DOE/RW--0007

DE85 003262

Transportation Business Plan: Strategy Options Document

October 1984

U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Washington, D.C. 20585

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Department of Energy
Washington, D.C. 20585

Dear Reader:

The Office of Civilian Radioactive Waste Management (OCRWM) is responsible for establishing a transportation system to support shipment of spent fuel and high-level waste to repositories and storage facilities developed under the Nuclear Waste Policy Act of 1982 (NWPA). An element of that responsibility is to produce a business plan for acquiring and operating this system.

The Transportation Business Plan: Strategy Options Document accompanying this letter is an interim step in the process of producing the business plan. It sets the context for business strategy decisions by providing pertinent background information, by describing the legislation and policies governing transportation under NWPA, and by discussing the projected scope of business activities associated with establishing the system. It also serves as an instrument for initiating dialogue between OCRWM and other interested parties. Included in the document are a number of optional strategies for activities such as shipping cask development and procurement and transportation services procurement. Additionally, in the spirit of the NWPA directive to utilize the private sector to the maximum extent possible, opportunities for industry business ventures are indicated throughout the system development cycle.

I urge your comments on the options and opportunities included in this preliminary working plan. Through careful consideration of all comments received, OCRWM hopes to identify State, tribal, and public concerns as well as industry requirements and interests. The added dimension of your views and recommendations will contribute significantly to the consensus approach that I believe is essential to the success of our program. Following a period of strategy reevaluation based on your comments, OCRWM intends to issue a Transportation Business Plan in 1985. This plan will be evolutionary in nature and will be modified as required to address changing conditions to meet overall objectives and goals.

A companion document to the Transportation Business Plan will be the Transportation Institutional Plan, a draft of which is also expected to be available for public comment in 1985. That document will identify and foster the establishment of the communication links that are vital to cooperative effort among interested parties.

I request that you provide your comments on the enlosed document by February 1, 1985. Please submit your comments in writing to:

Mr. Robert E. Philpott
Chief, Transportation Programs
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy, RW-33
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Additional copies of the Strategy Options Document can be obtained by telephoning (202) 252-5568, by direct pick-up at the address shown below, or by writing to:

U.S. Department of Energy
Room 1E-218
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Thank you for your interest and participation in this important activity.

Sincerely,

Robert H. Bauer, for

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

PREFACE

The Nuclear Waste Policy Act of 1982 authorized the Department of Energy to establish a national system for the disposal of spent nuclear fuel and high-level waste, and directed the creation of the Office of Civilian Radioactive Waste Management (OCRWM) as the responsible organization. A primary element of the assigned functions is to develop the transportation capability necessary to support the repository system. In performance of all related transportation activities, the Act further directs the Department to "utilize by contract private industry to the fullest extent possible in each aspect of such transportation."

This document provides the framework for development of a business plan for establishing and operating the transportation system. Section I contains introductory material and defines the plan in terms of policy basis, purpose, and scope of business activities. Section II discusses the evolving strategy that will direct the Department's business actions and describes various strategy options that are under consideration. Also discussed in Section II is a process for the systematic development and acquisition of the transportation system. This process is based on a phased development approach with business activities divided into four stages: system definition; engineering development and certification; cask fleet procurement and carrier negotiations; and transportation operations.

A primary objective of this document is to serve as an instrument for initiating interactions between the Department of Energy and a wide range of interested parties. Accordingly, private sector comments and suggestions are invited, particularly regarding the strategy options. The involvement of potential business participants and other concerned groups is essential to the development of a successful business plan. The comments that are received will be reviewed and, where appropriate, reflected in the final Transportation Business Plan which OCRWM expects to complete in 1985. In this way, industry requirements and interests can be identified and State, tribal, and local concerns can be addressed and accommodated in the Department's formulation of specific strategies and action plans.

TRANSPORTATION BUSINESS PLAN
FOR THE
CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM
STRATEGY OPTIONS DOCUMENT

TABLE OF CONTENTS

LIST OF TABLES

List of Figures

SECTION I: BACKGROUND

A. POLICY GUIDANCE

The Nuclear Waste Policy Act of 1982 (the Act) created the Office of Civilian Radioactive Waste Management (OCRWM) within the U.S. Department of Energy (the Department) and assigned it the lead responsibility for carrying out the functions provided for by the Act. One of the primary responsibilities is the transportation of spent fuel and high-level nuclear waste material to facilities developed under the Act. OCRWM is responsible for transporting commercially generated waste to Federal facilities and could also have some responsibilities for the shipment of certain defense wastes. The scope and magnitude of these responsibilities are derived from several key provisions (Sections 9, 136, 137 and 302) of the Act (Public Law 97-425). These provisions include the following excerpted directives related to transportation:

Section 9: Nothing in this Act shall be construed to affect Federal, State, or local laws pertaining to the transportation of spent nuclear fuel or high-level waste.

Section 136: (a)...the Secretary [of the Department of Energy] is authorized to enter into contracts with persons who generate or own spent nuclear fuel resulting from civilian nuclear activities for the storage of such spent nuclear fuel in any storage capacity provided under this subtitle: Provided, however, that the Secretary shall not enter into contracts for spent nuclear fuel in amounts in excess of the available storage capacity specified in section 135(a). Those contracts shall provide that the Federal Government will (1) take title at the civilian nuclear power reactor site, to such amounts of spent nuclear fuel from the civilian nuclear power reactor as the Commission [Nuclear Regulatory Commission] determines cannot be stored onsite, (2) transport the spent nuclear fuel to a federally owned and operated interim away-from-reactor storage facility, and (3) store such fuel in the facility pending further processing, storage, or disposal.

