SUPPORT INFORMATION FOR TRANSPORTATION OPTIONS STUDY FOR THE U.S. DEPARTMENT OF ENERGY

UNIVERSITY OF MARYLAND
LOGISTICS BEST PRACTICES GROUP
COLLEGE OF BUSINESS AND MANAGEMENT
COLLEGE PARK, MARYLAND

A STUDY COMMISSIONED BY THE OFFICE OF TRANSPORTATION, EMERGENCY MANAGEMENT AND ANALYTICAL SERVICES, EM-76

MARCH 31, 1997

Table of Contents

List of Abbreviations

ATMS	**Automated Transportation Management System**
CLO	**Chief Logistics Officer**
CFR	**Code of Federal Regulations**
COTS	**Commercial of the Shelf**
DOE	**Department of Energy**
DOD	**Department of Defense**
DOT	**Department of Transportation**
DP	**Defense Programs**
EDI	**Electronic Data Interchange**
EM-76	**Office of Transportation, Emergency Management, and Analytical Services**
EM-70	**Office of the Deputy Assistant Secretary for Site Operations**
FOB	**Free on Board**
GUI	**Graphical User Interface**
Hazmat	**Hazardous Materials**
HQ	**Headquarters**
ISO	**International Standards Organization**
JIT	**Just in Time**
LANL	**Los Alamos National Laboratory**
M&O	**Management and Operations**
MPV	**Mobile Packaging Van**
MWS	**Managed Warehouse Systems**
P&T	**Packaging and Transportation**
OCRM	**Office of Civilian Radio Active Waste Management**

List of Abbreviations (Continued)

PATS	**Packaging and Transportation Safety**
SMAC	**Shipping Mobility/Accountability Collection**
SWOT	**Strengths, Weaknesses, Opportunities and Threats**
TMD	**Transportation Management Division**

Executive Summary

This two year study, led by university and industry specialists, analyzed and evaluated the transport/logistics operations at the U.S. Department of Energy (DOE) for the DOE's Office of Transportation, Emergency Management and Analytical Services (EM-76). This evaluation comes at a defining moment for DOE, a moment when transportation budgets within the Department have been reduced while the demand for transportation services is intensifying, and a moment when environmental restoration activities are becoming increasingly important.

DOE and private sector firms share the imperatives of cutting costs and reducing risks while handling a rising volume of shipments. In the past five years, industry has addressed the challenges of cutting costs and reducing risks by adopting a whole new paradigm of logistics involving lean core logistics management groups, corporate-wide purchasing of carrier services to gain economies of scale through volume discounts and leverage over carrier performance, and constant auditing of internal personnel and external partners' operating performance metrics. More recently, there has been an increased emphasis in industry on outsourcing to professional third party logistics firms as a way to further reduce costs and optimize supply chain networks.

Currently, DOE does not have a coherent corporate logistics management approach or a core group of logistics professionals providing strategic direction and operating guidance. There is no mechanism in place for leveraging transportation service demands across DOE sites; for making bulk purchasing arrangements with carriers to control costs; or for executing and monitoring formal carrier partnerships. Finally, there is no standardized and consistently applied set of performance metrics in use across the sites to help DOE and its major field offices evaluate operational costs or quality levels, and target improvement initiatives.

A comparison of DOE and industry best practices showed that DOE has a large performance gap to close. This study concluded that one of the best ways to improve DOE's performance levels is to shift oversight of transportation activities to headquarters logistics personnel, who will be responsible for the oversight of transportation activities. To this end, we recommend the creation of a corporate logistics management group within the DOE. The group should be headed by a Chief Logistics Officer (CLO) and include an Operations Manager, a Risk Management / Compliance Manager, and a Performance Metrics Manager. This group will be responsible for managing all the transportation activities of the DOE, the operations of which will be divided into four regions. This centralization of control, combined with the regional operating orientation, will provide the following advantages:

- Full realization of economies of scale in purchasing transportation services.
- One set of rules and procedures that can be enforced at the headquarters level.
- Risk management tightly controlled at the headquarters level.
- The ability to integrate information systems across sites.

- More agile and flexible than a pure centralized model due to regional focus.

The study also recommends shifting transportation operations from the management and operations (M&O) contractors currently performing these duties to companies specialized in logistics and transportation. Each third party logistics operator would be responsible for managing transportation within one of the DOE regions. In particular, professional logistics companies can bring numerous benefits to DOE, such as:

- Ability to combine DOE shipments with other shipments to realize the lowest available transportation rates.

- Sophisticated information systems that allow real-time tracking of shipments.

- Gain - sharing agreements that allow the DOE to realize continuous savings from more effective management practices employed by the third party contractors.

- More effective customer service. Third-party contractors can provide performance metrics (e.g. percent of on-time deliveries, fill rates, etc.) that allow for the measurement and improvement of internal and external customer service.

In conclusion, the model proposed in this study addresses DOE's continuous personnel reduction and the increasing need by M&O contractors to focus on mission-critical activities in which they have clear internal competencies, rather than on support functions, such as transportation, in which they have no unique competencies. Moreover, the model addresses the need of DOE to attain quick transportation system savings and to avoid further steep sunk costs in information technology and capital equipment in the mid and long term.

1. Introduction

The Department of Energy's (DOE's) transportation system is at a defining moment; a moment when transportation budgets within the Department have been reduced while the demand for Departmental transportation services is intensifying. At a time when environmental restoration activities undertaken by the DOE are leading to a much larger volume of rail and truck shipments, including a leap in hazardous and radioactive materials movements, Departmental budgets are being cut. Clearly, the DOE and its contractors will have to make due with less; that is, restructure their operations, including their transportation operations, to achieve greater levels of efficiency.

2. Background

The main objective of DOE's Office of Transportation, Emergency Management and Analytical Services (EM-76) is to ensure the safe, efficient, and economical transportation and packaging of materials. The Office's functions include information systems management, packaging development, transportation logistics support, regulatory compliance advice, national carrier qualification and public outreach.

In addition, EM-76 provides policy guidance and support, mainly to DOE field personnel in charge of outbound transportation operations. (Inbound operations are generally controlled by the supplier.) In 1993, DOE's Shipping Mobility/Accountability Collection (SMAC) Report accounted for 313,538 outbound shipments for a total of 81,041 tons. The SMAC report also indicated that hazardous waste shipments accounted for less than 1% of DOE shipments and about 6% of DOE's freight tonnage. Outbound shipping activity has registered a steady increase since 1988, contributing to the need for increased effectiveness in the transportation and logistics operations at the DOE.

As Figure 1 shows, responsibility over transportation at DOE is divided between headquarters, field offices, and contractors. The headquarters division, EM-76, acts as an advisor to the field offices through the design of policies and strategies. The field offices' functions are programmatic; that is, they support the various programs (e.g. environmental clean-up) in which the DOE is engaged. The field offices manage the contractors, who, in turn, perform daily transportation and logistics related operations such as purchasing, warehousing, on-site transportation, packaging, carrier selection, and distribution.

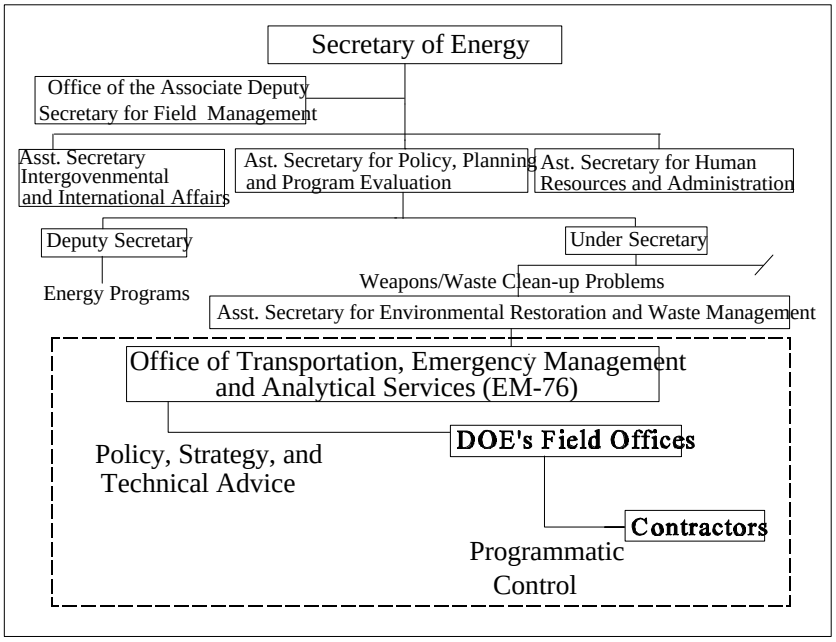

Figure 1-DOE's Current Organizational Structure

One of the driving forces in transportation policy at DOE is the maximization of safety in its transportation operations. In order to achieve success in this area, EM-76 collects statistics on measures that reflect safety concerns, such as the number of accidents involving radioactive materials. By the DOE's own account, it has achieved great success in limiting the number of incidents involving radioactive material.

