Department of Energy
Washington, DC 20585

March 23, 1994

Mr. Robert M. Bernero
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Bernero:

On March 16, 1994, we transmitted a letter to you which enclosed the approved memorandum for changing to a Multipurpose Canister-based system. Several pages were inadvertently omitted from the enclosure. This letter contains the enclosure in full. We regret any inconvenience this may have caused. If you have any questions, please call me at (202) 586-6046.

Sincerely,

Dwight E. Shelor
Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosure

Department of Energy

Washington, DC 20585

February 16, 1994

MEMORANDUM FOR: Daniel A. Dreyfus, Director
Office of Civilian Radioactive
Waste Management

FROM: Ronald A. Milner, Associate Director RAM 2/16/94
Office of Storage and Transportation

SUBJECT: ACTION: Modify the CRWMS Program Baseline to a Multipurpose Canister-Based System

BACKGROUND: The purpose of this memorandum is to request approval to change the Civilian Radioactive Waste Management System (CRWMS) Program Baseline to incorporate the Multipurpose Canister (MPC) concept and proceed through the MPC design and certification phase. The intent is to change the technical, cost, and schedule program baseline to include the MPC as the primary architectural element for packaging spent nuclear fuel for storage, transportation, and disposal. The baseline changes will be accomplished through the baseline change proposal and will be consistent with the strategic planning process and development of the Program Plan. For the Mined Geologic Disposal System (MGDS), the Waste Package and Repository Advanced Conceptual Design Plan will be revised to focus on the MPC as the primary alternative for use in disposal. The attachment provides the justification for this change and includes a brief analysis of risks.

The Nuclear Waste Technical Review Board has characterized the schedule for deployment of MPCs by 1998 as overly optimistic. A number of stakeholders and others have expressed similar opinions. Interactions with the Nuclear Regulatory Commission (NRC), leading to certification of the MPC system, represent the highest risks to the schedule and are, therefore, the focus of attention to mitigate delays. The remaining technical concerns are related to the disposal of MPCs, including the final decision on thermal loading, criticality control, and waste package materials selection. Finally, use of MPCs almost certainly will require the use of rail transport to the repository.

The actions necessary to initiate required changes to all affected CRWMS Program documents will be authorized by approval of this memorandum.

The change to the Program technical baseline, as defined in BCP-00-94-0001, has been approved by the Program Baseline Change Control Board contingent upon approval of this request to incorporate the MPC into the waste management system. Early approval is necessary in order to avoid delay in the release of the Request for Proposal for Design and Certification of the MPC.

Approval of this action, in conjunction with the concurrence by the Offices of General Counsel and Environment, Safety, and Health on our proposed approach to compliance with the National Environmental Policy Act (NEPA), will allow the program to proceed through MPC design and certification. A subsequent decision will be necessary prior to fabrication and deployment of MPCs. This subsequent decision will be based on the successful certification of the MPC by the NRC, the completion of the appropriate NEPA documentation, and review by the Energy System Acquisition Advisory Board (ESAAB).

RECOMMENDATION: Approve changing the CRWMS baseline to a system based on the MPC.

ATTACHMENT: CRWMS Program Baseline Change - Justification for Changing to a Multipurpose Canister-Based System

APPROVE: _____

DISAPPROVE: _____

DATE: 3/10/94

	Concur	Nonconcur
RW-2	_____	_____
RW-3	_____	_____
RW-4	_____	_____
RW-5	_____	_____
RW-10	_____	_____
RW-20	_____	_____
RW-30	_____	_____
RW-50	_____	_____

CRWMS Program Baseline Change - Justification for Changing to a Multipurpose Canister-Based System

Summary

The Civilian Radioactive Waste Management System (CRWMS) program has not progressed as originally envisioned in the Nuclear Waste Policy Act of 1982, as amended. This is a result of a number of factors, including (1) failure of the voluntary siting process to identify a Monitored Retrievable Storage (MRS) facility site that can support waste acceptance beginning in 1998, and (2) repository schedule delays resulting from funding constraints, lack of the timely issuance of permits from the State of Nevada, and other reasons. Without an MRS or repository to accept waste, it is unlikely that the removal of spent nuclear fuel from reactor sites will begin in 1998. This will result in utilities having to purchase significant amounts of additional, out-of-pool storage. It is estimated that by the year 2010, an additional 60 reactor pools will reach capacity, resulting in a need for out-of-pool storage for approximately 6,000 tons of spent nuclear fuel. Additional, at-reactor storage technologies will continue to be deployed on a site-by-site basis without regard to CRWMS needs or interface requirements. These storage and support technologies are not standardized and are not compatible with the Federal waste management system being developed by the Department.