Section 137: (a)(1) Transportation of spent nuclear fuel under section 136(a) [the Federal Interim Storage Program] shall be subject to licensing and regulation by the Commission and the Secretary of Transportation, as provided for transportation of commercial spent nuclear fuel under existing law.

(2) The Secretary, in providing for the transportation of spent nuclear fuel under this Act, shall utilize by contract private industry to the fullest extent possible in each aspect of such transportation. The Secretary shall use direct Federal services for such transportation only upon a determination of the Secretary of Transportation, in consultation with the Secretary, that private industry is unable or unwilling to provide such transportation services at reasonable cost.

Section 302: (a) In the performance of his functions under this Act, the Secretary is authorized to enter into contracts with any person who generates or holds title to high-level radioactive waste, or spent nuclear fuel, of domestic origin for the acceptance of title, subsequent transportation, and disposal of such waste or spent fuel.

(d) Use of Waste Fund - The Secretary may make expenditures from the Waste Fund, subject to subsection (e), only for purposes of radioactive waste disposal activities under titles I and II, including - ...

(2) the conducting of nongeneric research, development, and demonstration activities under this Act;

(3) the administrative cost of the radioactive waste disposal program;

(4) any costs that may be incurred by the Secretary in connection with the transportation, treating, or packaging of spent nuclear fuel or high-level radioactive waste to be disposed of in a repository, to be stored in a monitored, retrievable storage site or to be used in a test and evaluation facility; ...

The successful execution of these directives requires a careful and comprehensive planning effort to ensure that all transportation components are in place when needed to support the civilian waste management program. As required by the Act, contracts have already been signed with the owners and/or generators of the spent fuel, obligating the Department to take title to the material for permanent disposal. In accordance with this obligation, and because of its responsibilities as the shipper of record, the Department must ensure safe and economical transportation of spent nuclear fuel and high-level waste.

To increase private sector understanding of, preparation for, and cooperation in future commercial waste transportation activities and operations, the Department plans to consult with industry representatives and other interested parties during the development and implementation of the business plan and to publish periodic market projections of expected transportation service requirements for the 20-year period following publication of the plan. An active consultation and cooperation program with State, tribal, and local governments and other interested parties will be maintained to resolve institutional issues. In addition, the Department will consult with Federal regulatory agencies to permit adequate time for required regulatory reviews and to complete activities that may expedite certification procedures.

As directed by the Act, a Mission Plan has been prepared to "provide an informational basis sufficient to permit informed decisions to be made in carrying out the repository program and the research, development, and

demonstration programs required under this Act." To amplify the transportation information contained in the Mission Plan, two additional documents are being developed: the Transportation Business Plan and the Transportation Institutional Plan. Both are intended to stimulate dialogue between the Department and other potential participants in the establishment and operation of the transportation system.

B. BUSINESS PLAN PURPOSE

The Transportation Business Plan will be a summary document of information concerning the Department of Energy's expected business methods and strategy for developing and operating the transportation system to support management and disposal of nuclear spent fuel and high-level waste. It will provide information on contracting procedures, equipment requirements, facility requirements, funding availability, and other areas of interest or concern in conducting business. The documentation and public discussion of such plans are considered important in developing an adequate understanding of Federal needs in this area and in assuring comprehensive planning to meet these needs.

C. SCOPE OF BUSINESS ACTIVITIES

The business activity associated with spent fuel and nuclear waste transportation, as covered by the Act, encompasses all the elements of developing and operating the required transportation system. Shipments of substantial quantities of spent nuclear fuel or high-level waste to the first repository--or to Monitored Retrievable Storage (MRS) if such a facility is authorized--are expected to begin by 1998. The major areas of business potential for private industry reside with this extended activity. For example, waste transportation expenditures for the lifetime (26 years) of a single repository are estimated to be in the range of $1 billion to $2 billion (1984 dollars). Consequently, the business plan will focus primarily on long-term business and contracting concerns.

Most of the material to be moved under provisions of the Act will be spent nuclear fuel from domestic pressurized water reactors or boiling water reactors. It may be shipped either in the form of intact fuel assemblies or as consolidated fuel rods and associated hardware. In addition, a limited quantity of solidified high-level waste will be shipped from former reprocessing activities to storage and disposal locations. The design receipt rate for the repository is approximately 3000 MTU of spent fuel per year. A startup period of about five years would be needed to build up receiving capability to design levels. A second repository is scheduled to begin operation several years after the first. Table 1 contains the waste acceptance schedule projected in the April 1984 Draft Mission Plan for the first and second repositories. This schedule is considered highly speculative at this time but is indicative of the magnitude of spent fuel shipments expected. The table does not consider the possible movements of defense high-level waste to these repositories.

The Department intends to rely on all surface modes of transport (truck, rail or barge) for nuclear waste shipments under the Act. Intermodal transport

will be used where appropriate. In planning for transport operations, the Department will consider a mix of carriage options that protect public safety; minimize risks, costs, and the number of shipments; and are consistent with access constraints at existing or future facilities.

The Act states that the President shall evaluate by January 1985 the use of disposal capacity at one or more repositories to be developed for the disposal of high-level radioactive wastes resulting from atomic energy defense activities. Historically, the Department's Office of Defense Programs (DOE/DP) has made all arrangements for development of casks and procurement of transport services for defense waste. If a decision is made to store defense and civilian wastes in the same repositories, agreements would then be negotiated with DOE/DP to cover necessary services and the allocation of costs for those services. The development of transportation equipment and provision of transportation services would be covered in these agreements. Pending this decision on commingling, the transport of defense-related nuclear waste will not be included within the scope of the business plan. If the 1985 decision is to dispose of defense wastes in repositories developed under the Act, the Department will require systems for transporting defense waste materials to be safe, reliable, and compatible with repository receiving facilities and with schedules for civilian waste operations.