An example of a transportation activity in which EM-76 is involved is carrier qualification. To this end, EM-76 has a carrier qualification program in place in order to assess the operating records of carriers to be used by the DOE contractors. EM-76, however, does not ensure that contractors, in fact, only use EM-76 qualified carriers. DOE's field offices often qualify regional carriers and DOE contractors may use their own corporate carriers, rather than DOE qualified carriers.

In summary, the DOE is facing increasing demands in the transportation of materials. The organizational structure of the Department is decentralized, with transportation authority divided between a DOE headquarters unit (EM-76) DOE field offices, and contractors. As well, suppliers to DOE currently manage the transportation of most inbound shipments.

3. Problem

It was against the backdrop of potentially escalating requirements that a management review of internal DOE transportation operations was launched in 1994. Previous management studies had identified significant transportation system efficiency concerns. For example, one audit at a single site had identified $124 million in possible savings in transport and packaging costs over a five year period. Another audit had revealed that a 55 gallon drum can vary in price from $25 to $40 depending on which part of the complex was purchasing it.

The 1994 Transportation Needs Assessment Management Review had three major aspects: (1) A review of requirements and operations conducted by the Transportation Management Division (TMD), a predecessor to EM-76, and an advisory group of fifty experts and contractors; (2) an independent internal review by DOE headquarters (HQ) and field representatives to evaluate how TMD's program was meeting DOE goals; and (3) a University of Maryland benchmarking study of DOE's transportation functions that compared DOE activities to industry best practices.

The overall findings of the management review highlighted an array of serious planning and operational deficiencies in the transportation function. These included:

- General lack of operational control, planning, information collection or monitoring throughout the Department with no obvious architecture to connect the various DOE field sites.

- Fragmentation of receiving, shipping and logistics activities at DOE field sites.

- Lack of a coherent approach to procurement of transportation services and packaging, thereby reducing the opportunity to realize economies of scale and cost savings through volume purchasing or commercial off the shelf (COTS) products.

The University of Maryland Best Practices Study group reviewed transportation practices at DOE's headquarters and site operations and compared these to the practices of leading companies and organizations as a part of the needs assessment (see Appendix 1 for a list of the members of the University of Maryland Best Practice Group.) A set of consensus best practices in transportation was identified by this study. These practices included:

- Transportation management and responsibility in all twenty best practice organizations were vested in a single mission-driven headquarters group staffed by logistics professionals trained in business process reengineering, change management, and advanced information technology applications.

- The HQ transport management group established and enforced through audits uniform standards and practices across the whole organization as a way to manage risk and assure

quality and efficiency.

- The HQ group aggregated shipment volume and procurement requirements across the whole organization in order to gain leverage in commercial negotiations.

- The HQ group managed all carrier rate negotiations and long term quality partnerships, using carrier evaluation data from field units.

These findings contrasted sharply with the organizational structure employed by the DOE consisting of a small headquarters transportation group that provided policy guidance to field offices but held little or no managerial control over the transportation operations in the field.

Given this divergence between the best practice findings and the organizational structure employed by the DOE, along with the findings of inefficiencies in the transportation operations at the DOE field sites, it was decided by the DOE to seek better options for performing its transportation operations. The University of Maryland was again commissioned by the DOE, this time to provide recommendations for alternative transportation system management options for the Department.

4. Study Methodology

The University of Maryland Best Practices Group was charged with the task of determining options for the reorganization of the DOE's transportation functions and providing recommendations for reengineering the transportation functions. In order to accomplish these tasks, the Best Practices Group developed a three phase approach. The first phase involved gaining a better understanding of the current operations at the DOE. This phase involved the following activities:

- Sending site operations surveys to all DOE sites in order to gather baseline performance metrics and qualitative inputs on DOE operations from the widest possible set of contractor traffic managers.

- Conducting site visits to Fernald, Argonne, Oak Ridge, Savannah River, Sandia, and Los Alamos to observe transportation processes first hand and interview transportation field personnel.

- Convening a packaging and transportation safety focus group (PATS), consisting of private sector and DOE specialists, to identify and analyze the critical strengths, weaknesses, opportunities, and threats of DOE's transportation system.

The second phase of the Best Practices Group approach involved defining the transportation options for the DOE. This phase of the study involved conducting the following activities:

- Surveying site contractor traffic managers about their satisfaction with the current way transportation is organized at the DOE and the attractiveness of potential alternative transportation system models.

- Surveying "best practice" organizations about their current transportation models and their satisfaction with those models and gathering baseline performance metrics from these organizations to compare with DOE sites' metrics.

Finally, the third phase of the study involved evaluating various transportation options and developing recommendations as to a course of action for the reengineering of the DOE transportation operations. This phase included the following activities:

- Convening an industry/government best practices expert group to rank thirteen possible transportation options in terms of suitability in addressing DOE's critical strengths, weaknesses, opportunities and threats identified by the PATS group and field managers in Phase 1.

- Having the best practices expert group evaluate each of the top three options against a set of DOE implementation requirements (e.g. immediate cost reduction impacts, ease of implementation, etc.)

- Providing a recommended course of action based on the findings of the expert group and having those actions validated by DOE headquarters and field office decision makers.

5. Findings

This section presents our findings from the DOE site visits, the survey of site contractor transportation managers, our industry/government best practices group, and our survey of best practices organizations. The findings from the first two sources relate to operations at the DOE, while the findings from the latter survey are on operations at "best practices" organizations. The findings from each of the groups are discussed, in turn, followed by a section that synthesizes the results.

5.1 Site Visits

As outlined above, the University of Maryland Best Practices Group (represented by two consultants) visited six DOE sites to assess the operations of the field offices in the Department. Among functions examined at these sites were: transportation services (modal choice, carrier selection and private transportation), negotiations and contracting, use of intermediaries, terms of trade, monitoring of shipments and carrier performance, various electronic data interchange (EDI) systems between carriers and DOE, and resource support (information systems, finance and budget, facilities and equipment, management, organization and staff). At each site, the team met with and interviewed a number of staff personnel. Twenty major findings from the field site visits

are outlined, below. The findings highlight major weaknesses in the organizational structure of the DOE, in communication among various DOE and contractor offices, in the Department's general management practices, and in the way the Department monitors its operations.

5.1.1 Structural Issues

- *No common, well-defined and pronounced understanding of the roles and interfaces between headquarters, field office and contractor transportation personnel.*

Where there was some attempt to give structure to the nature of the relationships among headquarter, field office, and contractor transportation personnel, it was vague at best and sometimes counterintuitive. In business systems parlance, this lack of definition translates into an undefined process, without well understood boundaries, roles, or parameters. For instance, at one site the contractor's traffic manager told us that he was under no obligation to assist us under request from the DOE, but instead was accommodating us out of his good nature. From the DOE itself, there was no apparent initiative to define and formalize these relationships.

- *There is very little coordination of activities between functions in transportation at any of the sites.*

Supply chain management as a process is a concept that apparently has not found wide acceptance across the DOE complex. Improving individual functions does not equate with optimizing the entire process. In fact, evidence shows that in some instances, improving one function actually increases total costs. At one site, traffic department personnel reported to one vice-president and transportation personnel to another. Without coordination of effort, these two activities often worked counter to each other and increased inventory storage times. Inbound and outbound transportation function as independent activities in most sites, allowing no coordination of material flow in and out on the same carrier, to reduce freight costs. Further, we saw no evidence that procurement provided any advance shipment notification to receiving in a systemic fashion to allow for optimization of receiving and distribution resources.

5.1.2 Communication Issues

- *Communication between headquarters and the site contractors remains a primary problem.*

This is true for vertical communication; that is between headquarters, field offices and contractors, and for horizontal communication; that is across the complex. Communications between the DOE regional traffic managers and the site contractors varies dramatically and, instead of being a matter of policy, apparently is up to the individual regional traffic manager. For example, at one site, the contractor knew what to expect from the best practice group visit and was well prepared (although he had the shortest lead time between receiving the survey and our visit). At the second, no one knew we were coming until the day before (despite our strong exhortations that this not be the case) and personnel were at a loss in understanding what was

expected. Communications between site contractors is poor, although there is a traffic management council that meets to discuss common problems.

- *There are no standards for reporting relationships and organizational structure across the complex.*

The relationship between DOE representatives and contractors differ greatly from site to site. This contributes to inefficient communication and a lack of management and control.

5.1.3 Management Issues

- *There is no common definition of basic transportation/logistics terms and concepts from which to manage the function.*

We found that terms like shipment, traffic, transportation, just-in-time (JIT), fleet management, stores, on-site and off-site shipments varied from site to site. As a result, there can be no standardization of data with any degree of integrity that would allow for the understanding, much less the management, of the transportation function. At one site JIT meant receiving product in proportion to actual usage, with inventory in stores averaging around $11,000. At another site, JIT meant simply receiving inventory at set times at the receiving dock. At still another site, "JIT" inventory levels were approximately $85 million. Obviously, JIT means different things to different people. To set standards for performance, JIT must be clearly defined, and objectives, like acceptable inventory levels, must be uniformly prescribed.

