5 E +03 gallons per year and from decontamination operations is 8.8 E +03 gallons per year. Spent fuel elements are handled in air and inert atmospheres.

7. What are the atmospheric release rates for radioactivity? What specific radionuclides are typically released (if any)? What is the percentage of filter efficiency achieved?

Answer

The atmospheric release rates for radioactivity are as follows for HFEF operations:

	Nuclide	Annual (Ci)
a.	Xe-133	2.4 E - 01
b.	Xe-135	1.1 E - 01
c.	Unidentified $\beta\gamma$	2.6 E - 06
d.	Unidentified α	1.8 E - 01
e.	Kr-85	2.0 E - 01

The specific radionuclides that are typically released are stated above. The percentage of filter efficiency achieved for particulates is 99.97%.

8. What are the beta-gamma radiation levels in the surrounding area?

Answer

In the surrounding area, background levels are less than 0.02 mR/hr.

9. What are the specific radionuclide levels in air and biota?

Answer

The specific radionuclide levels in air and biota are background levels.

10. What handling operations present special problems?

Answer

Maintenance and repair of equipment associated with cask transfers and master/slave manipulators contribute the highest radiation exposures to HFEF operation personnel.

11. What is the industrial safety record? Are there any particularly hazardous operations with respect to frequency or severity?

Answer

No lost workday injuries. Two recordable injuries; one injured elbow slipping on ice, one injured back slipping on stairs. There are no particular hazardous operations with respect to frequency or severity.

12. Have there been any serious incidents with respect to transfer of canisters during unloading of casks or during other operations?

Answer

HFEF has had no serious incidents while unloading casks or during operations since the HFEF/North facility entered service 11 years ago.

13. What is the collective annual radiation dose to the nearby population groups? What are the highest individual committed doses?

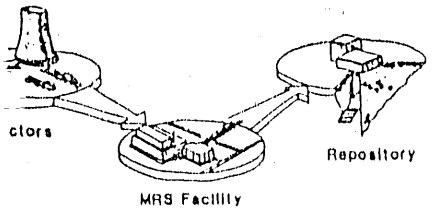
Answer

The collective annual radiation dose to the nearby population groups is 3.000 E -06 mRem/yr. There are no measurable individual committed doses to nearby populations from HFEF operations.

14. If the above questions indicated any problems, what remedial actions have been determined to be feasible for implementation at the MRS?

Answer

The above do not indicate any problems that are not already accommodated through prudent design of a hot cell facility.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

TASK FORCE MEMORANDUM NO: 6

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: LOW-LEVEL GENERATED WASTE

The Environmental Study Group of the Task Force asks that you respond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. Please characterize the flow of packaged low-level radioactive waste from the plant in terms of volume, content of radioactive nuclides, and hazard potential. Include low-level waste from both normal operation and from clean-up of expected off-normal events.

2. Under the Low Level Waste Policy Act, which state or interstate compact will be responsible for the low-level waste of Question 1? (That is, must it be stored by the state or interstate compact corresponding to the utility that used the fuel, the state where the final repository is located, or the MRS location, Tennessee?) Assuming the last, what are the project plans if no interstate compact including Tennessee should be approved? If this waste is to be disposed of in Tennessee, it is our opinion that releases via this source must be included in the environmental assessment of the MRS. How would they compare to the amount of low-level waste generated by a nuclear power plant or a large research hospital?

cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 6

1. Please characterize the flow of packaged low-level radioactive waste from the plant in terms of volume, content or radioactive nuclides, and hazard potential. Include low-level waste from both normal operation and from clean-up of expected off-normal events.

Answer

Two types of wastes are generated at the MRS. They are low level waste (LLW), defined in 10 CFR 61 in terms of its maximum content of specific radionuclides such that the hazards potential from near surface burial is acceptable; and Contact Handled Transuranic Waste (CHTRU), defined as having less than 200 millirem per hour surface dose-rate and containing more than 100×10^{-9} curies of transuranic elements per gram of material. The CHTRU has a hazards potential such that it cannot be accepted for surface burial by Federal Regulation 10 CFR 61 and will be shipped to a repository.

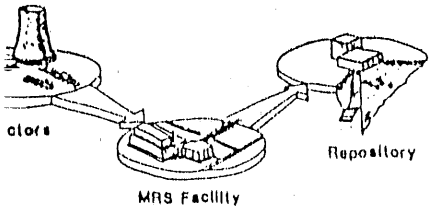
At this stage of conceptual design of the MRS, the quantities of the above wastes that will be generated is estimated from available data, such as the quantity of contamination on the surface of spent fuel rods that may be scraped off in disassembling the fuel bundles. It is estimated that the MRS will produce on the order of 500 drums per year of the wastes described above, arising from both normal and abnormal operations. The 55 gallon drums will contain metallic materials alone: or combustible material and contaminated resins or sludges from the cleanup system mixed with cement. The drums will be stored at the MRS facility until disposal. A study of options and costs for disposal must be performed (see answer to Question 2) before a decision can be made on the necessity of segregating drums of LLW from those of CHTRU.

2. Under the Low Level Policy Act, which state or interstate compact will be responsible for the low-level waste of Question 1? (That is, must it be stored by the state or interstate compact corresponding to the utility that used the fuel, the state where the final repository is located, or the MRS location, Tennessee?) Assuming the last, what are the project plans if no interstate compact including Tennessee should be approved? If this waste is to be disposed of in Tennessee, it is our opinion that releases via this source must be included in the environmental assessment of the MRS. How would they compare to the amount of low-level waste generated by a nuclear power plant or a large research hospital?

Answer

At this time, no decision has been made relative to the disposition of the wastes referred to in Question 1. The assumption in our MRS analyses is that this waste would be disposed of in the repository. This assumption is based on the following: 1) it is an acceptable disposition method, 2) the cost and time requirements to sort the wastes to verify that they meet the requirements for disposal as low-level waste (not all low activity wastes meet the requirements for disposal in LLW burial grounds) are uncertain, and 3) the low-level waste disposal costs themselves are uncertain. Operationally, it may be preferable to send these wastes to the repository for underground disposal. Since it is at least ten years before an MRS facility would be operational, we feel that we have time to gather further information on disposa options and costs for these wastes before making the decision.

There is a variance of at least a factor of four in the quantity of low-level waste produced annually by nuclear power plants. The low-level waste from an MRS is expected to be less than 10 times that from a nuclear power plant.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

TASK FORCE MEMORANDUM NO: 7

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: FUEL HANDLING

The Environmental Study Group of the Task Force asks that you respond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. Please outline how increased risks associated with rod consolidation will be outweighed by other benefits.

2. Please list the provisions in the contracts between the utility companies and DOE that control the condition of the fuel at the point and time of DOE acceptance (relative to cladding integrity and surface contamination).

3. What are the physical quality criteria for DOE's acceptance of fuel for the MRS?

4. Please briefly summarize data available to MRS management that defines the condition of the spent fuel now stored at utility sites with respect to surface contamination and cladding integrity. Is this condition expected to be degraded by handling of the spent fuel elements between now and 1996?

5. For the aged commercial spent fuel of interest, please characterize in summary or by reference the expected mechanical condition of the fuel and cladding when it will arrive at the MRS site and following the mechanical operations required for fuel consolidation. What fraction

of pins are expected to rupture during hot-cell handling, and how severe are these ruptures expected to be? Just what will be released to the hot-cell environment when a pin ruptures, and how will this material be contained, cleaned up, and packaged for shipment to the repository with the fuel?

cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 7

1. Please outline how increased risks associated with rod consolidation will be outweighed by other benefits.

Answer

The increased risk associated with rod consolidation is not great based on engineering estimates backed up by limited testing in the U. S. and abroad. In addition, the crucial disassembly operation has been tested by repairing partially irradiated fuel assemblies by removing and replacing failed fuel rods prior to reactor re-insertion. Benefits of consolidation accrue from the reduction of the volume of fuel stored at the MRS and shipped to, and emplaced in, a repository. Reduced volume translates into economic benefits from fewer waste packages stored, shipped and emplaced.

2. Please list the provisions in the contracts between the utility companies and DOE that control the condition of the fuel at the point and time of DOE acceptance (relative to cladding integrity and surface contamination).

Answer

Contractual provisions that relate to the description or control of the condition of fuel at the time of shipment are listed and paraphrased below:

Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste, 10 CFR 961.11.

Article IV

A.2.b. requires a complete description of the fuel being delivered (as set forth in Appendix F).