The Department also has responsibility under the Act for possible shipments to a Federal Interim Storage (FIS) facility, but little if any utilization of this storage option is expected. Consequently, the attendant business opportunities would be quite limited. To meet near-term transportation needs for FIS, the Department plans to rely on existing casks, cask owner-provided support services, and common or contract carriers. Projections of the type and quantity of spent fuel to be transported will be revised periodically along with an assessment of the adequacy of existing transport capability. Adjustments will be made to the current projection, if required. Transportation business arrangements will be made on a case-by-case basis.

Table 1. Waste Acceptance Schedule[1]
(in Metric Tons of Uranium)

Year	Annual Spent Fuel Generation (MTU)[2]	Discharge From Decommissioned Reactors (MTU)[2]	Cumulative Spent Fuel Generation (MTU)	First Repository Acceptance (MTU)	Second Repository Acceptance (MTU)	Cumulative Acceptance (MTU)	Remaining Backlog (MTU)	Approximate Number of Shipments Per Year[4]
Pre 1998	-	-	40,800		-	-	40,800	-
1998	2,700	100	43,600	400		400	43,200	230
1999	2,900	-	46,500	400	-	800	45,700	230
2000	2,700	300	49,500	400	-	1,200	48,300	230
2001	2,900	300	52,700	900	-	2,100	50,600	530
2202	2,800	400	55,900	1,800	-	3,900	52,000	1,050
2003	2,700	800	59,400	3,000		6,900	52,500	1,750
2004	2,500	900	62,800	3,000		9,900	52,900	1,750
2005	2,800	1,100	66,700	3,000	1,800	14,700	52,000	2,800
2006	3,400	300	70,400	3,000	1,800	19,500	50,900	2,800
2007	3,400	600	74,400	3,000	1,800	24,300	50,100	2,800
2008	3,600	300	78,300	3,000	1,800	29,100	49,200	2,800
2009	3,800	200	82,300	3,000	1,800	33,900	48,400	2,800
2010	3,700	-	86,000	3,000	3,000	39,900	46,100	3,500
2011	4,100	400	90,500	3,000	3,000	45,900	44,600	3,500
2012	3,900	100	94,500	3,000	3,000	51,900	42,600	3,500
2013	3,800	700	99,000	3,000	3,000	57,900	41,100	3,500
2014	3,900	600	103,500	3,000	3,000	63,900	39,600	3,500
2015	3,700	1,400	108,600	3,000	3,000	69,900	38,700	3,500
2016	3,800	1,500	113,900	3,000	3,000	75,900	38,000	3,500
2017	4,200	300	118,400	3,000	3,000	81,900	36,500	3,500
2018	4,500	700	123,600	3,000	3,000	87,900	35,700	3,500
2019	4,500	800	128,900	3,000	3,000	93,900	35,000	3,500
2020	4,900	100	133,900	3,000	3,000	99,900	34,000	3,500
2021	(3)			3,000	3,000	105,900		3,500
2022				3,000	3,000	111,900		3,500
2023				3,000	3,000	117,900		3,500
2024				3,000	3,000	123,900		3,500
2025				100	3,000	127,000		1,800
2026					3,000	130,000		1,750
2027					3,000	133,000		1,750
2028					3,000	136,000		1,750
2029					1,000	139,000		580
2030					1,000	140,000		580

Notes: (1) Excerpted from DOE/RW-0005, "Mission Plan for the Civilian Radioactive Waste Management Program", Draft April 1984.

(2) Data from U. S. Energy Information Administration Memorandum from B. Poole to W. Sprecher, Subject "EIA Projections of Nuclear Power Capacity Through 2020 and Associated Electricity Generation and Spent Fuel Arisings", Dated September 19, 1983.

(3) Energy Information Administration Waste Generation Projections run only through 2020. For waste created after 2020, either the capacity of the first two repositories could be increased, or additional repositories could be built.

(4) Based on a 50/50 split between truck and rail/barge casks and an average capacity of 1 MTU per shipment in a truck cask and 6 MTU per shipment in a rail/barge cask. (Note: The number of shipments shown in this table is less than estimates shown in some recent generic environmental analyses that use conservative assumptions [less payload per shipment] about cask capacity in order to determine the maximum impact of transportation).

SECTION II: PROSPECTIVE BUSINESS STRATEGIES AND OPERATIONS

A. BUSINESS STRATEGY OPTIONS

The Office of Civilian Radioactive Waste Management's business strategy for establishing a safe, economic, and publicly acceptable nuclear waste transportation system must ensure that the Federal waste management transportation needs will be met in a timely fashion and with maximum feasible participation by the private sector. This strategy is intended to delineate business relationships, arrangements, and responsibilities throughout the entire process of developing and operating the system. Particular attention is given to ways for utilizing the private sector to the fullest extent possible because of the very specific requirements in the Act. The relative roles and responsibilities of the Department and private industry are being formulated in several broad categories of activity. These categories include:

- Cask* Development and Procurement;
- Cask Ownership;
- Service Procurement (including carriage, maintenance, and training);
- Public Interface.

Options for each of these categories are discussed below:

1. Cask Development and Procurement

A major business requirement is the development and production of the transportation casks. For this endeavor, three main options have been considered:

- The Department takes no action until contracting for equipment and services to be operational by 1998.

- The Department issues performance specifications in the 80s and begins procurement activities in the mid-90s.

- The Department takes an active role in cask development in the 80s and early 90s and begins cask procurement activities in the mid-90s.