- *There are no uniform technical and domain specific requirements for DOE field and contractor traffic managers.*

The experience, skills, and abilities of these people varied greatly and many were without sufficient training and experience to adequately perform their duties. The background of the DOE and contractor staff personnel ranged from computer programmers to nuclear engineers; none had an extensive background in logistics. As an example, at several sites, the transportation staff was unaware of the implications for claims and liability of switching from Free on Board (FOB) origin to FOB delivered terms of sale. At another site, we commented:

> The Traffic Manager has settled into his job and seems comfortable with it, although he readily acknowledges that his background experience in data processing was not ideal for his present responsibilities. He has led the change to make the group more service oriented toward their internal customers. They have recently implemented changes that encourage the internal customers' use of the services provided by the group. While these changes represent improvement in attitude and service level, the group still lacks proper understanding of the traffic function. There are no metrics in use to track carrier performance, and they do not understand the value of per mile cost comparisons between carriers. Apparently no one in the group has a background in industrial traffic

management. They display a great attitude but lack the knowledge and the tools to really do the job they want to do.

- *Long range planning seems to be non-existent at several sites.*

At one location, where the material flow is predominantly JIT, and we were told that the trend would accelerate, plans were in process to build a new receiving/warehouse facility with additional space, radio frequency bar coding and other new technologies. At another facility, material procurement has increasingly moved towards continuous replacement, yet the number of procurement agents has remained constant at a high number.

- *Information systems developed and implemented across the complex are not well integrated, do not assist in the daily operations of the transportation activity in an effective manner, and do not provide strategic decision making support information.*

The functionality of most of the tools made available to the contractors is limited at best and not well supported. What systems are in place are transactional in that they simply report the current status of the activity and provide little planning and communication among functional groups. For instance, in no site did we see the JIT system tied into the Automated Transportation Management System (ATMS) or SMAC. Moreover, nowhere did we see tools for planning and scheduling transportation activities. There are no capabilities, as there are among commercial off-the-shelf packages, to test alternatives and react in real-time to unexpected events. As the DOE shifts to a significantly higher level of transportation activity, especially of waste and restoration projects, it will be critical to plan and schedule these shipments. The time to put these systems in place is now, while the opportunity to learn and adapt to them is available.

- *There is a lack of consistent guidance in even basic procedures and no evidence of consistent follow-up to ensure compliance with the few guidelines that do exist.*

The contractors often act autonomously, doing what they want to do in the way they want to, without interference from DOE, either field or headquarters. FOB terms for purchase are a good example. At one site, we were told that FOB Delivered was the option of preference. At another, total discretion went to the purchasing agent. At a third, we were told that FOB Origin was preferred but not required, and a fourth told us that FOB Origin was the standard practice but hard data stated otherwise. There is no evidence of established policies or objectives for practices like this one. Another example was evident in carrier selection. Most sites adhered to the story that carriers from nationally negotiated tenders were predominantly used, but after further questioning it became apparent that, in fact, regional carriers were utilized most often. But even this practice varied from site to site, with no firm understanding of what was required, expected or preferred.

- *There is no evidence of an effective reward system.*

Performance incentives, as defined in the private sector, do not exist (e.g. in the private sector, bonuses in a department could be based on the achievement of one or more goals, such as "percentage of shipments delivered on time" or "5 percent annual reduction in transportation expenditures.") Reviews and evaluations are almost exclusively qualitative instead of quantitative and reflect more personality than achievement.

- *Sites do not fully utilize contracts with their motor or rail carriers (with the possible exception of FedEx.)*

At one site, the transportation staff did not know if the rates they were paying were correct. They have no tariffs, nor anything else in writing, for use in auditing carrier's freight bills. If this is endemic across the complex, serious freight overcharges may exist.

- *There is little control over the mode of shipment and no enforced standards.*

Almost anyone can request shipments in any form they desire. As a result, many shipments do not go out in the most cost effective manner. For example, at one site we witnessed hundreds of computers and monitors that had been shipped in overnight air and then left sitting on the dock for several days (or even weeks) before on-site distribution.

- *There is a systemic problem in the DOE transportation organization in regards to the priority of programs over policy.*

A great deal of money has been spent on transportation programs like SMAC, ATMS, carrier evaluation, etc. Most of this has been poorly spent. Programs available for purchase or lease (or for free at the university library in the case of carrier evaluation) are more effective, efficient and accurate than those developed internally by the DOE. Further, commercial of the shelf programs utilize industry standards that make them compatible with other operational programs like managed warehouse systems (MWS), spreadsheets, relational database management systems, satellite tracking, and communications software. These programs can be customized, are often modular, are updated frequently with new releases, usually have graphical user interface (GUI), and are supported by technical customer service. What we found are systems like SMAC, that have little management value, are labor intensive and are not adequately supported. In fact, most inbound shipments by number support JIT programs and are thus not reported to SMAC. The impact of an emphasis on programs rather than policy was made plain at one of the sites where we were told that the DOE field traffic manager was only interested in increasing his programmatic budget and paid no attention to and cared even less about actual transportation activities.

- *Waste shipment activities vary widely from site to site.*

We encountered a common desire to abdicate responsibility and liability with respect to the transportation of radioactive waste. This often took the form of a "turnkey" contract with a third party. The common belief was that by contracting out the packaging, documentation, transportation and disposal to a third party, the site would no longer have any liability for the waste.

- *There is apparently no standardization of contract and obligations across the contractor complex.*

Without some commonality in this area, it is difficult to get cohesion in any effort; that is, reinventing transportation. There are indications that some of the lack of understanding of responsibilities, roles, accountability, and control could be symptomatic of a disparity in overall contract obligations. A clause-by-clause analysis of the transportation segments of these contracts is required and some kind of standardization established and communicated.

- *Transportation operations in almost every case are reactive rather than proactive.*

Transportation people react to shipping requests, react to incoming shipments, react to poor performance (usually after a complaint), react to packaging requirements, react to non-routine incidents, etc. Management trends in the private sector, by contrast, are towards prevention rather than mitigation; proactive so as to optimize resource utilization and capacity planning (e.g., inbound receiving scheduling). Often we found that the reactive management style manifested itself in large number of employees being inactive, waiting between unplanned and unscheduled system requirements.

- *The major driver in many transportation efforts is simply Department of Transportation (DOT) compliance, not overall safety, efficiency, customer responsiveness, or cost reduction.*

There appears to be little motivation for innovation and a culture that discourages new practices while encouraging risk adverse behavior.

- *The present practices in transportation management in DOE tend to reward sub-optimization.*

Decision-makers at separate and uncoordinated levels focus on different criteria for making a determination on carrier selection, losing sight of overall benefits. For instance, at one site we found the lowest cost carrier was never used because it provided the lowest service level of any carrier, although there was no evidence of any metrics to substantiate this claim. From our observations, there is no mechanism for feeding service information into the carrier rate negotiation process.

5.1.4 Monitoring Issues

- *The metrics commonly used as a management tool in the private sector are not currently in place at the DOE sites visited.*

Each staff person was asked to identify, and if available, provide copies of performance metrics relative to the transportation function. As outlined in Table 1, the personnel were not able to produce a comprehensive set of metrics. Table 1 provides a list of types of metrics commonly collected in private industry. DOE transportation managers were asked whether or not these types of metrics were collected. It can be seen clearly from the table that very few metrics were reported as being collected at the sites visited. As a result of the lack of metrics, real and significant performance evaluation of transportation operations was not possible at the sites.

- *Operational metrics is a largely misunderstood and almost totally unused management tool.*

Instead, metrics is a term that is widely used without much understanding. As the survey results verify, little measurement of performance takes place in the DOE transportation function. What little measurements are available tend to be towards activity (i.e., numbers and volumes) rather than on performance (i.e., meeting performance criteria). At one site, the only metrics displayed reflected the facility's performance in terms of employment diversity, but not transportation.

5.2 Findings From Survey of Site Contractor Transportation Managers

The University of Maryland Best Practices Logistics team surveyed 28 DOE field managers with transportation responsibilities. They were asked questions related to the strengths and weaknesses of current logistics and transportation procedures, as well as on future directions for the transportation function within the DOE. Appendix 2 contains a complete listing of questionnaire results; below, is a summary of some of the key responses from the survey:•

- *Problem Identification*

The respondents expressed a wide variety of concerns. In some cases, respondents did not volunteer current deficiencies in operating conditions. However, there was a group of managers working at major sites that considered transportation operations at DOE sites to be fragmented. Specific symptoms mentioned by those respondents were the every day ineffective use of resources, the insufficient time notification to finish tasks, the inability to keep up with escalating regulation requirements, and the minimal cooperation between DOE' s transportation staff and contractors. As well, respondents at major sites cited the fragmentation between on-site and off-site operations as a major obstacle in handling support activities such as packaging and training.