As noted by Secretary O'Leary, there may have been an expectation created in the standard contract (10 CFR Part 961) that DOE would initiate waste acceptance in the year 1998. To encourage utilities to use standardized dry storage technologies, make dry storage systems compatible with the CRWMS, and to provide a potential option for offsetting the costs for additional storage needs resulting from delays in the implementation of the CRWMS, the CRWMS program baseline should be modified to a system based on multipurpose canisters.

This approach is consistent with the consensus, which has been growing during the past several years, that a system based on multipurpose canisters may offer advantages for the management of spent nuclear fuel. Primary among these advantages are: standardization of dry storage and support technologies; reduction in the number of individual spent fuel assembly handlings; development of the ability to ship spent fuel from reactor storage without returning to a transfer pool; simplification of the CRWMS fuel handling and support facilities; and development of a system that facilitates subsequent movement of spent fuel throughout the CRWMS, including into a repository for ultimate disposal. Over the past year and a half, the Office of Civilian Radioactive Waste Management has undertaken extensive external interactions, including conducting two public Stakeholder Workshops, regarding the MPC. Subsequently, the MPC-based system has received a consensus endorsement from the nuclear utilities through an Edison Electric Institute (EEI)/UWASTE resolution, and has also been viewed positively by other stakeholders such as the Nuclear Waste Technical Review Board, the National Association of

Regulatory Utility Commissioners, and others who have encouraged the DOE to move forward in its evaluation of the MPC-based concept.

Development of multipurpose canisters in the near term also provides ancillary benefits for the CRWMS. These include: demonstrating progress by DOE in resolving civilian radioactive waste management issues; providing a potential option to assist nuclear utilities and ratepayers by offsetting the costs for increased on-site storage; identifying potential repository issues ahead of the Part 60 licensing procedure; and expanding the existing framework within which DOE-NRC interactions can identify licensing issues and move toward resolution in the pre-licensing environment.

In order to ensure that obtaining these near-term benefits provided by the MPC-based system will not undermine the longer-term performance of the CRWMS, a series of analyses were performed to compare the MPC-based system to a modified reference system and other multipurpose alternatives for a variety of criteria. With respect to the overall system criteria, the analyses demonstrated the MPC-based system to be comparable to the modified reference system and superior to the other multipurpose alternatives. The results indicated that:

- The life cycle cost of the MPC system was essentially equivalent to that of the modified reference system, and superior to that of the other alternatives.

- The health and safety impacts of the MPC system were within regulatory limits and on the same order as those of the modified reference system and the other alternatives.

The analyses considered also the impacts on the MPC-based system of not having an MRS facility and of having a delayed repository. With no MRS facility, the MPC-based system is equally advantageous relative to the modified reference system as it is with an MRS. If the adverse impacts of developing a multiplicity of non-standardized and non-integrated storage and transportation technologies in a modified reference system with no MRS are accounted for, the MPC-based system is even more beneficial. With a delayed repository, the advantages of the MPC-based system relative to the modified reference system increase. Implications of the MPC system for the MGDS include:

- the use of larger waste packages;

- the use of horizontal, in-drift emplacement;

- MPC materials as the basket for the waste package; and

- a thermal loading range from 25 to 100 kW/acre.

The economic risks of technical uncertainties related to MPC non-transportability following long-term storage and MPC non-emplaceability in the MGDS were evaluated and are reasonable relative to the scope of the program. However, the MPC-based system is not without technical risk. The primary technical uncertainties relative to emplacement of the MPC (e.g. long-term criticality control, thermal constraints, and materials) are being addressed with a focus on near-term resolution. In the final analysis, these risks could have significant economic impact on overall system costs.