In the first option, the Department would take no major actions over the next decade to develop specific, new casks. Industry would accept the complete responsibility of designing and testing the casks, using its own financial resources. This first option assumes that potential cask suppliers would have sufficient quantities and types of NRC-certified casks on hand by 1998 to meet the Department's radioactive waste transportation needs. At the time of initial shipments, the Department would identify the reactor location

---

*The term cask in the context of this Section includes cask, tie-downs, conveyance, and associated auxiliary handling equipment.

and the amount and destination of the material to be transported. This option obviously places great dependence on industry to develop, provide, and certify (through NRC) sufficient casks to meet all of the Department's transportation requirements.

Under the second cask development option, the Department would announce performance requirements for casks in the 1986-87 timeframe. Industry would still provide the full up-front capital for the development of casks and ensure that they were compatible with reactor/repository interface requirements and with all safety standards. In addition, industry would perform required testing and would obtain cask certificates of compliance from NRC. Under this option, the first major Department procurement of transportation equipment would be in the 1995-96 time frame, when industry would be invited to respond to the performance requirement specifications by submitting competitive cask designs. Selection of cask supply contractors would be based on the best combination of ability to meet specific performance criteria at a competitive price, timeliness of cask availability to meet the transportation needs of the initial shipments, and certification of the cask by the NRC.

The third option assumes that the Department would be an active participant with industry in the cask development process. Department participation would be directed primarily at providing early guidance for cask development through a Program Research and Development Announcement (PRDA) or a Request for Proposal (RFP) process. Starting in 1986, industry would be invited to make proposals based on cask performance criteria for various modes of transportation. It is envisioned that two categories of casks -- a new generation of the traditional transport cask and a dual-purpose or multipurpose cask -- would be addressed. Since development of multipurpose casks and canisters is projected to include full investigation of viable conceptual designs, engineering development contracts for this category would not be invited or placed until 1988. The cask procurement process would be directed sequentially at engineering development, NRC certification, and prototype fabrication and testing as required. Prototype testing would include initial cask operational tests; systems integration debugging to meet reactor, repository, and other storage facility handling requirements; and safety verification. Cask development expenditure by the Department is projected to total as much as $80 million (1984 dollars) for the 6-year period (1986-1992). At the completion of engineering development, NRC certification, and prototype fabrication and testing, the Department would procure casks for full-scale operational requirements in the 1995-96 time frame for the startup of the program in 1998.

The Department views this third option as the preferred cask development strategy. By actively participating throughout the development process, the Department is in a better position to ensure that the requisite numbers and types of casks are available when needed. Schedules for product requirements and availability can be coordinated, and compliance with milestones can be verified by all involved parties. From the industry perspective, government participation at an early stage of development eliminates the business risk of initial, very large investments of industry capital without adequate assurance

of the market requirements for their product and without protection from unexpected program changes. In addition, this option promotes the availability of business opportunities for a wider range of suppliers, thereby broadening the industrial base for full-scale transportation operations.

2. Cask Ownership

Cask ownership is important in defining the respective roles of the Department and private companies with regard to the development and operation of transportation equipment. The goal of the Department is to ensure a sufficient supply of safe shipping casks at the optimum total life cycle cost to the utility rate payers. Several ownership options have the potential for being the most cost efficient, depending on market conditions and industry interest. These options are:

- Private industry owns the casks and provides transport services by contract.
- Private industry owns the casks and leases to the Department.
- The Department owns the casks.

If a company develops a well-designed cask and uses it efficiently, a service contract or lease agreement could result in lower transportation costs to the Department than the purchase option. Financial market conditions and taxation policies could make a significant difference in the relative advantage of Department leasing versus ownership. The details of these parameters are being investigated, but schedule requirements indicate that final decisions on cask ownership need not be made for several years. Expressions of industry interest in providing competitive pricing for a particular procurement option will be a major influencing factor in the Department's cask ownership considerations. The final decision will be based on which option best serves the public interest. The initially preferred option for cask fleet supply could change over the life of the program.

3. Service Procurement

The Department will require numerous services to conduct transport operations. These services include the carriage of materials, maintenance of equipment, inspection of equipment and operations, and training of operating personnel. As directed by the Act, the Department intends to use private industry to the maximum extent possible in each aspect of transportation. While there are business opportunities that will involve large expenditures by the Department in several of these categories (e.g., carriage of materials), most of these services have relatively short leadtimes for implementation or are an application of a currently available industrial capability. Consequently, most services will not be competitively procured from private suppliers until the 1995-1998 time frame. Since some aspects of the Department's service procurement strategy could have an effect on cask development or other long leadtime activities, it is appropriate to delineate at an early stage the service procurement strategy options. The major areas

affected are carriage arrangements, maintenance services, and training operations.

a. Carriage Arrangements

Carrier negotiations and arrangements can be completed by one of the following options:

- Use the Department's existing traffic management organizations to select and direct contractors and common carriers as is current DOE practice.

- Have the different equipment supplying organizations arrange for carriage either by negotiating for services with common or contract carriers or by acting as a private carrier on highway, rail, or barge modes.

- Stimulate the creation of one or more comprehensive transportation service corporations to provide total transportation services including carrier arrangements.

The first option is the procedure that the Department currently uses to arrange for transportation of a variety of materials (including nuclear waste) and is consistent with current Departmental policy. There are, however, some private waste shipment arrangements whereby owners of transportation casks use their own equipment and personnel for carriage. By selecting an option similar to the second arrangement, the Department could procure a combined service of equipment supply and carriage. Conversely, cask owners could also provide a combined packaging and transport service. The third option would provide for one or more comprehensive service contracts whereby the selected contractor or contractors would make arrangements to provide total transportation services including carriage. The advantages of this option would have to be weighed against the need for formation of new business entities and associated capital and against the risks of near-total reliance on these new entities for all aspects of transportation. The Department would be the shipper of record as provided for by the Act under each of the above options. Industry insight and preferences are solicited on these alternatives.

b. Maintenance

Maintenance and servicing of casks and associated transport equipment will be an important part of future large-scale transport operations. The following options for provision of maintenance capability exist:

- The Department hires specific contractors to service and maintain casks and associated transport equipment at a Federal facility.