Table 1 - Management Systems Findings at DOE Field Sites

DOE site collect metrics (Y= Yes, N= No)

Management Systems	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Comprehensive Operational Performance Metrics	**N**	**N**	**N**	**N**	**N**	**N**
Quantitative Performance Incentives	**N**	**N**	**N**	**N**	**N**	**N**
Customer Satisfaction Surveys	**N**	**N**	**N**	**Y**	**N**	**Y**
Comparative Cost Measures	**N**	**N**	**N**	**N**	**N**	**N**
Benchmarking	**N**	**N**	**N**	**Y**	**N**	**N**
Established Functional Interfaces	**N**	**N**	**N**	**N**	**N**	**N**
Demand Management Planning	**N**	**N**	**N**	**N**	**N**	**N**
Asset Performance Measurement System	**N**	**N**	**N**	**N**	**N**	**N**

The following definitions apply:

Comprehensive Operational Performance Metrics - A set of quantitative performance measurements adequate to use in the management of a function or activity. Information must be complete, timely, accurate and cover all data points in process performance. This kind of measurement information is often linked to value creation and improvement mechanisms.

Quantitative Performance Incentives - Rewards and compensation systems that are directly related to specific, measurable, regular, and repeatable performance objectives.

Customer Satisfaction Surveys - Regular and specific identification of internal or external customer requirements as well as a measurement of an organization's ability to satisfy those requirements in respect to quality, timeliness, responsiveness and efficiency. These surveys should be translated into actionable items

Comparative Cost Measurements - Industry specific standards for the comparison of costs between or within organizations. In transportation these measurements are often standards like truckload costs per mile, costs per ton mile, transportation costs as percentage of procurement expenditures, etc.

Benchmarking - The comparison of practices and performance with best-in-class organizations. A number of firms have performed a number of benchmarking studies for a multitude of business processes, including logistics, and found that in each case significant improvement resulted from careful examination and analysis of external organizations, all aimed at improving competitive position, controlling costs, enhancing customer service, and surviving transportation deregulation. Benchmarking in supply chain has focused on "micro-processes" within the function.

Established Functional Interfaces - The identification and formalization of relationships between functional departments within a process. Newly redesigned processes in logistics emphasize functional integration over functional efficiency. By focusing on outputs instead of tasks, on horizontal rather than vertical information flows, and on relational exchange with suppliers, logistics management has moved significantly closer to integrating the entire supply chain.

Demand Management Planning - The proactive management of resources to meet demand on a pull basis utilizing high level planning and financial packages with a wide range of functionality, especially in forecasting, master scheduling and distribution. The right combination of planning and scheduling tools can create a significant strategic advantage in reducing total cost to customer and minimizing order cycle time.

Asset Management Performance Systems - Management systems that measure the optimization of resource utilization, capacity control measurements, and the financial benefit to cost relationship between capitalized and normalized investments.

- *Reinvention Needs*

Although the majority of respondents did not think it is necessary to change the nature of the organization and operations at the local level, there was general agreement that a re-engineering effort should focus on increasing the organization's overall flexibility and adaptability, reducing costs, and raising the levels of accuracy and timeliness involved in the paperwork and documentation processes.

- *Reinvention Objectives*

In general terms, the respondents believed that a reinvention process should result in stronger communication between DOE officials and contractors. Some respondents went farther and stated that the transportation and packaging operations should be adapted under one organization. These respondents also perceived that centralization is critical in areas of support, such as training and packaging. A vast majority declared that reducing costs and risks should be top priorities when implementing a reengineering process.

- *Transportation Management Models Evaluation*

As illustrated in Appendix 3, respondents were divided between centralized and decentralized models as the best alternatives for DOE's transportation operations. Although the majority of respondents considered a hybrid centralized/decentralized model as the most attractive option for DOE (program strategy is established by a central group while day-to-day operations are managed at the field level), there were respondents who preferred the pure decentralized model or a hybrid centralized model (decentralized decision-making except for centrally managed risk policies) for DOE's current operations. Surprisingly, there was an important portion of DOE respondents that believed in outsourcing as a partial solution for DOE's transportation system.

5.3 Industry/Government Best Practices Expert Group

The University of Maryland Best Practices Logistics Group invited 19 professionals from the private and public sectors to recommend a transportation and logistics model for DOE. (A list of the experts in this group is included in Appendix 4.) As a first step, the professional focus group reviewed the Strengths, Weaknesses, Opportunities, and Threats (SWOT) in DOE's current transportation model. (As outlined in Section 4, these strengths, weaknesses, opportunities and threats were the outcome from the Packaging and Transportation Safety (PATS) group.) In the second step, the thirteen transportation models described in Table 2 were analyzed and a general consensus achieved as to the type of model best suited to the DOE. A discussion of this second phase of the analysis is presented in Section 7 of this report. The rationale behind the SWOT review is that by first assessing the current situation at the DOE, the experts can then be in a better position to provide recommendations as to strategic and operational changes.

Table 2-Transportation Management Alternatives

Pure Centralized Model	In this model key personnel from major departments within an organization collectively coordinate or manage, from a central location, transportation for organization-wide operations. The central group determines transportation strategy and controls mode and carrier selection. This group also contracts and negotiates rates and is responsible for risk management and emergency response regarding shipments to and from all organization locations.
Centralized Pool Model	Each organization facility location or region's transportation needs are managed from a central location by a single transportation specialist or team assigned to it. One specialist or team can be assigned two or more sites. However, numerous specialists or teams housed in the same central location are required to manage the organization's entire transportation function.
Hybrid Centralized Model	A central transportation group establishes transportation management and carriers at all locations and negotiates conditions for their service. Personnel at field locations select which carriers it will employ from the pool to handle its shipments. The central transportation group also contracts and negotiates rates and is responsible for risk management and emergency response regarding shipments to and from all organization locations.
Hybrid Centralized/ Decentralized Model	Transportation program strategy is established by a central oversight group, while day to day decision making responsibility for carrier selection, negotiation , shipment management, and other activities, consistent with the strategy, is managed at field locations.
Hybrid Decentralized Model	Transportation managers at field locations control mode and carrier selection, and contracting and rate negotiation pertaining to shipments to and from their location. Coordination between field locations is not necessarily assumed to occur. Risk management policies and activities, such as emergency response, are managed from a central organization location.

Pure Decentralized Model	Transportation managers at field locations control mode and carrier selection, contracting and rate negotiation, risk management, and emergency response pertaining to shipments to and from their location. Coordination between field locations is not necessarily assumed to occur.
Complete Outsourcing by Headquarter Level	Responsibility for all transportation activities, including risk management and emergency response, for all field locations is contracted to one or more outside organizations.
Outsourcing by Headquarter Level of Transportation with Centralized Risk Management and Emergency Response	Responsibility for all transportation activities, except risk management and emergency response, for all field locations is contracted to one or more outside organizations. Risk management and emergency response activities for all field locations, however, are managed at organization headquarters.
Central Outsourcing by Headquarters with a single M&O Contractor	Responsibility for all transportation activities, including risk management and emergency response, for all field locations is contracted to a single M&O contractor (e.g., Westinghouse or Lockheed-Martin).
Central Outsourcing by Headquarters to a Third Party Logistics Provider.	Responsibility for all transportation activities, including risk management and emergency response, for all field locations is contracted to a third party logistics provider.
Central Outsourcing by Headquarters to Single M&O Contractor who, in turn, outsources to one or more Third Party Logistics Provider.	Responsibility for all transportation activities, including risk management and emergency response, for all field locations is contracted to a single M&O contractor who, in turn, outsources to one or more third party logistics provider.
Multiple-site of Field Office Contractors.	Execution of transportation activities, including risk management and emergency response, for one or more field locations are contracted to a single outside organization. Several such contractors are needed to manage all field locations' transportation needs. Responsibility for managing all outside contractors resides with a centrally-located group within the contracting organization.
Multiple Sites Outsourcing to Multiple Contractors	Each field location contracts the execution of its transportation activities, including risk management and emergency response, to one or more outside organizations. There is not necessarily coordination among the field locations.

The SWOT analysis was incorporated in the professional focus group's review through computer "groupware," a software program that allowed the meeting facilitator to provide the participants with immediate feedback on the importance of each strength, weakness, threat, or opportunity evaluated. The strengths were then ranked from greatest to least important. The same system was applied to weaknesses, opportunities, and threats, as well. Appendix 5 provides a ranking of the strengths, weaknesses, opportunities, and threats.

Below, the top-rated strengths, weaknesses, opportunities, and threats are listed and explained.

5.3.1 Top Ranked DOE Strengths

- *Dedicated core of traffic management staff, well trained in the specialized shipping/handling requirements of the Department of Energy's unique materials.*

DOE relies on its employee base as its most important strategic resource. Key transportation personnel have been in place at the various sites for many years. This factor has allowed a continuous and stable change process in which a solid employee and knowledge base has been built up in handling high risk materials. Through a training ladder of course modules that cover safe operations in transporting dangerous materials in compliance with up-to-date regulations and procedures, and through overall policies and technical assistance programs, DOE has been able to make sure that procedures are generally available at most sites on how to ship the materials unique to that particular site.