The MPC-based system has clear near-term system advantages and presents no significant penalties over the longer term for the program. The MPC-based system should be incorporated into the CRWMS program baseline and the program should proceed with the detailed design and certification of multipurpose canisters.

Background

In September 1992, a report on *Issues Associated with Alternative Cask and Canister Concepts for Storage, Transportation, and Geologic Disposal of Spent Nuclear Fuel within the CRWMS* was completed. The results showed that the Multipurpose Canister (MPC), Transportable Storage Cask (TSC), and Multipurpose Unit (MPU) concepts all offered potential improvements over a modified reference system. Following discussions with nuclear utility representatives, a more detailed evaluation of the feasibility of implementing the MPC concept was initiated. In March 1993, the results of this MPC feasibility study were released in the report *A Preliminary Evaluation of Using Multipurpose Canisters within the Civilian Radioactive Waste Management System.* The MPC feasibility study reinforced the advantages found in the previous study and provided a basis for moving to the conceptual design phase. The results of the conceptual design phase were reported in the September 1993 *MPC Implementation Program Conceptual Design Phase Report.* A goal of the MPC conceptual design phase was to perform the studies required to rigorously evaluate the advantages and risks of the MPC-based system relative to the modified reference system and other multipurpose alternatives, including the TSC and the MPU. The studies in the MPC Conceptual Design Report (MPC-CDR) included the following:

- Concept of Operations for the MPC System - defines the assumptions and parameters used in the studies
- Operational Throughput for the MPC System - defines the logistics used in the studies
- At-Reactor Dry Storage Issues - evaluates on-site storage needs and costs for MPC and modified reference systems
- Life Cycle Cost Comparison for the MPC System - evaluates cost life cycle costs for MPC and modified reference systems

- Programmatic Risk and Contingency Analysis for the MPC-based System - evaluates cost impact of unresolved issues on MPC system
- Evaluation of Alternative Cask/Canister Systems - develops and evaluates cost for TSC and MPU systems
- Health and Safety Impacts Analysis for the MPC System and Alternatives - evaluates radiological and non-radiological impacts for MPC, TSC, MPU, and modified reference systems
- Mined Geologic Disposal System MPC Design Considerations - analyzes issues of MGDS waste package, surface, and subsurface design, including materials, thermal loading, long-term criticality control, operations, and cost
- Regulatory Considerations - analyzes regulatory issues including MPC licensing and NEPA considerations
- Stakeholder Involvement - considers the inputs and conclusions from the two MPC stakeholder workshops

Scope

(a) Description of Alternatives

(1) Modified Reference System

The modified reference system used in the analyses is based on individual spent nuclear fuel (SNF) assemblies being transferred from utilities' spent fuel pools to and among single purpose casks at the utilities, MRS facility, and MGDS. Separate casks are designed and used for storage, transportation, and disposal and large, heavy-walled, in-drift emplacement waste packages are assumed.

(2) MPC

The MPC-based system is based on individual SNF assemblies being loaded into MPCs (sealed canisters) once at the utilities and then remaining in the MPCs throughout the system life, including disposal. A single MPC is designed with separate overpacks for storage, transportation, and disposal.

(3) TSC

The TSC-based system assumes individual SNF assemblies are loaded into TSCs (dual purpose casks) at the utilities and remain in the TSCs for storage and transportation, but are transferred to a separate cask for disposal. A single TSC is designed for storage and transportation and a separate cask is designed for disposal.

(4) MPU

The MPU-based system assumes individual SNF assemblies are loaded into MPUs (universal casks) at the utilities and remain in the MPUs throughout the system, including disposal. A single MPU is designed for storage, transportation, and disposal without use of overpacks.

(b) Evaluation Criteria

(1) Cost

This criterion compares the total life cycle cost for each of the systems, with the lowest life cycle cost being preferred. The significance of cost differentials with respect to total program cost should be considered. The cost comparisons include both Federal and utility costs.

(2) Schedule

This criterion compares the time until each of the systems can begin operation, with the earliest system operation being preferred. Emphasis is placed on the capability and probability meeting the 1998 target date. Beginning of system operation is defined as the first delivery of cask/canister systems to utilities.