B.1 requires DOE to accept all SNF of domestic origin generated by the utility without regard to condition.

B.2.a. requires DOE to provide loading and handling procedures and specifications for failed fuel canisters.

Article VI

A.1.b. requires the utility to accurately classify spent fuel as specified in Appendix E.

A.2.a. requires utility to provide a detailed description of the spent fuel being delivered (as set forth in Appendix F) and to notify DOE of changes as soon as they become known.

A.2.b. requires utility to obtain confirmation from DOE prior to delivery of non-standard fuel.

B.2. authorizes DOE verification during cask loading.

B.3.a. DOE may refuse to accept improperly described fuel until corrections made.

Appendix E

A.1. requires reasonable effort by utility to properly classify spent fuel:

a. standard fuel
b. non-standard fuel (5 categories)
c. failed fuel (3 categories)

B.6.a. requires visual inspection for evidence of structural deformity or damage necessitating special handling (failed fuel class F-1),

B.6.b. previously encapsulated assemblies (class F-3),

B.6.c. specifies packaging in compliance with regulatory requirements.

3. What are the physical quality criteria for DOE's acceptance of fuel for the MRS?

Answer

DOE is contractually obligated to accept all utility spent fuel of domestic origin. Acceptance criteria relate to proper packaging, description and notification as discussed in question 2 above.

4. Please briefly summarize data available to MRS management that defines the condition of the spent fuel now stored at utility sites with respect to surface contamination and cladding integrity. Is this condition expected to be degraded by handling of the spent fuel elements between now and 1996?

Answer

In addition to the information supplied to DOE under the Standard Contract, the utilities are required to submit an annual report on past and projected fuel discharges to the DOE Energy Information Administration (EIA) (Form RW 859-Nuclear Fuel Data Form) under EIA data collection authority. This report describes non-standard fuel in greater detail than is required by the Standard Contract, including the following categories:

1. Visual defects
2. Encapsulated
3. Requires special handling
4. Cannot be consolidated
5. Deformed
6. Fails to fit storage rack
7. Other

These categories are subject to review as their usefulness is evaluated.

Evidence to date indicates that there is no observable degradation over time for spent fuel in pool storage, including failed fuel.

Spent fuel surfaces are contaminated with crud built up during irradiation and may have some fission product contaminations from failed fuel. Known failed fuel assemblies are encapsulated to minimize this contamination source. Shipping and handling facilities are designed for contamination control. No quantitative fuel contamination data are collected or considered necessary.

5. For the aged commercial spent fuel of interest, please characterize in summary or by reference the expected mechanical condition of the fuel and cladding when it will arrive at the MRS site and following the mechanical operations required for fuel consolidation. What fraction of pins are expected to rupture during hot-cell handling, and how severe are these ruptures expected to be? Just what will be released to the hot-cell environment when a pin ruptures, and how will this material be contained, cleaned up, and packaged for shipment to the repository with the fuel?

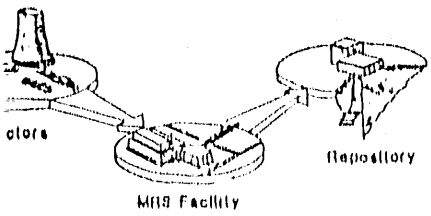
Answer

For purposes of developing a conservative design, it has been assumed that as much as 10% (1% is expected) of the spent fuel received at the MRS will have been canistered at reactors without having been consolidated because of some defect or non-standard condition. Opening of these packages is not contemplated. The historic fuel failure rate at commercial reactors is 0.2% of the fuel rods.

The radiological impacts of MRS operations will be discussed in the Environmental Assessment currently under preparation. An assessment of the old backup MRS concept is contained in document PNL-5476, "Reference-Site Environmental Document for a Monitored Retrievable Storage Facility: Backup Waste Management Option for Handling 1800 MTU Per Year," D. V. Silviera, et. al, June 1985. Based on information in that document, only about 0.01% of spent fuel shipped from reactors is expected to show evidence of failure during shipment (gaseous nuclides evident during shipping cask unloading). It is further assumed for design purposes that up to 0.3% of fuel rods will stick during consolidation operations at the MRS and that the cladding may be breached in 50% of these rods during removal. That is one failed rod for each three PWR assemblies or eleven BWR assemblies consolidated. Failed rods will be removed using remote manipulators designed for this purpose. They will be accumulated and packaged separately.

It is expected that up to 30% of the ^{85}Kr and 10% of the ^{3}H and ^{129}I will be released from failed fuel rods. These radioactive gases will be diluted by the large volume of process cell air and exhausted through filters to the stack. Stack monitors assure that releases remain below regulatory standards. High efficiency particulate air (HEPA) filters

(redundant and testable) will remove 99.97% of particulate matter created in the process cell due to scaling of crud deposits on the fuel, cutting operations and fuel particulates, if any. The HEPA filters are designed to be changed remotely as necessary and are compacted and placed in drums with grout for future disposal. The hot cell and cell equipment are periodically decontaminated as part of routine operations.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE, TENNESSEE

TASK FORCE MEMORANDUM NO: 8

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: DECOMMISSIONING

The Environmental Study Group of the Task Force asks that you re pond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. What are the plans to dispose of the equipment and to decontaminate the facility at the end of its useful life?

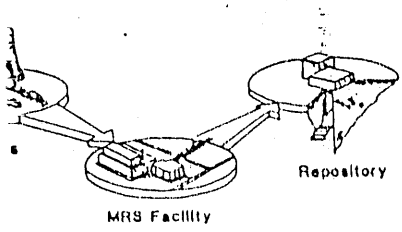
cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 8

1. What are the plans to dispose of the equipment and to decontaminate the facility at the end of its useful life?

Answer

The MRS facilities will be designed and operated to facilitate decontamination/decommissioning operations with minimum contamination spread within the facility, radiation exposure to the public and decommissioning personnel, and radioactive waste volumes. Equipment and facility components whose decontamination levels remain higher than acceptable levels established by the NRC will be dismantled and removed offsite.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE, TENNESSEE

TASK FORCE MEMORANDUM NO: 9

TO: Mr. Ben C. Rusche, Director
DOE - Office of Civilian
Radioactive Waste Management

DATE: August 15, 1985

FROM: Mr. Robert Peelle, Chairman
Environmental Study Group

SUBJECT: GENERAL OPERATIONS

The Environmental Study Group of the Task Force asks that you respond to these questions in writing. If the task group already has the material that provides the best available response, please give the specific references. If a rational response requires that a question be rephrased, please offer us the reworded version. We recognize that considerable effort may be required to provide some of the requested material, so we will welcome responses as they become available. Please take into account our desire to be drafting our initial task force report by October 1, by indicating a schedule on which you expect to be able to provide responses that will not be available by September 15, 1985.

1. Will the transporter casks' (incoming and outgoing) external surface ever be in contact with hot cell atmosphere? (Page 2.4 of PNL 5476, UC-85).

2. What chain of authority will be responsible for dealing with a major accident involving hazardous waste at the facility (federal, state, local)?

3. What type of security control and safeguards will be a part of the plant operation?

cc: Clinch River MRS Task Force Members
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
Peter Gross, DOE/ORO/MRS Office
D. J. Silviera, Pacific Northwest Laboratories

Response to Task Force Memorandum No. 9

1. Will the transporter casks' (incoming and outgoing) external surface ever be in contact with hot cell atmosphere? (Page 2.4 of PNL 5476, UC-85)?

   Answer

   No. The exterior surfaces of casks (both the shipping casks for transport and the sealed storage casks used for storage at the MRS facility) will never be in contact with the hot cell atmosphere.

2. What chain of authority will be responsible for dealing with a major accident involving hazardous waste at the facility (federal, state, local)?

   Answer

   DOE, NRC, State and local governments will implement an agreed-upon course of action. If MRS is approved, details of this plan will be addressed in the C and C agreement, and the licensing interactions with the NRC. The approach taken by DOE would be to prepare the equivalent of this plan. The plan would be a coordinated effort developed by DOE, NRC, the State and local governments. It would designate the various areas of responsibility (including physical and financial). In general, an accident would be reported by the operating contractor to DOE who would notify the NRC, State and local governments and the Emergency Response Plan would be implemented. Onsite response would be the responsibility of the operating contractor. The operating contractor/DOE would provide assistance to local authorities if off-site consequences were expected. Details would be developed and included in mutual aid agreements/emergency plans.