- *Considerable expertise in transportation regulatory compliance training programs.*

DOE has established a nationwide transportation training program to ensure compliance with applicable regulations. This approach allowed hazardous materials employees to perform their job requirements in an operationally safe manner and to reduce the potential for unnecessary disturbances in shipments. The training programs are reviewed and updated by a central panel of federal registers. Any changes to regulations are provided by this panel to DOE which, in turn, alerts field transportation personnel of these changes through a complex-wide fax and e-mail system.

- *The ATMS is already online at five major sites in varying degrees of implementation.*

The main objective of ATMS is the unification of systems previously available and the increase in reliability levels by: (1) Eliminating manual operation through graphical user interface; (2) improving freight management by automating the processes associated with route, mode, and rate selection, as well as the selection of high quality national carriers; (3) reducing labor intensive transportation tasks such as the preparation of shipping papers, the verification of applicable hazardous materials regulations, and automatic auditing of freight invoices prior to payment; and (4) using electronic data interchange to reduce time.

5.3.2 Major DOE Weaknesses

- *DOE headquarters level, while providing important policy and program guidance to the field and sites, has very weak operational monitoring/supervision capabilities, which leads to fragmentation of the transportation system.*

These problems are the consequence of DOE's not having a unified corporate vision for its own transportation system. Currently, transportation activities are spread across several headquarter divisions, including Environmental Restoration and Waste Management, Defense Programs, the Office of Civilian Radiation Management, and the Office of Naval Reactors. These policy/management units can issue conflicting policy guidance to the same set of DOE field officers and contractor transportation personnel. Yet, sites are left largely on their own in undertaking operative actions, with their performances not effectively measured or managed by headquarters units. In 1994, a review of four major sites revealed that a transportation quality assurance audit had not been conducted in five years.

- *Inexperienced staff and management being assigned to highly complex transportation positions will lead to citations, fines, and incorrect regulatory interpretations that will establish precedents that could severely impact DOE's future transportation activities.*

Recent downsizing efforts undertaken by DOE have resulted in retirements and departures of headquarter and field staff with operational backgrounds. As a result, inexperienced personnel are starting to move into lead positions on transportation operational activities, such as managing shipments to the U.S. of foreign research reactor spent fuel. Although these individuals may not have completed required training, they are making decisions that affect the transportation of hazardous materials. Such a trend could lead to incidents related to improperly performed functions, such as the preparation of shipments and shipping documents, and the authorization of freight payments. Shipment costs could increase as a result of higher levels of regulatory requirements set by DOE to offset the inexperience of decision makers, and due to concerned state governments insisting that DOE spend more money on additional training and equipment.

- *While regional rates are negotiated by headquarters, the rates of regional carriers that handle the majority of the shipments for the sites are largely uncontrolled.*

Approximately 70% of DOE shipments are handled by regional carriers. There is currently no program in place at the national level to pre-qualify these carriers, to aggressively negotiate rates or to set performance standards and monitor performance against those standards. Cost control is further hampered by the fact that an estimated three quarters of all shipments are forwarded inbound prepaid, which means that transport costs are not easily disaggregated or controlled.

5.3.3 Major DOE Opportunities

- *DOE complex-wide environmental clean-up mode is intensifying with an estimated 1,400 more facilities to be transferred to Environmental Restoration and Waste Management for decontamination and decommission, increasing demand for transportation services.*

The forecasted increases in environmental restoration and waste management activities are projected to lead to a huge increase in the number of shipments. Although hazardous materials comprised only about 4% of total DOE shipments and 24% of total tonnage in 1994, these percentages are expected to increase rapidly as waste from sites move into transit. It is also anticipated that DOE will be forced by court actions or legislative decree to move spent fuel rods currently stored on site at nuclear power plants around the country to repositories, which would also increase hazardous material (hazmat) shipments and the need for transportation services.

- *The pervasive use of information technology in internal logistics management is opening up new possibilities to better manage activities and minimize costs.*

Real time information, monitoring, and control systems provide a new framework for logistics management in which it is possible to add value to routine operations and dramatically improve product/service performance. Advances such as bar coding, in-transit tracking of shipments using satellites, and electronic data interchange have revolutionized the function of logistics.

- *New training/coaching technologies, such as desktop video conferencing, could assist in rapid and continuous upgrading of transportation workers' skills.*

Converging streams of technologies, such as fiber optics, digital satellite, studio and desktop video conferencing, and inter/intranets, are enabling the evolution of interactive multimedia networks capable of providing information, training, and support on a customized and just-in-time basis. Given the Department's highly decentralized and skill-intensive operational environment, these technologies offer DOE tremendous opportunities for developing, upgrading, and integrating personnel capabilities across the complex.

5.3.4 Major DOE Threats

- *Regulatory issues have raised and could continue to raise costs of transportation considerably.*

Regulatory initiatives from the Department of Transportation and the Environmental Protection Agency are currently oriented toward increasing the monitoring of operations at the DOE sites, which results in increased paperwork, staff time, and overall compliance costs. Regulations have been introduced to make sure that carriers have in place radiation protection programs. Under these circumstances, several carriers have opted not to haul radioactive

materials, thereby increasing transportation costs.

- *Budgetary cutbacks could deplete agency resources for transportation.*

Over the last two years, DOE's transportation budget has been reduced 55%. These cuts have put on hold several national activities. As a complement to cutting expenses, DOE has implemented personnel downsizing and buyouts (early retirement incentive) programs. These policies are major drivers in the reduction in the number of experienced transportation staff members.

- *Anticipated short and medium term leap in number and volume of spent fuel and other hazardous waste shipments could overwhelm current transportation systems and staff.*

Several factors could combine to produce a formula for potential disaster. These include: The deficiency of DOE strategic and operational controls coupled with an increasing institutional tendency toward decentralization; and, the reduction in personnel at the headquarters and field levels coupled with the projected drastic increases in shipments, particularly radioactive wastes that have complex shipping requirements. These factors could result in much greater near and medium term risks of accidents, incidents, and waste of resources.

5.4 Findings From The Survey of Best Practices Organizations

An attempt was made to determine the organizational structure and processes employed by best practice organizations, identified from the trade literature and trade organizations. Twenty-five surveys on organizational practices in transportation were sent out resulting in 15 responses. The respondents and their companies are listed in Appendix 6. The respondents all have managerial authority over some or all aspects of transportation and logistics in their organizations. The companies cover extensive geographic areas of operations, in some cases operating on a worldwide basis. The respondents reported average annual sales of $1.2 billion, with an average number of shipments per year of 731,565 units and an average shipment volume per year of 4,900 tons.

An important aspect of the survey was the determination of the organizational models employed by these firms and their satisfaction with the models. The transportation management models that best describe those used by the majority of the respondents' companies are the pure centralized model, the hybrid centralized model, and the hybrid centralized/decentralized model. (See Table 2 for a description of the models.) Each model was selected by 30.1% of the respondents as the model that best fits the description of the network in use at their firm. It is important to note that, according to the results, the respondents' organizations have had extensive practical experience with these models. On average, the models have been in place for 115 months (9.6 years). The time needed to implement the new models averaged 18 months.

In general terms, the respondents were satisfied with their transportation management

models. The respondents were especially pleased with the performance of their models on the following areas: (1) The ability to meet requested shipment delivery dates, (2) the model's flexibility and adaptability, and (3) the ability of the model to reduce risk.

5.5 Synthesis of Major Findings

The site visits performed by the University of Maryland Best Practices Group (represented by two consultants), allowed us to determine, first-hand, the presence of systemic problems in the transportation function at DOE. Additionally, our analysis of the surveys, completed and returned to us by DOE field traffic managers, reinforced many of the conclusions we have drawn, especially on the lack of metrics and the implication it infers about the ability to measure and therefore manage the transportation function. The contractors in the field appear, in many instances, to have little direction from DOE headquarters. This does not appear to be in the form of revolt, but more of a conditioned response. Apparently, the DOE headquarters representatives have had little contact with the field operations in the past, so the contractors simply have become accustomed to acting independently of DOE supervision.

The SWOT analysis, performed by the Industry/Government Best Practices Group, did reveal that a major strength of the DOE was having a dedicated core of traffic management staff, well trained in the handling requirements of the DOE's unique materials. However, the same group pointed to major weaknesses at DOE such as the lack of monitoring/supervision from the headquarters and the assignment of inexperienced staff and management to highly complex transportation positions.

Finally, the survey of the best practice organizations revealed a major gap between the organizational structure of the DOE and the structures of the best practice organizations. A large majority of the organizations have a centralized structure for transportation management, whereas the structure of the DOE's transportation management is highly decentralized.

In conclusion, the findings from our study seem to strongly indicate organizational and structural weaknesses with transportation management at DOE. In the next section, we present alternatives to overcome these problems.

6. Alternatives

In order to address the weaknesses in the organization of transportation activities at the DOE, the University of Maryland Best Practices Group identified thirteen potential organizational models for the Department. As noted above, the models are presented in Table 2. The first six models present organizational structures with various degrees of centralized management control. Model 6, “Pure Decentralized Model” represents one of the extremes, with a very weak central office. All decision-making authority is vested in field office management. On the other hand, Model 1 “Pure Centralized Model” has transportation management functions residing at a central location. The remainder of the six models (2,3,4, and 5) divide transportation control between

head office and the field.