(3) Health/Safety

This criterion compares radiological and non-radiological impacts for each of the systems, with the lowest health/safety impacts being preferred. The significance of impact differentials with respect to similar health/safety impacts should be considered. The system includes all health/safety impacts from utility operations to underground disposal.

(4) Technical Feasibility

This criterion compares the technical capability of each system to be designed and operated, with demonstrated technical capability being preferred. Emphasis is placed on the use of existing technology or technology under development with no major uncertainties identified.

(5) Regulatory/Environmental

This criterion compares the regulatory and environmental aspects of each of the systems, with ease of demonstrating regulatory and environmental compliance being preferred. Emphasis is placed on systems based on clear licensing precedents or extensive licensing review and coordination.

(6) Stakeholder Acceptance

This criterion compares the relative acceptance of each of the systems by stakeholders with the highest estimated acceptance being preferred. Emphasis is placed on simplified operations, ability to operate without additional facilities, and ability to offset utilities' financial burdens. Stakeholders include the utilities and their ratepayers, independent review groups, regulatory and legislative bodies, and other affected and interested parties.

(c) Evaluation of Alternatives

(1) Cost

Total life cycle cost for the systems was evaluated in the *Life Cycle Cost Comparison for the MPC System* and *Evaluation of Alternative Cask/Canister Systems* reports in the MPC-CDR. All costs from utility storage to disposal were considered. All systems were compared to the modified reference system as a basis. The MPC system had the lowest life cycle cost and was $550 million less than the modified reference system. The MPU and TSC systems were $3.2 billion and $4.3 billion more, respectively, than the modified reference system. The estimated cost savings for the MPC-based system in comparison to the modified reference system is on the order of only 1-2 % of the total system costs, well within the band of estimating errors. The MPC-based system is therefore considered to be essentially equivalent to the modified reference system for this criterion.

(2) Schedule

Schedules for the alternative systems were evaluated in the design volumes of the MPC-CDR and in the *Evaluation of Alternative Cask/Canister Systems* report. Although the storage components of the modified reference system are already available, operation of this system cannot begin until an MRS is available. Being tied to the availability of a facility capable of waste acceptance makes the modified reference system schedule highly uncertain. The remaining systems are capable of at least storage and transportation and, therefore, do not require an MRS to begin initial implementation. Of these systems, the TSC system is closest to receiving licensing approval and should be available by 1998, if not earlier. The MPC-based system is similar to technologies currently in licensing review that are expected to be available by 1995. The MPC-based system, therefore, is expected to be available in 1998 with a reasonable probability. The MPU-based system represents new technology that is not currently part of a licensing initiative and, therefore, it is doubtful that the MPU could be available in 1998.

(3) Health/Safety

Health/Safety impacts for alternative systems were evaluated in the *Health and Safety Impacts Analysis for the MPC System and Alternatives* report in the MPC-CDR. All impacts from utility storage to disposal were considered over the program lifetime. Impacts evaluated included radiological and non-radiological impacts for routine operations and incidents. Non-radiological routine and incident impacts were equivalent for all systems. Radiological incident impacts were slightly lower for the MPC and MPU-based systems (3.3×10^{-5} person-rem) than for the TSC system (6.2×10^{-5} person-rem) and the modified reference system (7.4×10^{-5} person-rem), as a result of reducing the number of individual SNF handlings. Radiological routine impacts were lowest for the modified reference scenario (53,300 person-rem) and higher for the TSC system (55,700 person-rem), MPU system (58,500 person-rem), and MPC system (69,600 person-rem). The increase for the MPC system was driven by canister welding operations and occurred primarily at the utilities. MPC system exposures at utilities would account for less than 2% of annual utility exposures. The use of improved canister welding operations would reduce the differential between systems. Exposures for all systems were within regulatory limits.