- The equipment owners or suppliers provide the capability to maintain and service casks and associated transport equipment at non-Federal locations.

- The creation of one or more comprehensive transportation service corporations is stimulated as discussed under carriage arrangements.

Maintenance, periodic inspection, and servicing of equipment is essential to safe operation, quality assurance, and continuation of operating certificates. Responsibility for the performance of these requirements rests with the owner and operator of equipment, but individual tasks may be contracted to another qualified party for completion. The Department's primary concern is with ensuring that transport equipment is maintained to comply with all applicable safety standards. A second interest is in encouraging operations that can reduce transportation costs. The Department seeks industry opinion as to which option would provide the safest and most economical fleet operation.

c. Training

In developing its transportation program, the Department will continue to ensure training procedures that contribute to operational safety and that reinforce public confidence in the transportation system. It is recognized that training comprises many elements. For example, personnel training includes instruction of drivers, maintenance and service mechanics, and inspectors. All elements of training will be conducted in accordance with a quality assurance program based on the high training standards that are utilized in the Department's existing training programs. These programs include compliance training, emergency response training, and State awareness seminars.

With regard to the actual function of conducting the training, two options are being considered:

- Private companies would be responsible for training to DOE-approved safety standards.

- The Department would be responsible for training.

To determine the most cost-effective method that also builds public confidence, the Department would benefit from the advice of interested parties concerning private sector capability in the training area and quality assurance experience in training programs.

4. Public Interface

The Department is committed to activities that will enhance public understanding and knowledge of spent nuclear fuel and high-level waste transportation and that will enable concerned members of the private sector to be participants in deciding transportation policy. As stated in the OCRWM Mission Plan, an active consultation and cooperation process will be conducted with affected State, tribal, and local governments throughout development and operation of the transportation system. In support of these objectives, the Department is developing an institutional plan for transportation that will provide guidance in establishing relationships and resolving issues of

concern. It is also important to consider public interaction within a business context and to include it as a part of the Department's business strategy, since cooperative relationships will be a significant element in efficient development of a transportation system. Two options for conducting interactions are:

- The Department assumes all responsibility for public interaction during development and operation of the transportation system.

- The Department and the private sector share the task of establishing the framework for effective and continuing dialogue and for provision of information concerning transport equipment and operations.

The Department believes that, under some circumstances, industry can greatly facilitate effective communications. For example, there have been recent cases involving spent fuel shipments where an effort by utilities and private companies to disseminate factual information and to allow public inspection of empty casks has enhanced transport operations in local areas. The Department is interested in receiving comments and suggestions concerning the future role of industry in transportation-related public information efforts.

B. SYSTEM ACQUISITION PLAN

The Department's proposed approach for the development and operation of the nuclear waste transportation system is reviewed in this subsection. This approach is consistent with the preferred cask development and procurement strategy option, which assumes Department involvement throughout the development cycle.

To plan, develop, and operate the system to support long-term transportation requirements, the Department envisions a management and tracking capability based on a series of phased activities. Within each of the four designated phases, milestones have been established as a means of measuring progress to ensure that elements of the required system will be in place when needed. A work-breakdown structure defines the expected tasks within major areas of activity. Since expenditures during each of the phases of the transportation system development cycle are highly sensitive to strategy decisions yet to be made, cost estimates are included only as a basis for interim planning. Similarly, the inclusive dates given for the phases should be regarded as only approximate.

1. Phase 1 - System Definition (1984-1987)

During the System Definition Phase, requirements for the overall transportation system will be defined in terms of the needs, capabilities, schedules, costs, and operating constraints. The Department will develop information concerning long-term shipments, such as the size, weight, and other characteristics of waste forms; quantities, timing, and destinations of shipments; and handling constraints at origin and destination points. Activities include estimating the number and types of casks that will be

needed to serve storage and disposal facilities; defining interface characteristics of casks; establishing the key features desired in modifications of existing designs or in a new generation of shipping casks; identifying the physical interface requirements at the various reactor sites; and continuing any required safety or development research.

Based on the preferred option of cask development, the Department will invite industry to develop transportation system design concepts. These concepts will range from a new generation of the traditional reusable (transport only) casks to more advanced dual-purpose and multipurpose casks. Dual-purpose casks could serve as storage modules as well as transport casks. Multipurpose casks could be used for storage, transport, and disposal. Studies have been initiated that will help define a plan of action for resolving feasibility questions regarding the various cask concepts. The System Definition Phase for a particular cask will end with publication of specifications sufficient to solicit bids for the design engineering development, certification, and fabrication and testing of a cask prototype.

In addition to inviting proposals for determining the technical features of the system components (characteristics of casks and interfaces), the Department will solicit comments concerning administrative aspects of the system (cask ownership, certification responsibilities, contracting arrangements, personnel training, and cask servicing and maintenance methods). Response to this preliminary document will provide one element of the private sector participation that is required for effective business planning.

A detailed milestone chart (Figure 1) depicts the expected near-term activity by quarters, and a work-breakdown chart (Figure 2) delineates tasks by major work areas. The Department estimates that up to $3 million (1984 dollars) will be be spent each year during this phase to support those activities.