Alternatives 7 to 13 differ from the first six options, in that they all propose at least some degree of outsourcing. Outsourcing options were considered for at least two reasons. First, as stated in the “Findings” section of this report (Section 5), downsizing at the DOE may be creating a situation whereby the Departments lacks sufficient personnel skilled in the transportation and management of hazardous materials. Second, outsourcing firms may be able to overcome some of the operational problems identified in Section 5 of this report, such as the lack of standardization among the logistics practices at various DOE field offices and the current inability to accumulate sufficient transportation volumes across the Department to obtain the best discounts offered by carriers.

The outsourcing models differ from each other in a number of respects: On the number of outsourcing firms employed; on the type of firm contracted to perform the outsourcing function; on the level at which the outsourcing firms will be managed (headquarters or field); and on the residual management functions (such as the management of hazardous materials) maintained by the Department. Alternative 13 most closely resembles the current organizational structure at DOE, with each site employing one or more contractors to perform transportation (and other functions) at the site. Other outsourcing alternatives attempt to consolidate the transportation operations within a single contractor and/or centralize the management of transportation activities performed by contractors at the headquarters level of the DOE. Alternatives 10 and 11 specifically state that transportation activities are to be outsourced to third party logistics providers, rather than to non-specialized (M&O) contractors.

7. Analysis

7.1 Extent of Centralization

The internal factors and external conditions influencing DOE's transportation function were evaluated by a panel of industry and government logistics professionals. A central part of this evaluation was the selection of organizational alternatives best suited for DOE. In this process, the professionals evaluated the best options to leverage the strengths, minimize the weaknesses, and respond effectively to the threats and opportunities of the transportation function of DOE identified in Section 5 of this report.

There was a general consensus among the logistics professionals that an organizational structure with a strong centralized component for transportation management was required. It was generally agreed that centralization would capitalize on DOE's dedicated core traffic management staff, expertise in transportation regulatory compliance training programs, and knowledge of control and monitoring systems. Centralization was also considered to be an effective agent in overcoming DOE's fragmentation of control over its transportation system. Moreover, the professionals argued that centralization factors in the structuring of transportation and logistics operations are essential in achieving better responsiveness to environmental changes

(due to better communication within the DOE) and in the reduction of risk levels. The professional consensus was that an organization requires centralized control to enforce discipline on field offices. It was also recommended that the chosen organizational model be complemented with an information system to fully integrate field offices with headquarters and expedite communication activities.

With regards to the use of information technology, the professional group concluded that centralization would be effective in leveraging competitive advantages in logistics management. The experts also agreed that centralization is a critical factor in minimizing costs and coordinating continuous feedback and training to workers. Finally, the centralization component was also forecast to be effective in defending DOE against future threats, such as regulatory issues that could raise costs of transportation, budgetary cutbacks, and short and medium term leaps in the volume of DOE's hazardous materials shipments.

7.2 Transportation Management Options

The professional group felt that DOE's most important requirements focused on (1) the necessity to reconcile organizational cultures among DOE management and employees and (2) the need to generate significant cost savings while simultaneously producing significant benefits in overall organizational effectiveness. The group also agreed that (1) the ability to create a common transportation management structure, (2) the need to align transportation system objectives with critical success factors related to cost, risks, and safety, (3) the necessity to develop standard procedures and metrics, and (4) the urgency to consolidate loads in and across sites, are all critical to DOE's success. DOE must integrate autonomous entities across its organization, improve the measurement procedures of performance, and gain leverage in national /regional carrier rate negotiations in order to achieve ongoing shipment cost savings.

As illustrated in Appendix 7, the professionals identified the Pure Centralized, the Hybrid Centralized, and the Centralized Pool models as the organizational models best suited for DOE. In the Pure Centralized Model, key personnel from major departments within the organization collectively coordinate or manage, from a central location, transportation for organization-wide operations. This central group determines transportation strategy and controls mode and carrier selection. This group also contracts and negotiates rates and is responsible for risk management and emergency response regarding shipments to and from all organization locations. As well as tight central control over transportation management, the Pure Centralized Model fosters the enforcement of one set of rules and procedures, improves the control of field operations by headquarters, promotes the full realization of economies of scale in the areas of purchasing and transportation services, and facilitates the integration of information systems across the organization. The Pure Centralized Model, however, can be a serious promoter of bureaucratization and complacency, can lead to the over-concentration of control, knowledge capital, and skill sets at headquarters, and may not allow the customization of approaches or tactics for special regional needs.

In the Hybrid Centralized Model, a central group manages transportation for the entire Department, including the negotiation of contracts and rates with carriers. Field personnel, however, select carriers from the approved pool on a shipment basis. The model would be easier to fit into DOE's culture than a pure centralized model, given the relatively decentralized structure currently employed by the DOE. The model would centralize strategic decision making while assigning tactical functions to the field. Like the Pure Centralized Model, the Hybrid Centralized Model would also facilitate shipment consolidation and internal communication, provide more alternatives for contracting carriers to achieve higher cost savings, and would ensure consistency of approach, as compared to the decentralized decision making model currently employed by the DOE.

In the Centralized Pool Model, each organization facility location or region's transportation needs are managed from a central location by a single transportation specialist or team assigned to the location or region. The major difference between this model and the previous two, is that the managers at headquarters have a regional focus. Transportation operation personnel in the field report to the managers responsible for their region. The Centralized Pool Model, in the same way as the other centralized models, facilitates the enforcement of one set of rules, the full realization of economies of scale, and a complete integration of information systems across the organization. The Centralized Pool Model, however, promotes a higher degree of flexibility and regional focus than the other two models. Nevertheless, the professionals warned that the Centralized Pool Model could lead to potential conflicts between site managers and site transportation staff, given that the transportation staff would report not to the site manager, but to a regional transportation manager.

7.3 Third Party Providers

A number of the logistics professionals believed that central outsourcing by headquarters would reduce DOE's logistics costs by helping improve the effectiveness of DOE's transportation operations. These professionals believed that this performance improvement would be the result of a third party provider's extensive knowledge base, operational flexibility, opportunity awareness, and information management capabilities.

Although the logistics professionals believed that a third party logistics provider may be the most effective vehicle for implementing change within the organization, two notes of caution were sounded. First, the model may be difficult to fit into DOE's current cultural and bureaucratic conditions, with existing close contacts between DOE field personnel and M&O contractors, and with bureaucratic government contracting rules that may make the letting of a third party logistics provider contract difficult. Second, the logistics professionals cautioned against outsourcing risk management and emergency response functions, stating that DOE personnel may be best equipped to handle these operations and that transferring them to an outside party could significantly increase costs and risks. It should be noted, however, that the DOE currently contracts out hazmat transportation to specialized hazmat carriers.

There were a few logistics professionals who were opposed to outsourcing transportation services to third party firms at all, believing that it would be better for the DOE to develop its own competencies in logistics. However, it should be noted that most transportation activities at DOE are already contracted out, and that the use of a third party provider would, for the most part, only result in the shifting of transportation activities from a general contractor to a specialized logistics contractor.

It was felt by a number of the professionals that a third party logistics firm could provide the following benefits:

7.3.1 Benefits To DOE Headquarters & Field Offices

- A single system control point for better overall accountability and responsiveness to dynamic shipping requirements.
- Better overall freight rates on a complex-wide basis; better warehouse and inventory management processes; better trained transportation workforce.
- Formal total quality management/ quality assurance program to replace the present loosely managed set of contractor traffic managers and subcontractors. Implementation and monitoring of ISO 9000 standards, Chemical Manufacturer's Association Responsible Care Distribution Code procedures and a set of performance metrics.
- Better ability to attain higher levels of effectiveness in shipment planning, scheduling, and execution across a spectrum of routine and special shipments as a result of leveraging a third party logistics company's clout with truck, rail, air, and barge carriers.
- Better ability to track chemical hazmat shipments in transit.
- Better ability to partner with industry emergency management groups, and share risk mitigation and preparedness training with industry in a regional transportation corridor management approach.

7.3.2 Benefits To Management and Operations Contractors

- Lowered costs of procured products due to better transport costs through short-term rate savings.
- Closer coordination between on-site procurement and transportation functions resulting in more efficient vendor management and better scheduling, delivery and receiving/internal distribution processes for procured products.

- Increased ability to track shipments in transit for better customer service information and optimized dock/warehouse utilization.

- Better ability to monitor and audit freight charges and damage to goods.

- Better ability to formally audit carrier operational systems, driver status, insurance coverage, scheduling, and regulatory compliance.

8. Recommendations

Based on the findings of the University of Maryland Best Practices Group and the analysis of options performed by the logistics professionals, it is recommended that the DOE reorganize its transportation functions in a more centralized manner and transfer operating authority over transportation activities, currently performed by M&O contractors, to specialized logistics contractors. Of the various possible models for centralizing the transportation function at DOE, the centralized pool model was thought to address most effectively:

(1) The transportation management's weaknesses, strengths, opportunities, and threats identified by the DOE's field managers and logistics professionals.