(4) Technical Feasibility

Technical aspects of the systems were evaluated in the design volumes of the MPC-CDR in the *Evaluation of Alternative Cask/Canister Systems* report, and the Mined Geologic Disposal System Multi-Purpose Canister Design Considerations Report. The modified reference system uses existing technology and has no major technical uncertainties except those associated with disposal, which are decoupled from storage and transportation. The TSC system uses existing technology, with the exception of the capability to transport after interim storage, and uncertainties of disposal which are decoupled from storage and transportation. The MPC-based system uses existing technology with the exception of the capability to transport after interim storage and attempting to be compatible with disposal. The MPU-based system uses existing technology for storage, but uses new technology for transportation and attempts to be compatible with disposal. Both the MPC-based system and the modified reference system assume burnup credit in the licensing of transportation casks. Technical consequences of the MPC system for the MGDS include the use of larger waste packages with horizontal, in-drift emplacement, MPC materials as the basket for the waste package, and a thermal loading range from 25 to 100kW/acre. A Performance Assessment determined that the larger waste package and emplacement mode did not result in a significant difference in performance. The MPC materials meet waste package basket requirements to the extent known at this time and a broad range of thermal loading can be accommodated.

(5) Regulatory/Environmental

Regulatory/Environmental aspects of the alternative systems were evaluated in the *Regulatory Considerations* report in the MPC-CDR. The modified reference system is based on components with clear licensing precedents, with the exception of the MRS facility and burnup credit for transportation. The TSC-based system is based on components with storage and transportation technology having clear licensing precedents, although the two have never been approved for the same package. The TSC has been undergoing licensing review for a number of years, with completion expected in the near future. The MPC-based system is based on storage technology with clear licensing precedent, transportation technology that has recently entered licensing review by the NRC, and disposal technology with no precedent. Although licensing for storage and transportation is under review, the addition of disposal is not under any current licensing action. The MPU system is based on storage technology with clear licensing precedent, transportation technology with no licensing precedent, and disposal technology with no precedent. Licensing of this technology is not currently under review by the NRC. Environmental impacts are expected to be equivalent for all systems, and within regulatory limits. Initiation of interactions with the NRC for the MPC-based system provides the opportunity for early review of repository-related issues.

(6) Stakeholder Acceptance

Stakeholder input was acquired through a variety of forums, including the two MPC workshops; and interactions with the Edison Electric Institute, nuclear utility representatives, regulatory agencies, vendors, and technical review boards. These interactions are discussed in the *Stakeholder Involvement* report in the MPC-CDR. The MPC, TSC, and MPU-based systems all offer the opportunity to simplify system operations, to begin operations without having an MRS facility, and, for the MPC and MPU systems, to offset some of the utility and ratepayer financial burden associated with on-site dry storage. The modified reference system does not offer these opportunities. The MPU-based system offers the most simplified operations, followed by the MPC-based system and the TSC-based system. Simplified systems based on the MPC, TSC, and MPU have been recommended by technical review boards, utility groups, and potential MRS hosts. Since they use a single container throughout the system for storage, transportation, and disposal, the MPC and MPU systems offer the most standardized and integrated approach to SNF management. Interactions to date indicate that most stakeholders believe the MPC, TSC, and MPU systems offer significant advantages over the modified reference system. There is also a strong perception that these systems are safer because they minimize the handling of individual spent fuel assemblies. The MPC-based system has received a consensus endorsement from the nuclear utilities through an EEI/UWASTE resolution.

Preferred Alternative

(a) Justification

The MPC-based system is the preferred alternative for the following reasons.

Cost - The analyses of MPC-based system did not indicate a cost increase compared to the modified reference system and showed a potential for modest cost savings (well within the band of estimating errors) when utility costs are considered. A large part of the cost savings relative to the modified reference system is attributable to the ability of the MPC to be transported after storage without having to return to the spent fuel pool. Among other things, this allows utilities with shutdown reactors to unload fuel from their pools into dry storage in MPCs and then to decommission the spent fuel pools, thus avoiding the cost of maintaining spent fuel pools after reactor shutdown. This, combined with the cost of the MPC being covered by the waste fund, allows the MPC system to offset a portion of the financial burden of on-site storage to utilities and ratepayers. The MPC-based system was shown to save several billion dollars over the TSC and MPU systems.

Schedule - The MPC can be available in 1998 and does not require the availability of an MRS facility to begin to provide some type of relief to utilities. It is realized that implementation of on-site storage at reactors sites is not preferable to removal of spent fuel and does not constitute "waste acceptance" under the terms of the standard contract (10 CFR Part 961). Initiation of the MPC design and certification process will accelerate licensing interactions with the NRC.