Figure 1

Phase 1. System Definition Milestones

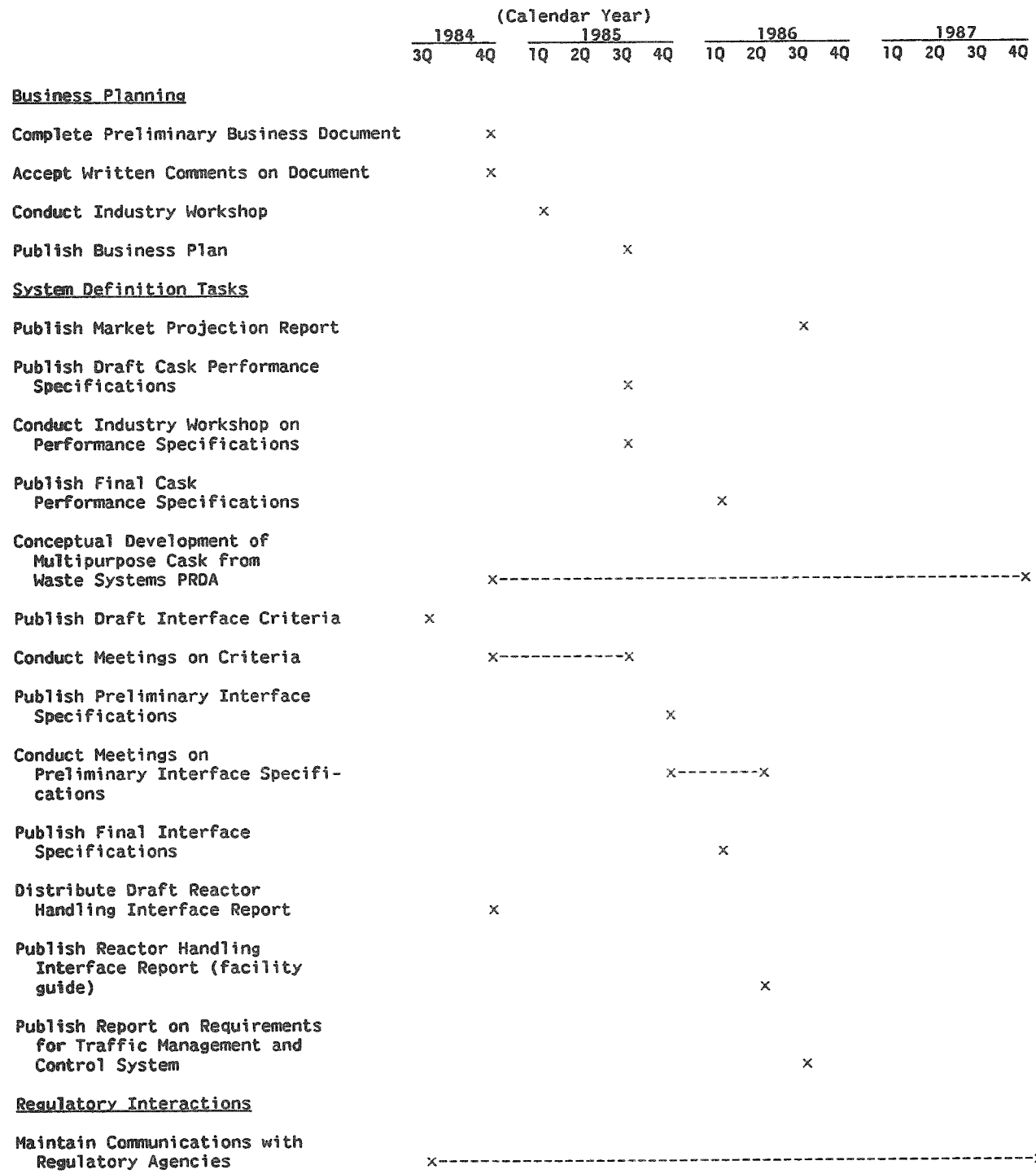

Figure 2

Phase 1. Work Breakdown for Business Activities During the System Definition Phase

1 System Definition Phase

11 Business Planning

- Develop and publish Business Plan.
- Conduct workshops with industry.

12 System Definition Tasks

121 Market Projections

- Publish periodic reports on the projected quantities of fuel to be transported.

122 Waste Form

- Publish baseline waste form data.

123 Casks

- Publish short descriptions of cask family member concepts.
- Develop and publish cask performance specifications.

124 Interfaces

- Develop and publish interface specifications
- Update information on cask handling capabilities at all reactors and affected user facilities and publish a facility guide.
- Establish plans for maintenance and servicing
- Conduct technical interface workshops.

125 Operations Management and Control

- Develop requirements for traffic management and control system

13 Regulatory Interactions

- Maintain communication between the Department, NRC, DOT and other Federal Agencies.
- Initiate cooperative technical information and testing programs to address regulatory issues where required.

2. Phase 2 - Engineering Development and Certification (1986-1996)

The Engineering Development and Certification Phase for a particular cask is entered following establishment of feasibility of that cask concept and the release of development specifications. The Department, as the customer, will invite industry proposals for the design, engineering development, certification, prototype fabrication, and testing of the cask. Contracts will be awarded on the basis of the proposals that offer the best combination of cost, schedule, and technical features. Building to specification, the industry contractor will test scale models and fabricate and test prototypes where required. Prototype testing would include verification of operational capability, integration and standardization to meet reactor and repository compatibility requirements, and verification of safety features.

Considerable flexibility must be built into the packaging system to accommodate service of many reactors and facilities with significant differences in handling capabilities and waste forms. Consequently, engineering development of a family of casks may be appropriate. Categories in the cask family could include:

- Truck Casks (25 ton)
- Rail/Barge Casks (40 to 100 ton range)
- Dual-purpose (Transport/Storage) Casks
- Multipurpose (Transport/Storage/Disposal or "Universal") Casks

The Department expects that some standardization of critical interfaces is needed to minimize licensing requirements and to allow for efficient operations at a repository or storage facility. There are advanced techniques (e.g., robotic handling) being developed today that would allow a cask to be handled using either manual methods or automated, remote systems. These handling techniques require some degree of standardization.