(2) The continuous reduction of personnel and the increasing need by the M&O contractors to focus on mission-critical activities in which they have clear internal competencies such as environmental technology development and deployment, rather than on support functions, such as transportation, in which they have no unique competencies.

(3) The urgent need at DOE to attain quick transportation system savings and to avoid further steep sunk costs in information technology and capital equipment in the mid and long term.

(4) A simultaneous necessity, given DOE's sensitivity to public safety and stakeholder concerns, to bolster risk management practices, as hazmat and radioactive shipping requirements escalate.

The model proposed will change the current organizational structure at DOE in two ways. First, it will shift oversight of transportation activities to headquarters logistics personnel, who will be responsible for managing transportation activities on a regional basis (See Figure 2). This centralization of control will provide the following advantages:

- Full realization of economies of scale in purchasing transportation services.

- One set of rules and procedures that can be enforced at the headquarters level.

- Risk management tightly controlled at the headquarters level.

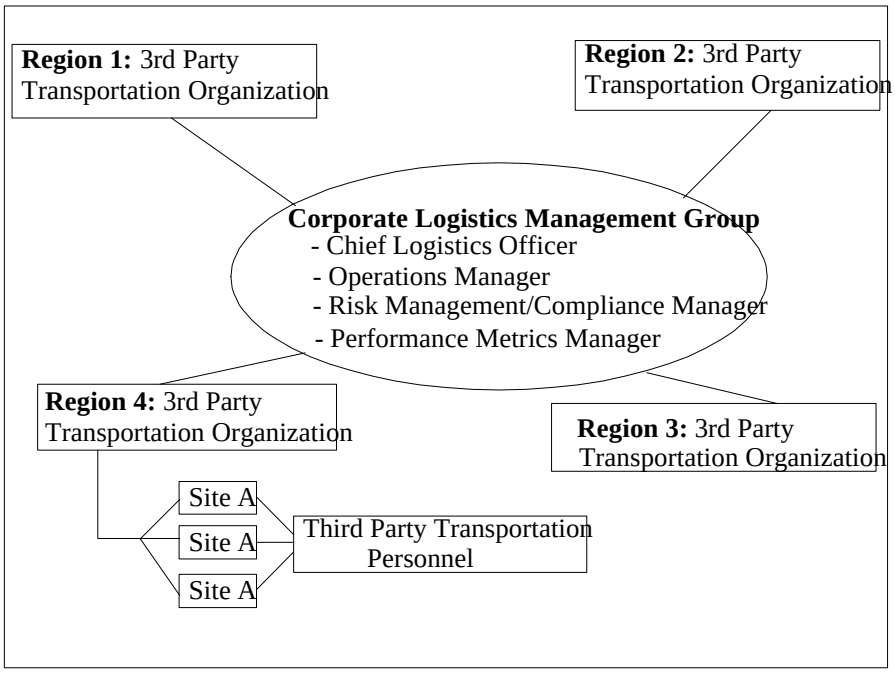

Figure 2 - Proposed Model

- The ability to integrate information systems across sites.
- More agile and flexible than a pure centralized model due to regional focus.

As well, the new model will allow specialized transportation and logistics contractors to manage regional transportation operations. The use of third party logistics contractors will provide the following advantages to DOE:

- Ability to combine DOE shipments with other shipments to realize the lowest available transportation rates.
- Sophisticated information systems that allow real-time tracking of shipments.
- Gain - sharing agreements that allow the DOE to realize continuous savings from more effective management practices employed by the third party contractors.
- More effective customer service. Third-party contractors can provide performance metrics (e.g. percent of on-time deliveries, fill rates, etc.) that allow for the measurement and improvement of internal and external customer service.

Based on the rationale provided for the centralized pool model, each of the DOE's sites would be placed into a geographic region for the purpose of dividing transportation authority and operations. Each region's transportation needs would be managed from a central location by a single transportation specialist or team. Site transportation managers would report directly to a third party logistics firm's regional transportation manager, with only dotted-line reporting authority to the overall M&O site manager (Figure 2.) Third party logistics providers would be hired to act as regional multi-site managers of routine, hazmat, and radioactive shipments. Ninety five percent of DOE's 600,000 annual recorded shipments and seventy percent of total costs (1995 SMAC Report) are routine shipments of goods, such as coal, scientific/office supplies and small packages. Large third party logistics companies, with multi-client shipment bases, volume transportation service purchases, and in-place core carrier networks, could manage these routine shipments more effectively than "generalist" M&O Contractors. In addition, a third party logistics company could more effectively manage the specialist fourth party companies that currently handle all non-defense hazmat and radioactive shipments. The third-party logistics firms could do this by bringing these smaller companies under the umbrella of formal quality assurance programs, integrated shipment tracking systems, and by forming industry emergency management consortia. Moreover, through better corporate wide coordination and scheduling, the high capital cost equipment of these specialist companies could be more efficiently utilized, with overhead charges to DOE reduced. Through a move to off-the-shelf cask designs, DOE could begin to cost-share with industry cask customers.

Finally, a Corporate Logistics Management Group should be established to help field offices gain strategic control over the largely independent site contractor transportation/logistics staff. This team should consist of a Chief Logistics Officer (CLO), an Operations Manager, a Risk Management/Compliance Manager and a Performance Metrics Manager.

The CLO would be responsible for total transportation management, including operations, risk management, and third party logistics provider standard setting, selection and monitoring. The CLO should be a transportation management professional with executive level industry experience, preferably in the chemical/hazmat industry. This person should be recruited externally so she/he can bring in-house to DOE best practice skills in supply chain optimization, performance metrics and auditing, carrier management and risk control.

The Operations Manager would define operational processes, procedures, and metrics for regional transportation operations. This person should also participate in auditing the third party logistics company selection process. The Operations Manager should have experience on chemical/hazmat industry operations.

The Risk Management/Compliance Manager would set risk management/compliance procedures and training standards. In addition she/he would audit protocols and would interface with federal agencies. This professional should have extensive knowledge of management/safety techniques, and federal and local regulations.

The Performance Metrics Manager would be in charge of tracking down financial costs and performance measurements of the transportation system. This person should have a detailed knowledge of DOE's budgetary/accounting principles and overall performance management.

In summary, the proposal is as follows:

(1) Create a senior core logistics management team at headquarters level, consisting of a Chief Logistics Officer, an Operations Manager, a Risk management/Compliance Manager, and a Performance Metrics Manager.

(2) Form a pool of Regional Transportation Managers drawn from third party logistics firms. Each Regional Manager would report directly to the Operations Manager in the Corporate Logistics Management Group.

(3) Contract out all transportation operations within the Department to third party logistics providers. Third party providers would be responsible for one or more regions and would report directly, through their regional managers, to the Operations Manager.

(4) Place hazmat transportation management under the direction of the third party logistics firms. The third party providers can then subcontract out hazmat transportation to authorized hazmat carriers.

9. Implementation

It was decided at a meeting of DOE transportation managers that transportation operations should be contracted out to third party providers, on a trial basis, at the following sites: Fernald, Savannah River, and Oak Ridge.

In addition, the University of Maryland Best Practices Logistics Group was instructed to determine best practice procedures for implementing third party logistics contracts and managing and monitoring third party firms. As of the date of this report, the implementation strategy is in process.

Appendix 1- Members of the University of Maryland's Best Practices Group

The members of the University of Maryland Best Practice Group are:

Dr. Sandor Boyson, Project Leader

Dr. Thomas Corsi, Senior Research Advisor

Dr. Martin Dresner, Research Advisor

Mr. Joseph Catto, Industry Advisor (Consultant, Former Chair of the Distribution Committee, Chemical Manufacturers Association)

Mr. Jim Crane, Logistics Reengineering Advisor (GSE Process Systems)

Mr. Alan Salton, Logistics Reengineering Advisor (GSE Process Systems)

Mr. Elliot Rabinovich, Research Assistant

Appendix 2-Responses From DOE Field Manager Survey

1. DOE's Strengths and Weaknesses as Seen by Major Sites (Over 20,000 Shipments)

	Strengths	Weaknesses
Argonne East, Oklahoma Site Project. Gaithersburg	Flexibility, service oriented, competitive.	No Answer.
Lawrence Livermore National Laboratories	This is a small site, with a small number of shipments compared to other DOE sites. Hazardous material shipment is separate from general freight shipping which allows more attention to be spent on regulatory driven shipments.	Due to the small size of the site and size restrictions. The site rarely ships full truck loads of hazardous materials.
Richland International. Hanford	Low cost, flexible, customized, tolerant to changes.	Policies are not enforced at senior staff level such that traffic managers can effectively implement procedures.
Oak Ridge	Systematic approach, focus on efficiency and effectiveness, compliance with all weights evenly, and value added responsibility.	Four staffing mechanisms for budgeting.
Savannah River	Central transportation function, which is responsible for regulatory compliance, automated systems, cost effectiveness, liaison with DOE, and contractor management.	Cross organizational cooperation. Not all transportation functions are included in the organization. Local transportation functions are fragmented.