3. What type of security control and safeguards will be a part of the plant operation?

   Answer

   While the MRS design at this stage is only conceptual, attention has been given to safeguards and security provisions. Site security provides physical protection and access controls to deter, assess, and respond to potential theft of special nuclear material or radioactive maerial and to potential threat of sabotage. The site security fence provides the boundary to the "Limited Area" as described in DOE Order 5632, Chapter III (draft) for DOE Facilities. All MRS facilities including such buildings as the Administration, Site Services, Warehouse, Security, Fire Station, and similar buildings are located in the limited area.

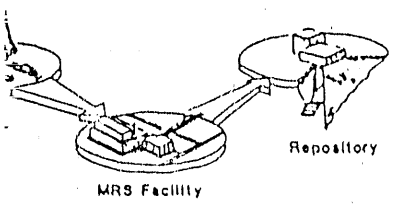
A "Protected Area" per DOE Order 5632.2 (see also NRC regulation 10 CFR 73.2.g) is established. This area contains R&H Building, the Storage Facilities, the radioactive shipment lag storage, and any other support facilities considered vital to safe operation of these facilities.

The protected area is enclosed within two physical barriers (fences) as described in DOE 5632.2.g (and NRC regulation 10 CFR 73.2.f). The area between the fences is called an alarm zone. The alarm zone is monitored by two independent and dissimilar intrusion alarm systems (20 CFR 73.2.1) that complement each other. The protected area perimeter is equipped with closed circuit television (CCTV) to provide surveillance of the alarm zone. Protected area, including alarm zone, lighting is provided to assure visual/CCTV surveillance. A patrol road is located to facilitate routine surveillance and alarm response. An "Isolation Zone" (10 CFR 73.2.k) is established around the buildings or facilities within the protected area.

Access to both the Limited Area and the Protected Area is controlled by manned security checkpoints. Access to the R&H Building and material storage areas is controlled by an access control system. All exterior doors and critical interior doors are locked and monitored by an alarm system during unoccupied periods.

All security alarms, fire alarms, evacuation alarms, or any other alarm that would require a security force response are annunciated at the Protected Area Gatehouse as the primary location and at the Security Building as the backup or redundant location. These alarm stations are hardened (per criteria in UL 752), controlled access buildings with capabilities to communicate to all security personnel and off-site law enforcement agencies.

Provisions are made for identifying, quantifying, labeling, and recording all radioactive waste materials and for periodically performing physical inventories to confirm the presence of accountable materials regardless of location within the facility.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

TASK FORCE MEMORANDUM NO. 10

To: Mr. Peter Gross
DOE/ORO/MRS Office

Date: August 19, 1985

From: Mr. Larry Dickens, Chairman
Socioeconomic Study Group

Subject: PERIPHERAL INDUSTRIAL AND OTHER OPERATIONS OF POSSIBLE BENEFIT TO OAK RIDGE-ROANE COUNTY

Several items are of interest to the Socioeconomic Study Group for their possible positive benefit to the community. Could you provide the best available information on the following questions.

1. A barge handling facility will have to be constructed at the MRS site. Could this facility be designed and operated such that the City and northeastern Roane County could make use of the port as a regional transporation resource?

2. What spinoff manufacturing enterprises are viewed as possible (or likely) in connection with the operation of the MRS? What would be the approximate gross sales of a plant which would manufacture storage and/or shipping casks?

3. Are specific plans being made to have public access (viewing, touring, etc.) of the MRS as a possible tourist attraction? What budget allocation would be made available to operate the "tourist" aspect of the facility?

4. Would electric power (all utilities) be purchased from the City as opposed to purchase directly from TVA?

5. Would this facility exacerbate the fly-over restrictions which already exist in Oak Ridge, making potential airport operations even more difficult for the City?

Please provide us with the answers to these items by September 3, 1985, so that this information can be utilized in our analysis. If this date is not feasible, please let us know when the information will be available.

Larry M. Dickens

Larry M. Dickens, Chairman

pb

cc: Clinch River MRS Task Force Members
Wayne K. Scharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
D. J. Silvera, Pacific Northwest Laboratories
Ben C. Rusche, Office of Civilian Waste Management

Response to Task Force Memorandum No. 10

1. A barge handling facility will have to be constructed at the MRS site. Could this facility be designed and operated such that the City and northeastern Roane County could make use of the port as a regional transportation resource?

   Answer

   There are currently no plans in the MRS facility designs for barge handling capabilities. Water transport of spent nuclear fuel into the Oak Ridge area is not currently contemplated. However, if future transportation analysis or changes in requirements indicated that water transport would be desirable and a barge handling facility were to be built, it could be designed and operated to allow the City and northeastern Roane County to make use of the facility as a regional transportation resource.

2. What spinoff manufacturing enterprises are viewed as possible (or likely) in connection with the operation of the MRS? What would be the approximate gross sales of a plant which would manufacture storage and/or shipping casks?

   Answer

   One of the largest direct spinoffs identified to date would probably be the concrete storage cask manufacturing, which could be done "in house" or purchased from a private vendor on land adjacent to the site. For 15,000 MTU licensed storage, approximately 1830 casks would be required at approximately $160,000 each (1985 dollars) or an approximate total of $293 million (1985 dollars). In addition, canister manufacturing locally is possible with projected total sales in the $560 million range. Depending upon the geologic media eventually selected for the repository, additional substantial packaging costs, for materials or labor, could be incurred at the MRS site. As a focal point for transportation activities, a substantial portion of the $1 billion to $3 billion expected to be spent on transportation could be spent in the MRS area. For example, transport casks could also be manufactured in the region, which would also be a large revenue producer. Specialized service requirements, maintenance, quality assurance, material handling, data systems management, and telecommunications would be revenue producers. Process consumables should generate an additional total of $126 million. Possible new work in areas such as metals technology, waste packaging, laser cutting, and robotics would generate additional, and as yet unmeasureable, spinoff industries.

3. Are specific plans being made to have public access (viewing, touring, etc.) of the MRS as a possible tourist attraction? What budget allocation would be made available to operate the "tourist" aspect of the facility?

Answer

There are currently no plans to make the MRS a tourist attraction. However, your question has given us reason to factor this into our proposal. If the facility is approved by Congress, we will provide a visitor's center and proceed with plans, considering public input, to make the facility into a national, as well as international, center of display and prominence that demonstrates U. S. spent fuel handling capabilities. In essence, the MRS could become a tourist attraction, both nationally and internationally.

4. Would electric power (all utilities) be purchased from the City as opposed to purchase directly from TVA?

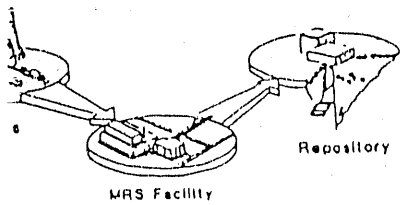
Answer

Current plans indicate that all power would come from the 230 kv line that runs adjacent to the site. All power would thus be purchased from TVA.

5. Would this facility exacerbate the fly-over restrictions which already exist in Oak Ridge, making potential airport operations even more difficult for the City?

Answer

The MRS facility would probably have fly-over restrictions similar to the ones which currently exist in Oak Ridge. However, the extent to which such additional restrictions would really exacerbate the current restricted geographic area is difficult to determine at this time.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE, TENNESSEE

TASK FORCE MEMORANDUM NO. 11

Date: August 19, 1985

To: Mr. Peter Gross
DOE/ORO/MRS Office

From: Mr. Larry Dickens, Chairman
Socioeconomic Study Group

Subject: EMPLOYMENT ISSUES

Members of the Socioeconomic Study Group would like to have employment-payroll projections for the operational phase of the MRS facility. In particular it is of interest to the Group to know what fraction of employees are expected to live in Oak Ridge and Roane County as opposed to surrounding jurisdictions which are not as directly impacted by the facility. On this issue it should not go unnoticed that an ever decreasing fraction of DOE contractor employees have chosen to live in Oak Ridge over the past fifteen years, and it is felt by many that the failure of DOE to shoulder its fair share of the local tax burden (in lieu-of tax) has strongly contributed to this trend.

1. How many workers will be employed at the MRS facility?

2. How many are projected to live in Oak Ridge? In Roane County?

3. If this number is different from the present fraction of about 25% and 16.3%, respectively, what incentives are envisioned as contributory toward revising their long-term trend of employee outflow from the local community?