Since the responsibility for obtaining a certified cask design rests with the organization developing it, certification activities are included in this phase. Each new cask system that is used for the transport of civilian radioactive waste will receive a certificate of compliance from the NRC prior to use. During this entire Engineering Development and Certification Phase, the Department will consult with regulatory agencies on potential changes to the regulations that could affect cask development.

The proposed milestones for the Engineering Development and Certification Phase are shown in Figure 3, and the Work Breakdown Structure is delineated on Figure 4. The Department estimates that $8 million to $15 million (1984 dollars) will be spent each year on these activities during this phase.

3. Phase 3 - Cask Fleet Procurement and Carrier Negotiations (1995-1998)

During the Cask Fleet Procurement and Carrier Negotiations Phase, procurement activities for repository/storage facility operations will be conducted, fabrication of production cask units will be started, and operating personnel training programs will be developed. This phase will also include

Figure 3

Phase 2. Engineering Development and Certification Milestones

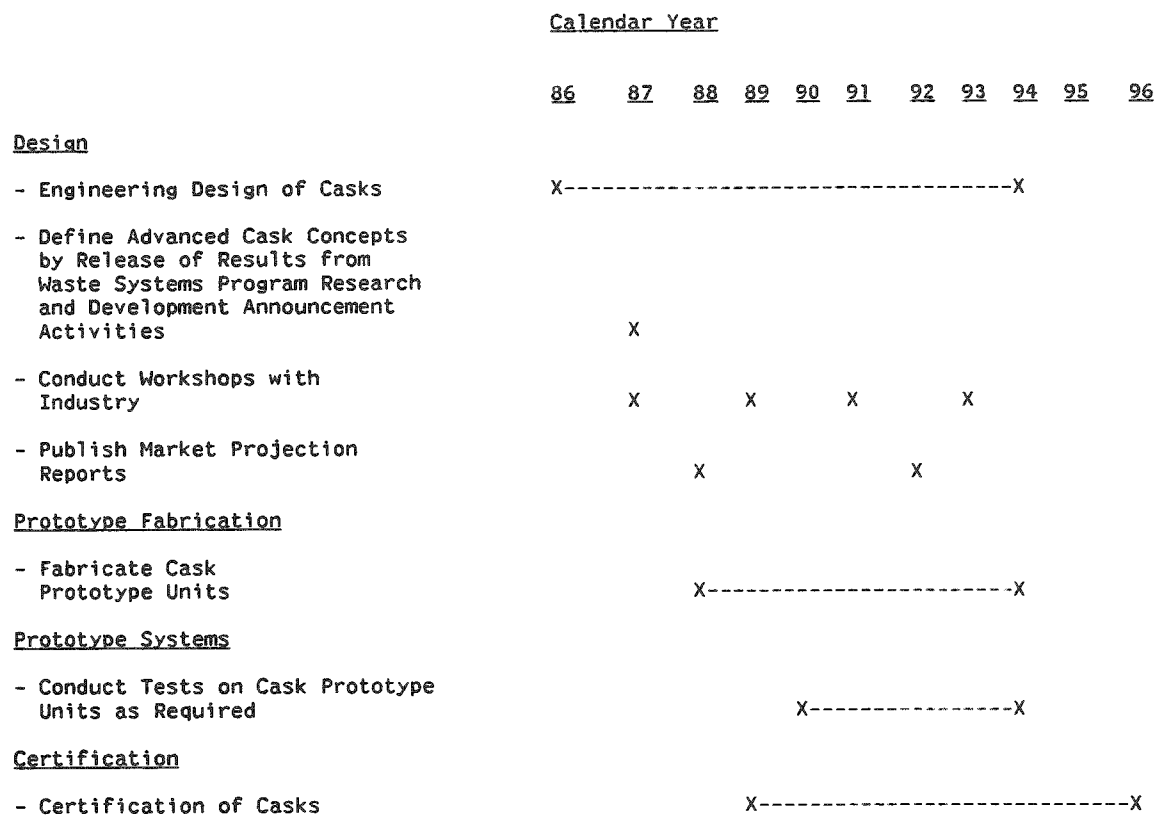

Figure 4

Phase 2. Work Breakdown for Business Activities
During the Engineering Development and Certification Phase

2 Engineering Development and Certification Phase			
21 Design	22 Prototype Fabrication	23 Prototype Systems	24 Certification
• Use workshops, Program Research and Development Announcements (PRDA), Requests for Proposals (RFP) and cooperative research and testing activities to provide data base for design of packaging equipment • Design of casks and handling equipment by industry. • Publish impacts on transportation casks of the results of the Nuclear Waste Packaging and Handling Design PRDA. • Conduct scale model development tests of cask designs as required.	• Fabricate one or two prototype units of each cask family member for repository or MRS shipments.	• Conduct performance and operations tests as necessary	• Obtain NRC certificates of compliance for casks

the operation of prototype units for the purpose of evaluating operating equipment, contractual relationships, scheduling, and handling of casks. The Department will be responsible for directing operation of prototype units and for procuring production casks for repository/storage facility operations. This phase, when completed, will confirm the technical and economic adequacy of the operating systems.

Milestones for the Cask Fleet Procurement and Carrier Negotiations Phase are shown in Figure 5 and the Work Breakdown Structure is delineated in Figure 6. The Department estimates that $15 million to $30 million (1984 dollars) will be spent each year on these activities during this phase.

4. Phase 4 - Transportation Operations (1997 -)

The Transportation Operations Phase will include all tasks needed to complete required shipments (i.e., cask procurement, personnel training, maintenance, transport operations, and traffic management) and to plan for future development and improvement of transport capabilities. As the shipper of record for spent nuclear fuel and high-level waste, the Department will take the lead role in directing these activities.