Health/Safety - The MPC system was shown to have higher routine radiation exposures compared with the modified reference system. The increase is driven by canister welding operations which occur primarily at the utilities. These results are based on current welding operations. It is expected that improved/automated operations will reduce the difference between the systems. The differential between the MPC system and the modified reference system is inconsequential relative to background radiation exposures.

Technical - The MPC system is based on the use of existing technology plus technology which is currently in licensing review for storage and transportation. It offers the opportunity for standardization of fuel handling throughout the system. The use of the MPC introduces certain consequences for the MGDS, including the use of larger waste packages with horizontal, in-drift emplacement, MPC materials as the basket for the waste package, and a thermal loading range from 25 to 100 kW/acre. The only technical uncertainties for the MPC system involve the transportability of the MPC following interim storage and the emplaceability of the MPC in the repository. The economic impact of these technical uncertainties is discussed below under Risks.

Regulatory/Environmental - The MPC system is based on storage technology with clear licensing precedent, transportation technology that is currently under license review, and disposal technology with no clear precedent. There is regulatory uncertainty with respect to both the modified reference system and the MPC-based system related to the assumption of successfully obtaining NRC approval for applying burnup credit for transportation. The development of the MPC design will accelerate the understanding of the application of burnup credit for long-term disposal. Uncertainties related to disposal technology are evaluated below under Risks. Resolving regulatory issues of disposal for the MPC-based system should be a focus for program efforts. The MPC-based system is expected to have environmental impacts equivalent to the other systems and within regulatory limits.

Stakeholder Acceptance - Interactions with stakeholders to date indicate a positive view of the MPC-based system relative to the modified reference system. The MPC-based system, along with the MPU, offers the most standardized and integrated approach to SNF management, since it uses a single container throughout the system for storage, transportation, and disposal. The MPC-based system can simplify system operations, begin system operations without an MRS facility, and offset some of the utilities' financial burden for on-site storage.

(b) Risks

The MPC system is expected to meet all regulatory and environmental requirements. The risks associated with the MPC system are economic risks. Economic risks for the MPC system were evaluated in the *Programmatic Risk and Contingency Analysis for the MPC System* report in the MPC-CDR. The primary economic risks for the MPC-based system relate to i) the availability of an MRS; ii) the schedule for the MGDS; iii) the transportability of the MPC following interim storage; and iv) the emplaceability of the MPC in the repository. Reasons for non-emplaceability could include thermal loading, long-term criticality control, basket materials, or emplacement mode needs other than those for which the MPC is designed. The analysis showed that the MPC system had equivalent savings over the modified reference system for systems both with and without an MRS and that the MPC-based system savings actually increased for a ten year delay in the start of operations of the MGDS (delayed from 2010 to 2020). If the MPC is determined to be not transportable following interim storage, the impacts ranged from a continued savings of $500 million, if non-transportability is determined in 1998 and can be fixed with a design change, to an increase in cost of $500 million over the modified reference system if non-transportability is determined in the year 2010 and the MPC system must be abandoned. If the MPC is determined to be not emplaceable, the impacts ranged from a continued savings of $300 million, if non-emplaceability is determined in 2001 and can be fixed with a design change, to an increase in cost of $1.2 billion over the modified reference system if non-emplaceability is determined in 2010 and the MPC is converted to a dual purpose canister system for storage and transportation only. Therefore, the economic risks for the MPC system range from an increase in savings, if there is

no MRS or if the MGDS is delayed, to either reduced savings or, in the extreme, a $1.2 billion increase in cost. The increases in system cost can be controlled and mitigated by early resolution of the non-transportability and non-emplaceability issues. Resolution of these issues should be a focus for program risk mitigation efforts.

(c) Impacts

(1) Program Documentation

Impacts to program documentation are included in BCP-00-94-0001, Rev 01 of the CRWMS Requirements Document (CRD) and System Requirements Documents (SRDs).