4. On the basis of DOE experience in the monitoring of local facilities for environmental protection, what cost is anticipated for monitoring activities associated with the facility and surrounding environs? Will this cost be directly supported by the facility?

5. What will be the employment skill mix of the MRS?

Please provide us with the answers to these items by September 3, 1985, so that this information can be utilized in our analysis. If this date is not feasible, please let us know when the information will be available.

Larry M. Dickens

Larry M. Dickens, Chairman

pb

cc: Clinch River MRS Task Force Members
Wayne K. Scharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
D. J. Silvera, Pacific Northwest Laboratories
Ben C. Rusche, Office of Civilian Waste Management

Response to Task Force Memorandum No. 11

1. How many workers will be employed at the MRS facility?

Answer

It is currently anticipated that there will be 600 operating contractor personnel at the MRS site, 20-30 Federal employees, and approximately 100 employees engaged in storage cask manufacturing (See attachment for specific breakout).

2. How many are projected to live in Oak Ridge? In Roane County?

Answer

Rough estimates indicate that between 100 and 150 may live in Oak Ridge, and approximately 200 within Roane County. Since part of Oak Ridge City limits are in Roane County, there may be some double counting in these estimates. Also, the estimates do not consider how many workers will be new residents. More detailed analysis of the worker distribution patterns would be undertaken in the Environmental Impact Statement, which will be prepared if Congress approves the MRS proposal.

3. If this number is different from the present fraction of about 25% and 16.3%, respectively, what incentives are envisioned as contributory toward revising their long-term trend of employee outflow from the local community?

Answer

According to Martin Marietta Energy Systems (MMES), 25% of their employees live in Oak Ridge and 14.1% live in Roane County, outside of Oak Ridge. The current worker distribution pattern has resulted from the interaction of many community-specific factors over a number of years and represents an average of both short-term and long-term employees. Since the MRS facility operating contractor will be hiring new employees, their distribution pattern would not necessarily be the same as the average pattern of current MMES employees.

Any incentive that could potentially reverse the long-term trend of employee outflow from Oak Ridge would depend, at least to a certain extent, upon what programs the operating contractor could develop and effectively implement. One possible way to encourage workers to locate in Oak Ridge and Roane County would be to ask the operating contractor to voluntarily develop a "relocation/housing" program that would directly encourage their employees to locate in the area. This could be done in the competitive procurement process,

prior to contractor selection. Then such requirements could possibly be made an explicit part of the contract with the operating contractor. In addition, it is expected that revenues to the City and County from the "tax equivalency" concept would substantially reduce the property tax, making the areas even more attractive.

4. On the basis of DOE experience in the monitoring of local facilities for environmental protection, what cost is anticipated for monitoring activities associated with the facility and surrounding environs? Will this cost be directly supported by the facility?

Answer

The costs of the monitoring of local facilities for environmental protection will be directly supported by the facility. Specific cost estimates for such monitoring are currently being developed, but is expected to be a small fraction of the annual operating costs. The operating contractor will have responsibility for the monitoring itself, but this could be supplemented by other arrangements also supported by the facility.

5. What will be the employment skill mix of the MRS?

Answer

The current skill mix estimates indicate that there will be an approximately even mix of professional white collar and skilled blue collar and craft employees. White collar employees would be primarily engineers, with some administrators, and the skilled blue collar workers would be primarily welders, operators, and technicians (See attached Table).

	Shift				
	1st	2nd	3rd	4th	Total
Onsite Storage Facility	6				6
Receiving and Handling Building					
Administration	11	6	6		23
Transfer/discharge	6	5	5		16
Shielded process cell	23	22	22		67
Building maintenance and service	18	9	9	5	41
Analytical laboratory	5	3	3		11
Health physics	13	13	13	3	42
Manipulator maintenance	2	2	2		6
HVAC maintenance	7	5	5	2	19
Subtotal	85	65	65	10	225
Receiving, Decontamination Sampling and Washdown	30	28	28	4	90
Total R&H Building	115	93	93	14	315
Support Facilities					
Administration	52				52
Fire Station	7	5	5	5	22
Security and gatehouses	20	13	13	13	59
Maintenance and garage	95	19	13		127
Development shop	13				13
Warehouse and storage	5	1	1		7
Total Support Facilities	192	38	32	18	280
MRS Staffing Total	313	131	125	32	601

*Excludes DOE/NRC/State of Tennessee officials (total of 26).
Site related cask manufacturing = 117 craftsmen.

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

October 21, 1985

Larry M. Dickens, Chairman, Socioeconomic Study Group, Clinch River MRS Task Force

DETAILED WORKER ASSIGNMENTS FOR THE MRS

Additional detail has become available with regard to worker assignments for the MRS. This information can be used to gain a better understanding of the skill mix which may be present at the facility.

The assignment numbers are based on the 3600 ton/yr design basis MRS, which would operate 24 hours per day, 7 days per week. The first page shows the relationship of total numbers for the 3000 ton/yr (5 days per week, 24 hours/day) operation.

It should be emphasized that these are preliminary estimates based on a conceptual design and hence are subject to change.

I hope this information is helpful to you. If I can answer any questions, please give me a call.

Peter J. Gross, Manager
Monitored Retrievable Storage Office

Attachment

cc w/attachment:
Wayne Scharber, TDHE
B. Smith, Safe Growth Council
Sen. W. Crutchfield, Tennessee Senate
Joe King, City of Oak Ridge
Leroy Hansen, U. T.

MRS Assignments

	3600 MTU/yr		3000 MTU/yr	
R&H Building				
Administration Area	28		23	
Health Physics	56		42	
Receiving & Inspection	118		90	
Remote Handling	89		67	
Equipment Maintenance	5		5	
Discharge Area*	27		22	
Radwaste Treatment	21		17	
Analytical Lab	14		11	
Control Room	20		20	
Support Areas	36		24	
		415		321
Administration Building				
Operating Personnel	52		52	
Government Representatives	26		26	
		78		78
Security		59		59
Site Services Building				
Office Area	70		67	
Shop Area	41		33	
Support Areas	29		27	
		140		127
Warehouse		8		7
Vehicle Maintenance		13		13
Fire Station		22		22
Cask Manufacturing Facility		117		103
		852		730

*includes storage facility personnel for sealed storage cask concept

o Receiving and Handling Building

Office Area - The office area accommodates the following functions:

Assignment	Number of Personnel by Shift				
	Day	2nd	3rd	4th	Total
Management	3	2	2	2	9
Staff	2	2	2	2	8
Operations	3	2	2	2	9
Secretarial	3	-	-	-	3
Total	11	6	6	6	29

Health Physics Area - A Health Physics (HP) area is located near the personnel exit from the Category I portion of the R&H Building. All personnel are monitored and, if necessary, receive decontamination treatment in the Health Physics area. Space is provided for HP technicians, a supervisor's office, decontamination facilities, and storage.

Assignment	Number of Personnel by Shift				
	Day	2nd	3rd	4th	Total
Supervisor	1	-	-	-	1
Lead Technician	-	1	1	1	3
Technicians	13	13	13	13	52
Total	14	14	14	14	56

Receiving, Inspection, and Shipping Areas - The twin receiving, inspection, and shipping areas flanking each site of the R&H Building are designed to receive shipments of spent fuel from commercial generators of nuclear waste by both rail and truck. They are also designed to handle casks for transfer to the remote handling area.

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Foreman	2	2	2	2	8
Crane Operators	3	2	2	2	9
Riggers	8	6	6	6	26
Millwrights	5	3	3	3	14
R&H Technicians	16	15	15	15	61
Total	34	28	28	28	118

Remote Handling Area - The remote handling area is designed for remote unloading of casks into the shielded process cells. Other related functions (such as equipment maintenance, crane maintenance, and decontamination) are also provided.

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Foreman	5	4	4	4	17
Unloading Techs	4	4	4	4	16
Consolidation Technicians	8	8	8	8	32
Welding, loadout & decon techs	6	6	6	6	24
Total	23	22	22	22	89

Equipment Maintenance Rooms - Shielding remote handled and contact handled maintenance and transfer hot glove-box repair rooms (all located directly below the cells) are designed to permit maintenance, decontamination, dismantling, removal, and transfer of in-cell equipment through cell floor hatches.