A milestone chart for the Transportation Operations Phase is included as Figure 7, and the Work Breakdown Structure is shown in Figure 8. The Department estimates that up to $100 million (1984 dollars) will be spent each year on these activities during this phase.

C. CONTRACTING ARRANGEMENTS AND BUSINESS OPPORTUNITIES

In line with directives of the Act, the Department will contract with private industry to the maximum extent possible. A brief review of proposed contracting arrangements for long-term transportation operations will help define some of the expected market characteristics. It should be noted that contractual obligations established under the Act require the Department to take title to the spent fuel or high-level waste at the site of the shipping facility. Under these conditions, the Department will always serve as the shipper of record. The Department may require access to a shipping facility in order for its inspectors to be present during fuel loading to verify that the shipments are prepared in compliance with applicable regulations and procedures. The Department plans to contract for cask supply, maintenance, and support services through a designated contracting organization.

To maintain market competition for cask supply, maintenance, and support services, multiple contracts will be negotiated for these services. Transport services will be negotiated between carriers and/or modes on a competitive basis. All Department purchases and contracts for goods and services will be governed by the Department's Acquisition Regulations, 48 CFR 9, together with the Federal Acquisition Regulations, 48 CFR 1. The Department's transportation operation will be conducted under the provisions of 41 CFR 109-40 and the requirements of the Act.

In cases where the Department needs to participate in the development process of casks and specialized hardware, discrete procurement actions that correspond with development steps (e.g., conceptual design, final design and

Figure 5

Phase 3. Cask Fleet Procurement and Carrier Negotiations Milestones

	Calendar Year			
	95	96	97	98
Procurement				
- Publish Contract Guidelines for Equipment Procurement	x			
- Procure and Fabricate Production Cask Units	x----------x			
Carrier Negotiations				
- Conduct Carrier Negotiations		x----------x		
Service Procurement				
- Procure Support Services Needed for Fleet Operations		x----------x		
Prototype Fleet				
- Conduct Prototype Fleet Operations	x----------x			
Training Preparations				
- Establish Department Training Standards	x			
- Procure Training Materials and Courses		x----------x		

Figure 6

Phase 3. Work Breakdown for Business Activities
During Cask Fleet Procurement and Carrier Negotiations Phase

3 Cask Fleet Procurement and Carrier Negotiations

31 Procurement	32 Carrier Negotiations	33 Service Procurement	34 Prototype Fleet	35 Training Preparations
• Develop contracts for long-term equipment procurement • Negotiate for the necessary amount of transport capability • Fabricate production units	• Negotiate carriage rates and arrangements	• Procure support services needed for first operations	• Conduct operating and handling demonstrations on prototype systems. • Develop operational procedures to be used at all facilities. • Develop transport procedures. • Evaluate the effectiveness of business arrangements.	• Establish training requirements • Develop operational procedures • Procure training materials and courses

Figure 7

Phase 4. Transportation Operations Milestones

	Calendar Year							
	97	98	99	2000	01	02	03	04
Business Arrangements								
- Place Additional Equipment Supply, Service, and Maintenance Contracts and Negotiate Rates for Full-scale Operation		X----------						
Transport Operations								
- Handle and Maintain Cask Equipment		X----------						
- Perform Transportation Operations and Traffic Management Function for Full Operations		X----------						
- Conduct Training Programs	X----------							
Future System Development								
- Conduct Development and Upgrading Activities for Fleet		X----------						

Figure 8

Phase 4. Work Breakdown for Business Activities
During the Transportation Operations Phase

4 Transportation Operations Phase

41 Business Arrangements

- Contract for cask and handling equipment requirements.
- Contract for maintenance and handling services
- Negotiate rates with carriers

42 Transport Operations

421 Handling and Maintenance

- Handle and maintain casks as required.

422 Shipment

- Conduct traffic management operations for fleet.

423 Training

- Conduct training operations

43 Future System Development

- Perform required fleet upgrading activities

prototype fabrication, and fleet production) will be used. In general, a separate contract will be negotiated for each development step of a cask or an item of specialized hardware.

Proposed guidelines to which the contracting organization would adhere are as follows:

- All requests for quotations for lease and purchase contracts will be announced in the Commerce Business Daily and will be competitively placed.

- The procurement organization may contract separately for cask and handling equipment supply and for handling and maintenance services.

- Reactors and shipping facilities will be divided by region and cask handling capabilities into multiple shipping groups (up to 20). Contracts for cask and handling equipment will be placed by shipping groups when a need is clearly identified, but not later than three (3) years prior to shipment date. These contracts would be of a multi-year duration.

- Carrier services will be negotiated by the Department unless complete service (combined equipment supply and carriage) contracts are used.

The Department plans to use all surface transport modes (truck, rail and barge) to their fullest and most efficient extent possible. In its role, the Department will ensure the capability to make shipments by a variety or combination of modes.

It should be understood that the foregoing proposed contracting arrangements and the projected primary business opportunities/procurements, as shown in Table 2, are based partially on assumptions and options that have yet to be decided. They are included in this preliminary document merely as an indication of the type of more detailed information that the private sector can expect both in the final version of the Transportation Business Plan and in other follow-on announcements and guidelines that may be required.

Table 2

Projection of Primary Business Opportunities/Procurements

Activity	Time Period of Procurements
Cask Conceptual Designs	1986-90
Prototype Cask Engineering, Certification, Fabrication, and Testing	1988-96
Carrier Services Contracting	1995-98
Fleet Cask Fabrication	1993-on
Fleet Cask Operations	by 1997
Maintenance Services	by 1996
Training Services	by 1995
Full-Scale Carrier Operations	by 1998

☆ U.S. GOVERNMENT PRINTING OFFICE: 1984-461-208:11176