(2) Cost

The total life cycle cost for the MPC system was evaluated in the *Life Cycle Cost Comparison for the MPC System.* This analysis showed that the MPC system would save $550 million in total system cost relative to the modified reference system. Based on the assumption that the $5.1 billion total cost for all MPCs would be paid from the waste fund, the analysis showed that cost to the waste fund cost would increase by $1.5 billion over the modified reference system while the cost to the utilities for on-site storage would be reduced by $2.1 billion for a net overall system savings of $550 million (an amount well within the band of estimating errors).

(3) Schedule

Analysis performed in the MPC-CDR showed that the MPC system can be available for deployment beginning in 1998. The initiation date and duration of the major actions, including evaluation, design, licensing, and fabrication, are aggressive but achievable if pursued vigorously.

Recommended Change

In summary, systems which serve multiple purposes offer distinct advantages over the modified reference system in addressing schedule issues associated with delays in the availability of the MRS and are broadly supported by various stakeholders. Of these multipurpose concepts, the MPC has distinct advantages from the cost perspective. All alternative systems meet regulatory, health, and safety requirements. Because of uncertainties, especially in transportability after interim storage and in licensing for disposal, there are risks associated with pursuing the MPC concept. However, the costs of addressing such risks are less than the cost differentials of pursuing other multipurpose concepts. The lower cost of the MPC and its ability to address schedule concerns are overriding factors in the determination of which system to develop. Therefore, it is recommended that the Program adopt the concept of utilizing the MPC as its baseline and that this system be reflected in the functions, requirements, and configuration items defined in Revision 1 to the CRD and the SRDs.

Implementation Actions and Responsible Organizations

(a) Revise Program Technical Baseline Documentation

The Program Technical Baseline Documentation has been revised to incorporate the MPC-based system as Baseline Change Proposal BCP-00-94-0001, contingent upon approval of this request. All applicable quality assurance requirements for this request have been met.

(b) Revise MRS Project Cost and Schedule Baseline

A BCP will be generated by the MRS Project and approved by the Program Baseline Change Control Board (PBCCB) in the 2nd Quarter of FY 94. It will propose changes to the MRS Project portion of the CRWMS Program Cost and Schedule Baseline document to reflect the current cost and schedule estimates for the Project including the MPC-based system.

(c) Baseline MRS Project Technical Baseline and MRS Project Management Documentation

A BCP will be generated by the MRS Project and approved by the MRS Project Office Baseline Change Control Board (POBCCB) prior to the release of the MPC system RFP. It will serve to baseline the MPC Subsystem, MPC Transportation Subsystem, and the OST/OSS Segments DRDs. It will also approve the MRS Project PMP and MPC System Interim Systems Engineering Approach and propose changes to the MRS Project CMP to accommodate the MPC system.

(d) Baseline MGDS Project Technical Baseline and MGDS Project Management Documentation

A BCP will be generated by the Yucca Mountain Site Characterization Project (YMP) and approved by the YMP POBCCB prior to the release of the MPC system RFP. It will serve to baseline the MPC-based system into the MGDS by changing the Waste Package and Repository Advanced Conceptual Design (ACD) Plan to focus on the MPC as the primary mechanism for disposal. Other changes will subsequently reflect the results of the revised ACD in Repository/Exploratory Studies Facility interface modifications as suggested in CRWMS M&O Doc. No.: B00000000-01717-5705-00009, Rev. 00 of December 17, 1993.

References

(a) Civilian Radioactive Waste Management System Management and Operating Contractor, September 1992. *Issues Associated with Alternative Cask and Canister Concepts for Storage, Transportation, and Geologic Disposal of Spent Nuclear Fuel within the CRWMS*. TSO.920820.0488. TRW Environmental Safety Systems, Inc., Vienna, Virginia.

(b) Civilian Radioactive Waste Management System Management and Operating Contractor, March 1993. *A Preliminary Evaluation of Using Multipurpose Canisters within the Civilian Radioactive Waste Management System.* A00000000-AA-07-00002. TRW Environmental Safety Systems, Inc., Vienna, Virginia.

(c) Civilian Radioactive Waste Management System Management and Operating Contractor, September 1993. *MPC Implementation Program Conceptual Design Phase Report.* A20000000-00811-5702-00002. TRW Environmental Safety Systems, Inc., Vienna, Virginia.