Maintenance personnel include the following:

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Crane Maintenance Techs	3	-	-	-	3
Remote, contact, and cold radwaste maintenance technicians	2	-	-	-	2
Total	5				5

Transfer/Discharge Area - The transfer/discharge areas each are designed to accommodate the discharge of consolidated spent fuel, HLW, and HAW/RHTRU canisters and drums into a cask (Primary Storage Concept - Sealed Storage Casks), which is mounted on a crawler-type transporter for delivery to the storage site.

	Number of Personnel by Shift				
Assignment	Day	2nd	3rd	4th	Total
Foremen	2	1	1	1	5
Welding, drum, and canister supply techs	4	4	4	4	16
Transporter operator	1	-	-	-	1
SF, HLW, and HAW/RHTRU storage area:					
Foreman	1	-	-	-	1
Technicians	2	-	-	-	2
Crane Operator	1	-	-	-	1
Inspector	1	-	-	-	1
Total	12	5	5	5	27

Personnel requirements for the Alternate Storage Concept are:

	Number of Personnel by Shift				
Assignment	Day	2nd	3rd	4th	Total
Foremen	2	1	1	1	5
Welding, drum, and canister supply techs	4	4	4	4	16
Transporter crew	2	2	2	2	8
SF, HLW, and HAW/RHTRU storage area:					
Foreman	1	1	1	1	4
Technicians	2	2	2	2	8
Inspector	1	1	1	1	4
Total	12	11	11	11	45

Radwaste Area - There are two separate radwaste areas: the high-activity radwaste HAW/RHTRU area for processing high-activity wastes (generated in the shielded cells) and the low-level radwaste area including both a low-level liquid radwaste area and a low-level solid radwaste area. The radwaste areas prepare site-generated radioactive waste for storage or disposal.

	Number of Personnel by Shift				
Assignment	Day	2nd	3rd	4th	Total
Supervisor, all maintenance	1	-	-	-	1
Foremen	2	1	1	1	5
Process cells, solid, liquid, and high-activity radwaste technicians	6	3	3	3	15
Total	9	4	4	4	21

Analytical Laboratory Facility - An analytical laboratory facility contains equipment, apparatus, and chemicals required for the counting and analysis or sampling of contaminated solids, liquids, and gases.

	Number of Personnel by Shift				
Assignment	Day	2nd	3rd	4th	Total
Lab Supervisor	1	-	-	-	1
Lab data management	1	-	-	-	1
Lab specialist	1	1	1	1	4
Lab technicians	2	2	2	2	8
Total	5	3	3	3	14

Control Room - Different aspects of the operations, including certain designated maintenance activities within the building, are observed and controlled from the control room. Data acquisition equipment handles the monitoring of personnel, inventory control, records, and procedures for the control of contaminated materials and building process activities. Operations in cask unloading rooms, process cells, and loadout rooms are observed by closed-circuit television (CCTV), and a system of communication is available for efficient operation of the facility. Control room personnel include the following:

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Operators	4	4	4	4	16
Supervisors	1	1	1	1	4
Total	5	5	5	5	20

The support areas personnel are as follows:

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Laundry Room	2	-	-	-	2
Materials receiving and storage	2	-	-	-	2
HVAC operations and maintenance technicians	9	5	5	5	24
Manipulator/crane storage and maintenance room technicians	2	2	2	2	8
Total	15	7	7	7	36

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
R&H Building total personnel	133	94	94	94	415

o Administration Building

Assignment	Number of Personnel
Finance and Administration	6
Personnel	6
Public Relations	3
Accountability	4
Plant Management	8
Plant Operations	5
Data Acquisition (computer room)	5

o Administration Building (cont'd)

Assignment	Number of Personnel
Quality Assurance	6
Reception	1
Health/Safety	4
Contracts	3
Security	1
Subtotal Operational Personnel	52
DOE/NRC/State Representatives	26
Total	78

o Security

Assignment	Number of Personnel by Shift				
	Day	2nd	3rd	4th	Total
Captain	1	-	-	-	1
Lieutenant	1	1	1	1	4
Security/Patrol Officers	10	10	10	10	40
AMS Monitoring Guards	2	2	2	2	8
Clerical	1	-	-	-	1
Extra Duty	5	-	-	-	5
Total	20	13	13	13	59

The Captain, Shift Lieutenant, secretary, clerk, and Alarm Monitoring Station (AMS) guards occupy permanent stations or offices in the building; the remaining personnel occupy various work stations (such as gatehouses) throughout the site. Two Security/Patrol Officers are on moving patrol when not temporarily occupied at the Inspection Gatehouse.

o Site Services Building

Office Area. The office area is designed to house the following:

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Physical plant operation personnel	7	2	2	2	13
Shop management	7	1	1	1	10
Emergency first aid	10	1	1	1	4
Purchasing	5	–	–	–	5
Engineering	12	–	–	–	12
Store	3	–	–	–	3
Instrument laboratory/ counting room	3	–	–	–	3
Control room	5	5	5	5	20
Total	43	9	9	9	70

Shop Area. The shop area is designed to accommodate the following:

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Machine	3	–	–	–	3
Servicemen	3	–	–	–	3
Millwright	5	1	1	1	8
Pipefitting	2	1	1	1	5
Welding	1	–	–	–	1
Sheetmetal	1	–	–	–	1
Carpentry	3	–	–	–	3
Electrical/instrument	9	2	2	2	15
Paint	1	–	–	–	1
Plastics, glass, and ceramic	–	–	–	–	0
Steam cleaning area	–	–	–	–	0
Tool crib	1	–	–	–	1
Total	29	4	4	4	41

Support Functions.

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Mail Room	2	-	-	-	2
Warehouse	2	-	-	-	2
Reproduction	2	-	-	-	2
Telephone	1	-	-	-	1
Janitorial facilities	6	6	-	-	12
Mockup	10	-	-	-	10
Total	23	6	-	-	29

o Warehouse

Assignment	Number of Personnel by Shift Day	2nd	3rd	4th	Total
Supervisor	1	-	-	-	1
Clerks	2	-	-	-	2
Warehousemen	2	1	1	1	5
Total	5	1	1	1	8

o Vehicle Maintenance

The Vehicle Maintenance Building is normally occupied by 13 personnel on a single day shift as follows:

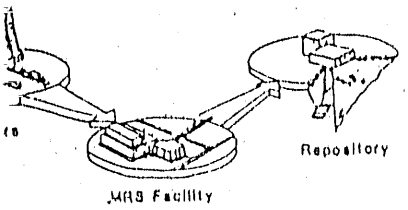
Assignment	Number of Personnel
Shop Manager	1
Service advisor	1
Clerks	3
Mechanics	4
Electrician/mechanic	1
Servicemen	3
Total	13

o Fire Station

Assignment	Number of Full-Time Personnel by Shift Days	2nd	3rd	4th	Number of On-Call Personnel (all shifts)	Total Full-Time
Firefighters (full-time)	1	1	1	1	-	4
Firefighters (on-call)	-	-	-	-	(9)	
Officers: Chief	1	-	-	-	-	1
Assistant Chief	1	1	1	1	-	4
Training Officer	1	-	-	-	-	1
Radio Dispatcher	1	1	1	1	-	4
Nurse	1	1	1	1	-	4
Emergency medical Technician (EMT)	1	1	1	1	-	4
Total	7	5	5	5	(9)	22

o Cask Manufacturing Facility

Assignment	Number of Personnel Day	2nd	3rd	Total
Plant Manager	1	-	-	1
Supervisor	1	-	-	1
Foreman	3	2	1	6
Clerk	1	-	-	1
Front-end loader operator	2	2	-	4
Rebar tying	12	12	-	24
Concrete pouring	6	6	-	12
Rebar fabrication	6	6	6	18
Instrumentation/electrical	4	4	1	9
Crane Operator	1	1	1	3
General laborer	12	12	12	36
Laboratory technician	2	-	-	2
				117



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE, TENNESSEE

TASK FORCE MEMORANDUM NO. 12

Date: August 19, 1985

To: Mr. Peter Gross
DOE/ORO/MRS Office

From: Mr. Larry Dickens, Chairman
Socioeconomic Study Group

Subject: TAXATION ISSUES

Members of the Socioeconomic Study Group would like to have answered the following questions concerning those positive benefits to the Oak Ridge-Roane County communities that may be derived from taxation or tax equivalency payments for the MRS facility and its operation.

1. What would be the total value, upon completion, of the MRS facility and of the land which it would occupy?

2. What is the approximate cost (value) of each of the large storage casks which will hold the compacted fuel rods prior to shipment to and storage in a permanent nuclear waste facility? What is the value, if any, of the contents of a cask; i.e., what would the market value be of the fissionable product contained in the spent fuel rods?

3. There is much concern over the possibility that the storage of wastes at the MRS facility might become very long term, with ultimate accumulation of a rather large quantity of waste in the temporary storage yard. For obvious reasons of cost versus benefit and as an incentive to DOE to complete the planned underground facility, would it be possible to create an exclusive city/county-owned MRS storage yard at the site in which all casks would be stored? A storage fee would be agreed upon and charged to the facility by the city/county governments who own and control the exclusive storage area. This concept could become a very large plus, psychologically and monetarily, to the affected communities.

4. If construction of a permanent waste repository is delayed over the next fifteen years, and if the proposed local MRS were to be the only one in existence, how many storage casks would reside at the proposed facility by the year 2005? By 2015?

5. How much revenue from utilities is to be available to pay for waste storage by the year 2000? Could we get all of it if nothing else is built? (Storage yard fee)

6. Is it feasible for the facility to be either built and operated by a private contractor or built by a private contractor and leased to DOE to insure the taxability of the property?

Please provide us with the answers to these items by September 3, 1985, so that this information can be utilized in our analysis. If this date is not feasible, please let us know when the information will be available.

Larry M. Dickens

Larry M. Dickens, Chairman

pb

cc: Clinch River MRS Task Force Members
Wayne K. Scharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
D. J. Silvera, Pacific Northwest Laboratories
Ben C. Rusche, Office of Civilian Waste Management

Response to Task Force Memorandum No. 12

1. What would be the total value, upon completion, of the MRS facility and of the land which it would occupy?

Answer

Excluding casks, the estimated value of the facility and land is approximately $800-$1000 million, in 1985 dollars. Capital and operating costs over a 26 year period are expected to total approximately $2.7 billion.

2. What is the approximate cost (value) of each of the large storage casks which will hold the compacted fuel rods prior to shipment to and storage in a permanent nuclear waste facility? What is the value, if any, of the contents of a cask; i.e., what would the market value be of the fissionable product contained in the spent fuel rods?

Answer

The current value of each cask is approximately $160,000. There is currently no market value of the spent nuclear fuel that will be contained in the casks. However, there is useable fuel content, which if reclaimed, would have value. The precise dollar value of such unclaimed fuel would require additional analysis.

3. There is much concern over the possibility that the storage of wastes at the MRS facility might become very long term, with ultimate accumulation of a rather large quantity of waste in the temporary storage yard. For obvious reasons of cost versus benefit and as an incentive to DOE to complete the planned underground facility, would it be possible to create an exclusive city/county-owned MRS storage yard at the site in which all casks would be stored? A storage fee would be agreed upon and charged to the facility by the city/county governments who own and control the exclusive storage area. This concept could become a very large plus, psychologically and monetarily, to the affected communities.

Answer

Recognizing the current language of the NWPA and its legislative history, DOE is obligated to take title to spent nuclear fuel and/or high-level waste at the nation's reactor sites, and has responsibility to provide for the transportation and permanent disposal of such waste in order to protect the public health, safety, and the environment. In essence, the MRS is, therefore, only an intermediate step in the Federal waste management system. Associated with taking

title to spent nuclear fuel and its permanent disposal are all of the required safeguards and security measures that are also a clear Federal responsibility. To create an exclusive city/county-owned and controlled storage yard at the MRS site in which all casks would be stored would not be consistent with the Congressionally mandated Federal responsibilities. Instead, it would require a transfer of authority from the Federal government to a city/county government for control of the spent fuel while in transit (or temporary storage) from the reactor sites to the repository.

4. If construction of a permanent waste repository is delayed over the next fifteen years, and if the proposed local MRS were to be the only one in existence, how many storage casks would reside at the proposed facility by the year 2005? By 2015?

Answer

The planned proposal to Congress will call for the MRS to be authorized for only 15,000 MTU storage capacity. This would be 1,800 casks. Any slippages in the repository program would have no immediate impact on MRS's NRC licensed capacity or Congressional authorization on the facility's capacity. Any capacity changes would require Congressional approval and NRC licensing amendments.

5. How much revenue from utilities is to be available to pay for waste storage by the year 2000? Could we get all of it if nothing else is built? (Storage yard fee)

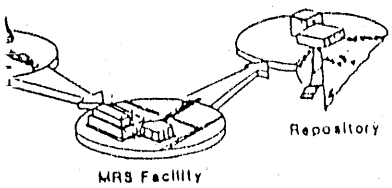
Answer

In 1984 dollars, the cost of the waste program is expected to be in the range of $24 to $30 billion by the year 2000 to pay for waste disposal. All but approximately $2.7 billion for the MRS is to be expended for the repository program. The primary thrust of the NWPA and the current DOE program is based on national policy and law, and will continue to be based, on permanent geologic disposal--not permanent monitored retrievable storage.

6. Is it feasible for the facility to be either built and operated by a private contractor or built by a private contractor and leased to DOE to insure the taxability of the property?

Answer

The Department currently expects that the facility and property will be owned by the Federal government, but will, in fact, be constructed and operated by a contractor. The current planned application of "tax equivalency" addresses the last part of this question. Under the "tax equivalency" concept, revenue/grant levels will be calculated so as to mirror amounts taxing jurisdictions would receive if they were taxing a private activity. This will insure the taxability of the property. We believe the State and local taxing jurisdictions should determine how the "tax equivalency" program will be implemented by considering the application of their taxing provisions to the MRS.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE, TENNESSEE

TASK FORCE MEMORANDUM NO. 13

Date: August 21, 1985

To: Mr. Peter Gross
DOE/ORO/MRS Office

From: Mr. Larry Dickens, Chairman
Socioeconomic Study Group

Subject: PROPERTY VALUES

Please provide the Socioeconomic Study Group with property value studies that have been completed for the Department of Energy in conjunction with facility sitings. If you cannot furnish these studies, please provide access to the documentation. We will need this information by September 14, 1985. Let us know if this is not possible.

Larry M. Dickens

Larry M. Dickens, Chairman

lm

cc: Clinch River MRS Task Force Members
Wayne K. Scharber, Tennessee Department of Health and Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
D. J. Silvera, Pacific Northwest Laboratories
Ben C. Rusche, Office of Civilian Waste Management

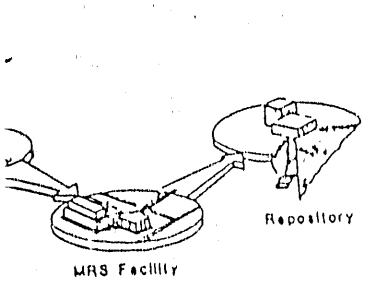
Response to Task Force Memorandum No. 13

Please provide the Socioeconomic Study Group with property value studies that have been completed for the Department of Energy in conjunction with facility sitings. If you cannot furnish these studies, please provide access to the documentation. We will need this information by September 14, 1985. Let us know if this is not possible.

Answer

Property value studies are normally included as a part of an Environmental Impact Statement. The number of EIS's that have been completed for the DOE on numerous projects is substantial. In general, these studies were undertaken prior to construction/ operation of the facilities and no follow-up was made to evaluate the accuracy of the predictions contained in the original EIS. However, the NRC has commissioned several post-licensing studies to determine the socioeconomic impact that did occur around a dozen or more reactor sites. One of the topics evaluated in the studies was the impact on the local housing markets. The complete reference for the report (several volumes) is:

NUREG/CR-2749
Division of Health, Siting and
Waste Management
Office of Nuclear Regulatory Research
U. S. Nuclear Regulatory Commission



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE , TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE , TENNESSEE

Task Force Memorandum No. 14

Date: August 20, 1985

To: Peter Gross
ORO/MRS Office

From: Shirley Hendrix, Chairperson
Transportation Study Group

Subject: QUESTIONS FROM THE TRANSPORTATION STUDY GROUP

Please respond at your earliest convenience to the following questions:

1. What accident scenarios have you considered for a vehicle transporting five-year-old spent reactor fuel?

2. What are the data for the Southern Railway (Norfolk and Southern) and the L & N (Seaboard) for:
   - mainline track quality from Oak Ridge (or nearby) to (other tracks going to) Washington, New Mexico, and Texas (panhandle)?
   - accident rates?
   - volume of hazardous materials transported per year for last five years?
   - population of areas near tracks from Oak Ridge to where the Southern or L & N lines end (or leave the state), or to where a switch would be made to another rail line?
   - nearness of tracks for Southern and L & N to special high-density facilities such as hospitals, schools, shopping centers, prisons, etc.?

3. Will DOT or DOE required that spent fuel transported by rail be shipped on Class I track?

Shirley Hendrix, Chair
Transportation Study Group

pb

Copies:

Clinch River MRS Task Force
Wayne K. Sharber, Tennessee Department of Health and Environment
Ben L. Smith, Safe Growth Team
Sen. Ward Crutchfield, Special Joint Committee on MRS
Ben Rusche, DOE
Larry Blalock, DOE

Response to Task Force Memorandum No. 14

1. What accident scenarios have you considered for a vehicle transporting five-year-old spent nuclear fuel?

Answer

In lieu of specific consideration of accident scenarios, the NRC requires tests and engineering analyses that simulate the conditions to be expected in severe transportation accidents when they are certifying a cask to be used in spent fuel shipments. The quantity of fuel shipped and its age determine the source term to be considered in accident analyses. The existing cask fleet was designed for small pay load of fuel less than one year old. Future cask designs will be for larger quantities of longer cooled fuel and they will be subjected to similar tests and analyses before winning certification.

For shipment of spent fuel in the waste program it is important to consider risk. Recent risk analyses for shipment in existing casks of five-year-old fuel from reactors to repositories have been made and are documented in report SAND84-1794 "A Preliminary Cost and Risk Analysis for Transporting Spent Fuel and High-Level Wastes to Candidate Repository Sites" K. S. Neuhauser, et. al, October 1984. The transportation risk is a summation of the product of the consequences and the probability of occurrence for a range of accidents grouped into six severity categories and occurring in three population zones.

The severity categories represent families of accident situations that result in different degrees of cask damage due to impact and fire. The most severe categories include hypothetical accidents that compromise the integrity of the cask and cause failure of fuel cladding which, along with high temperature from attendant fires, result in release of radioisotopes.

The report indicates that from 1 to 18 fatalities (latent cancers) can be expected due to the radiological impact of shipping 70,000 metric tons of spent fuel over a 26 year period. The nonradiological consequences of these shipments are estimated at 2 to 78 fatalities. Other inferences derived from this report are:

1) Radiological risk of rail shipments is about five times that for truck shipments.*

2) Nonradiological risk of truck shipments is 15 to 20 times that the rail shipments.

3) The radiological impact of natural background on the U. S. population is 6,000 to 80,000 times that of waste shipments including occupational and accident impacts.

*Recent analyses not yet published indicate that the radiological risk for normal rail shipments is significantly lower than the values used in SAND84-1795.

2. What are the data for the Southern Railway (Norfolk and Southern) and the L & N (Seaboard) for:

- mainline track quality from Oak Ridge (or nearby) to (other tracks going to (Washington, New Mexico, and Texas (panhandle)?
- accident rates?
- volume of hazardous materials transported per year for last five years?
- population of areas near tracks from Oak Ridge to where the Southern or L & N lines end (or leave the state), or to where a switch would be made to another rail line?
- nearness of tracks for Southern and L & N to special high-density facilities such as hospitals, schools, shopping centers, prisons, etc?

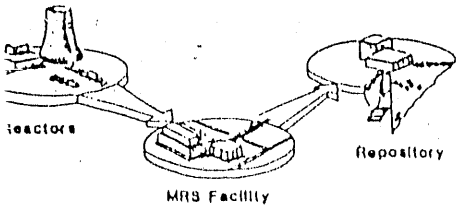
Answer

We have requested this information of the rail lines. As soon as it comes in we will forward it to you.

3. Will DOT or DOE require that spent fuel transported by rail be shipped on Class I track?

Answer

There is no regulation or requirement by DOT or DOE that nuclear waste rail shipments be exclusively on Class I track. The railroads, in the interest of safety and prudent business practice, adjust train speed and loading to the quality and condition of the track utilized in all shipments.



CLINCH RIVER MRS TASK FORCE

ROANE COUNTY/CITY OF OAK RIDGE, TENNESSEE

615/483-5671 · POST OFFICE BOX 1 · OAK RIDGE, TENNESSEE

TASK FORCE MEMORANDUM NO. 15

TO: Mr. Peter Gross
DOE/ORO/MRS Office

DATE: October 16, 1985

FROM: Joseph C. King, Coordinator
Clinch River MRS Task Force

SUBJECT: MRS SITE CHARACTERIZATION

Title I, Section 112(a) of the Nuclear Waste Policy Act specifies that DOE will disqualify any site for the development of a permanent repository that is "located (1) in a highly populated area; or (2) adjacent to an area 1 mile by 1 mile having a population of not less than 1,000 individuals." Federal regulations (10 CFR, Part 960) interpret this to mean that a permanent repository will not be sited in any incorporated or census-designated place, excluding counties, with a population of 2,500 or more. In 10 CFR, Part 960 the stated purpose of this restriction is "the protection of people from harmful exposure to radiation releases from repository surface facilities." It is our understanding that MRS surface facilities would be similar to those originally envisioned for a permanent repository. While Section 112(a) of the Nuclear Waste Policy Act does not technically apply to siting of an MRS, has DOE taken it into consideration in selecting Tennessee locations for the proposed facility?

Joseph C. King

cc: Clinch River MRS Task Force Members
Wayne K. Scharber, Tennessee Department of Health & Environment
Ben L. Smith, State of Tennessee Safe Growth Team
Senator Ward Crutchfield, Special Joint Committee on MRS
D. J. Silvera, Pacific Northwest Laboratories
Ben C. Rusche, Office of Civilian Radioactive Waste Management

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

October 22, 1985

Mr. Joseph C. King
Coordinator
Clinch River MRS Task Force
Post Office Box 1
Oak Ridge, Tennessee 37831

Dear Mr. King:

This is in response to Task Force Memorandum no. 15, dated October 16, 1985, concerning repository versus MRS siting considerations related to population density and exposure to releases from the facility.

Because the safe permanent isolation of spent nuclear fuel in geologic repositories is a unique and unprecedented technical undertaking, repository siting incorporates conservative requirements to compensate for uncertainties with regard to geologic and hydrologic features important for isolating wastes over thousands of years. The surface facilities at the repository provide a direct access to the geologic formations and isolated wastes, and so must also reflect this conservative approach. The qualifying conditions for the repository with regard to population density and distribution were specifically included for this reason in the Nuclear Waste Policy Act.

The radioactive materials handling operations of the proposed MRS, however, have been safely demonstrated over the past 30 years, and in this manner do not constitute unique hazards. For this reason, the MRS facility can be sited consistent with existing spent fuel storage facility siting requirements. The conservative requirements of the geologic repository do not apply to the MRS.

While the specific requirements of 10 CFR 960 were not appropriate for MRS siting, the proximity to population centers both in terms of actual population density and population immediately adjacent to the site were in fact carefully considered in the MRS site screening and identification. (See DOE/RW-0023, page 36, Golder Report, May 1985)

I hope this responds to the concerns expressed in your memorandum. If you have any further questions, please feel free to contact us at any time.

Sincerely,

Peter J. Gross, Manager
Monitored Retrievable Storage Office

cc: Wayne Scharber, TDHE
Ben Smith, Safe Growth Council
Sen. Ward Crutchfield, Tennessee Senate
D. J. Silveria, PNL

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 16, 1985

Ms. Shirley Hendrix, Chairperson
Transportation Study Group
Clinch River MRS Task Force

RESPONSE TO TASK FORCE MEMORANDUMS 1 AND 14

Enclosed are responses to questions from the Transportation Study Group provided in Memorandums 1 and 14. We also received Memorandum 2 which identified the mission for the Transportation Study Group. We concur in the statement of mission.

Enclosed also, for your information, is a typical NRC Certificate of Compliance.

If there are any questions or if I can be of further assistance, please give me a call on 576-6694.

Peter J. Gross, Manager
Monitored Retrievable Storage Office

Enclosures

cc: Joe King, City of Oak Ridge
Wayne Scharber, TDHE
Ben Smith, Safe Growth Council
Sen. Ward Crutchfield, Special Legislative
Study Group on MRS
Larry Blalock, AD-412

NRC FORM 618
(6-83)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES

1.a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. PACKAGE IDENTIFICATION NUMBER	d. PAGE NUMBER	e. TOTAL NUMBER PAGES
9023	4	USA/9023/B( )F	1	5

2. PREAMBLE

a. This certificate is issued to certify that the packaging and contents described in Item 5 below, meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."

b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. PREPARED BY (*Name and Address*).

Nuclear Assurance Corporation
5720 Peachtree Parkway
Norcross, GA 30092

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

NL Industries, Inc. application dated February 27, 1976, as supplemented.

c. DOCKET NUMBER 71-9023

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

(1) Model No.: NLI-10/24

(2) Description

A lead, water, depleted uranium and high temperature polymer shielded shipping cask, encased in stainless steel, equipped with balsa impact limiters, and mounted to a railcar which is considered to be an integral part of the packaging for normal conditions of transport. The cask body is 204-1/2 inches long by 96 inches in OD. The principal shielding consists of 6 inches of lead and 9 inches of water. Depleted uranium plates are encased in the bottom end forging and cask inner closure head. High temperature polymer sheet is encased in the bottom end and positioned between the inner and outer closure heads at the top end.

The lead shield is bonded between a 3/4-inch stainless steel inner shell and a 2-inch stainless steel outer shell. The outer shell is surrounded by a 3/4-inch stainless steel water jacket shell. The three (3) shells are welded to stainless steel forgings at both ends. Four (4) water expansion tanks are mounted to the railcar, and are connected to the water jacket by a flexible metal hose.

5. (a) Packaging (continued)

(2) Description (continued)

The primary containment vessel is comprised of the 3/4-inch inner shell and the inner closure head. It is 179-1/2 inches long and has a 45-inch inside diameter. The inner closure head is held in place by sixteen (16) bolts, and is sealed with a metallic O-ring. Secondary containment is provided by the outer closure head which is bolted, and has a Viton or silicone O-ring seal. There is no direct penetration between the containment cavity and the ambient. The two (2) penetrations into the containment cavity are from the space between the inner and outer closure heads, which has a single penetration through the cask body connecting it with the ambient. The two (2) lid penetrations are sealed with 1-1/2-inch quick disconnect valves and metal O-ring seals each in a valve box arrangement.

The radioactive contents are positioned within the containment cavity using neutron poisoned aluminum baskets and internal support structures. The PWR and BWR fuel basket cavities are lined with neutron absorber sleeves composed of a silver-indium-cadmium (80-15-5 w/o) alloy.

An auxiliary cooling system, mounted to the railcar, is used to maintain the cask and fuel temperatures so as to facilitate handling and cooldown.

The fully loaded cask, excluding the railcar, is approximately 194,000 pounds, which includes a maximum gross weight of the cavity contents of 34,100 pounds (fuel, spacers, fuel basket, etc.).

(3) Drawings

The Model No. NLI-10/24 shipping cask is constructed in accordance with the NL Industries, Inc. and National Lead Company Drawing Nos. as specified on page XVIII-1, Rev. 9 and page XVIII-2, Rev. 8, in Section XVIII of the Application.

5. (b) Contents

(1) Type and form of material

Irradiated PWR and BWR uranium oxide fuel assemblies of the following specifications:

5. (b) Contents (1) (continued)

	PWR	BWR
Fuel form	Clad UO_2 pellets	Clad UO_2 pellets
Cladding material	Zr or SS	Zr or SS
Maximum initial U content/assembly, kg	475	200
Maximum average initial U-235 enrichment, w/o	3.5	2.8
Maximum initial U-235 content/assembly, kg	16.6	5.6
Maximum bundle cross section, inches	9.00	5.75
Fuel pin array size, number of pins	14x14/15x15 16x16/17x17	7x7/8x8
Maximum active fuel length, inches	144	144
Maximum specific power, kw/kgU	40	27
Maximum average burnup, MWD/MTU	35,500	29,700
Minimum cooling time, days	150	150

The PWR type assemblies may be shipped either with or without control rods.

(2) Maximum quantity of material per package

The maximum decay heat load per package not to exceed 70 kilowatts, and:

Ten (10) PWR fuel assemblies or twenty-four (24) BWR fuel assemblies.

Above assemblies shall be contained in their respective fuel baskets as shown on NL Industries, Inc. and National Lead Company Drawing Nos.:

70652F, Sheet 1, Rev. 7 PWR Fuel Basket,
Sheet 2, Rev. 5 10/24 Rail Cask
70653F, Sheet 1, Rev. 7 BWR Fuel Basket,
Sheet 2, Rev. 5 10/24 Rail Cask

5. (c) Fissile Class III

Maximum number of packages per shipment for Class III One (1)

6. The maximum gross weight of the cavity contents must not exceed 34,100 pounds (fuel, spacers, basket, etc.).

7. The containment vessel must be dry (no free water) when delivered to a carrier for transport. Residual moisture must be promptly removed from the containment vessel by the methods described in Section XVI of the Application. The containment vessel must be promptly filled with helium to 1.0 atm pressure.

8. Known or suspected failed fuel assemblies (rods) and fuel with cladding defects greater than pin holes and hairline cracks are not authorized.

9. Prior to each shipment, the package must meet the tests and criteria specified in Section XVII of the Application.

10. The cask contents must be so limited under normal conditions of transport that the following measured dose rates be satisfied:

    a) at one meter from the external radial midplane surface of the package: 625 times the neutron dose rate plus 2.5 times the gamma dose rate will not exceed 1,000 millirems per hour; and

    b) at one meter from the external surface of the bottom of the package; 115 times the neutron dose rate plus 2.0 times the gamma dose rate will not exceed 1,000 millirems per hour.

11. The neutron shielding system and auxiliary cooling system must be filled with a mixture of water and ethylene glycol (53% to 58% by weight ethylene glycol).

12. The neutron shielding system must be equipped with two (2) pressure relief valves (one on the cask and one on an expansion tank) set at 220 psig.

13. Any system used for cooling down the package must be provided with a pressure relief device set so that the maximum pressure in the containment vessel cannot exceed 233 psig during the cooldown process.

14. The systems and components of each packaging must meet the criteria for the periodic tests specified in Section XVII of the Application.

15. Repair and maintenance must be as described in Section XVII of the Application. During inactive periods, the maintenance and testing program may be disregarded provided that the package is brought into full compliance prior to the next use of the package.

16. Prior to first use, each packaging shall meet the criteria for the acceptance tests specified in Sections XIV and XV of the Application, except that the prototype railcar test meeting the stated design criteria need be performed only once.

17. Packaging is authorized for rail mode of transport only.

18. Expiration date: July 31, 1986.

REFERENCES

NL Industries, Inc. application dated February 27, 1976.

Supplements dated: June 4, 1976; October 10, 1978; and July 6, 1979.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Date: APR 13 1984

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 18, 1985

Robert Peele, Chairman
Environmental Study Group
Clinch River MRS Task Force

RESPONSE TO TASK FORCE MEMORANDA #3, 4, 5, 6, 7, 8, 9

The purpose of this letter is to respond to Task Force Memoranda from your Study Group which you sent on August 15, 1985. The questions which you asked will be addressed in greater detail in the Environmental Assessment which is currently under preparation. As I'm sure you realize, all of your questions relate to environmental and safety considerations which must be addressed during definitive design in detail, and be shown to be acceptable to the NRC during licensing reviews of the Safety Analysis Report. However, at this early stage in the MRS program, such detailed analysis is not and will not be available. Safety analysis based on the conceptual design is currently being performed and will be reported in the proposal package when complete later this year. Consequently, we have attempted to address each of your questions in more general terms at this stage. The answers are enclosed.

If you have any further questions or if I can be of any further assistance, please do not hesitate to call me on 576-6694.

Peter J. Gross, Manager
Monitored Retrievable Storage Office

Enclosure

cc: W. Scharber, TDHE
Ben Smith, Safe Growth Council
Senator Ward Crutchfield, Special
Legislative Study Group on MRS
Joe King, City of Oak Ridge

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 11, 1985

Larry M. Dickens, Chairman, Socioeconomic Study Group

DOE RESPONSE TO SOCIOECONOMIC STUDY GROUP QUESTIONS

Enclosed are responses to the Socioeconomic Study Group's questions provided in Task Force Memorandums 10, 11, 12, and 13.

If you have any questions or if I can be of any further assistance, please give me a call.

Peter J. Gross, Manager
Monitored Retrievable Storage Office

Enclosure

cc: Wayne Scharber, TDHE
Ben Smith, Safe Growth Council
Joe King, City of Oak Ridge
Sen. Ward Crutchfield, Special Legislative
Study Group on MRS

END

DATE
FILMED
6/5/92