	Strengths	Weaknesses
Sandia National Laboratories	Compliance with DOE regulations, a few experts with practical background, excellent area office representation, always willing to team up with DOE to come up with win-win solutions, can always call and get a response within reasonable amount of time.	Lack of communications, ineffective use of resources, limited resources, insufficient time notification to accomplish tasks, ability to keep-up with escalating regulation requirements.
Westinghouse Hanford Richland	All transportation management, training, hazmat shipping, and packaging activities are centralized and performed by transportation and packaging organization.	Other site contractors are not required to use our services and some of these organizations "staff up" to perform some of the same functions transportation and packaging does. This costs DOE and the tax payers more money because of the attitude of some contractors.
Los Alamos	Within Los Alamos National Laboratory (LANL), the packaging and transportation (P&T) core functions have worked diligently to create transportation services that provide the best possible support for our laboratory functions. The mission of the core P&T operations at LANL is "We provide quick, compliant, and cost-effective shipping, packaging, transportation, and materials transfer services for our laboratory customers to enable them to do their primary job function with minimal disruption." A major emphasis is on minimal disruption to the successful accomplishment of the real product of LANL: Scientific research and development. All P&T core processes have	1) Bureaucracy and handcuffing of staff because of directive requirements. 2) "One size fits all" directive requirements that are stagnant and non-flexible. 3) Minimal partnering between the DOE transportation staffs and its contractors' transportation staffs.

	Strengths	Weaknesses
Los Alamos (Continued)	been developed with the emphasis of enabling scientists to maximize their productive time spent doing science. This approach also enables P&T Core Staff to handle most transportation activities and maximizes having transportation safety sensitive functions performed by the most highly experienced and skilled staff. By approaching transportation functions with a primary emphasis on reducing productivity impact and placing secondary emphasis on P&T Core processes efficiency, LANL is able to provide the most cost-effective services. This is a tremendous strength of LANL's operations in the current transportation management model. An example of how this has been successfully accomplished at LANL is our Mobile Packaging Van (MPV) service. The MPV is a "full-service" transportation process. The P&T core staff who operate the MPV service are highly trained and highly experienced hazardous material experts who, at the customer's request, go to a site, package hazardous materials, develop all appropriate paperwork, and then transport the materials. This service enables LANL scientists to get hazardous materials moved quickly and professionally without needing any transportation training. Further, the scientists don't need to procure packaging or spend any specifically non-productive time doing the movement. Perhaps the greatest benefit is that the hazardous materials transfer is done quickly and safely by experienced hazardous materials professionals.	4) Fragmentation of DOE Area Office, and Headquarters responsibilities. The responsibilities and accountabilities of DOE staff are poorly communicated to its contractors. 5) Perceived lack of focus on the part of DOE Transportation Management on ensuring that DOE's ultimate products (scientific/research/cleanup/etc).

2. Major Steps to Reengineer DOE at the Local Level, Identified by DOE Respondents

Fernald	1) Centralize all traffic and transportation functions into one organization. 2) Require mid- and upper-level management to become aware of traffic/transportation functions and responsibilities by taking DOT required training commensurate with activities in which they manage, i.e. General awareness and function-specific training as required by Code of Federal Regulations (CFR) Title 49 CFR 172.700.
Nevada Operation Office	1) Consolidate functions and centrally manage. 2) Establish a method of assessment of total transportation costs.
Rocky Flats Field Office	1) Have an influence in budget and personnel decisions. 2) Standardize procedures throughout DOE. 3) Modify DOE directives to implement an integrated contract or modify contracts to meet directives. 4) Define field office protocol with sub-contract transportation elements. 5) Adopt current DOE orders into contract. 6) Base support budgets on percentage of project budgets.
Sandia National Laboratories	Improve communications; increase knowledgeable, dedicated, effective staff; active participation from contractors (input, review, and implementation).

Los Alamos National Laboratory	1) Replace the DOE order/directive based oversight and requirement system with a result-oriented, performance-based approach to contractor oversight by DOE. 2) Promote effective communications and learning between DOE contractors. 3) Improve local DOE representation and promote an intimate partnering between DOE and its contractors. By "intimate partnering" I mean establish an environment where a DOE person has extensive, intimate knowledge and understanding about the services, functions, and environment of each contractor. This relationship should be one of frequent interactions (weekly or biweekly) between the DOE staff and the contractor staff. 4) Promote contractors in decision making regarding DOE complex policy decision making. An excellent avenue for this is through the existing (or an expanded) Transportation Management Representatives. 5) Promote leadership of transportation functions as opposed to management of the functions.
Richland	1) Define work that is mission essential . 2) Determine what expertise is needed to perform a mission now and in the future. 3) Inventory levels of expertise the organization presently has. 4) Acquire personnel to handle missions.
Albuquerque/Kansas City *Allied Signal*	1) Enhance existing Department of Transportation (DOT) oversight program and traffic analysts needs by hiring qualified analyst from external sources. 2) Hire qualified package engineers to support DOT HM-181 needs.
Savannah River	Increase local DOE support (manpower).

Oak Ridge	Assign the DOE traffic manager as an advisor that cuts across functions.
Battelle Columbus	Update the transportation manual and procedures
Chicago	Utilize more communication with field offices
Oak Ridge Operations Office	Outsource or remove transportation operations from facility manager
Mound Applied Technologies	Dedicated personnel with experience
Battelle Columbus Laboratory Decommissioning Project	Look at possibility of combining shipments from multiple Ohio sites going to the same disposal facility.
Lawrence Livermore National Laboratory	Eliminate additional non-mandated or non-applicable requirements in DOE orders so as to be consistent with the federal regulations governing this activity and to minimize cost.

Appendix 3-Transportation Management Models Evaluation By DOE Respondents

	Transportation Management Model	Percentage of respondents that assigned to each model:					
		0 Points	1 Point	2 Points	3 Points	4 Points	5 Points
1	Pure centralized model	3.90	69.20	26.90	0.00	0.00	0.00
2	Centralized pool	4.00	32.00	52.00	7.40	0.00	4.00
3	Hybrid centralized model	3.90	11.50	26.90	15.40	23.10	19.20
4	Pure decentralized model	3.90	26.90	19.20	7.70	23.10	19.20
5	Hybrid decentralized model	3.90	15.40	30.80	19.20	26.90	3.90
6	Hybrid centralized/decentralized model	0.00	3.90	19.20	26.90	19.20	30.80
7	Complete outsourcing by headquarter level	3.90	46.20	23.10	23.10	3.90	0.00
8	Outsourcing by headquarter level of transportation	3.90	19.20	53.90	15.40	3.90	3.90
9	Central outsourcing by headquarters	3.90	23.00	46.20	19.20	3.90	3.90
10	Multiple-site or field office contractors managed by a centralized organization	3.90	19.20	46.20	30.80	0.00	0.00
11	Multiple sites or field offices engaged in outsourcing to multiple contractors	3.90	19.20	15.40	30.80	23.10	7.70

Scale:
0 Points: No score assigned
1 Point: Completely Unattractive
2 Points: Unattractive
3 Points: Somewhat Unattractive
4 Points: Attractive
5 Points: Very Attractive

Appendix 4-Logistics Professionals Group

Name	Organization
Scott Perry	GST Corporation
Donald Center	GST Corporation
Kenrick Warner	Amoco Chemical Company
John Buck	Johnson & Johnson Hospital Services, Inc.
Tony Douglas	Chemical Leaman Trucklines, Inc.
Bob Nicholson	Caliber Logistics
Thomas Carpenter	Georgia Pacific
Bill Lees	Marriott Corporation
Gerry Kolle	Cytec
Jim McClellan	Malinckrodt
Ermes DeMaria	DuPont (New England Nuclear)
Frank Zeitlhofer	Nordian
Mark A. Skoda	TNT Logistics Corporation
Paul Gottschalk	Military Sealift Command
Frank Galluzzo	Military Traffic Management Command
Jeffrey Bower	Defense Logistics Agency

Appendix 5-DOE's SWOT Analysis by PATS Focus Group

Strengths - Ranked from 1 to 10.

From 1= Greatest strength to 10= Least important strength

1. Dedicated core of traffic management staff well-trained in the specialized shipping/handling requirements of DOE's unique materials.

2. There is considerable expertise in Transportation Regulatory Compliance training programs.

3. ATMS System is already online in 5 major sites, allowing for more efficient transportation.

4. Creation of the Traffic Management Council as a vehicle for coordination among the contractor traffic management community.

5. The National Transportation Management Program has considerable expertise in evaluating motor carriers and negotiating national agreements of services and rates.

6. High degree of potential strategic control could be exerted by Headquarters over dispersed transportation activities through modification of existing M&O contracts.

7. High degree of interest in and support of DOE transportation re-invention by best practice industry and public organizations.

8. Heightened awareness of need for major change inside DOE, with transportation re-invention initiatives.

9. Establishment of the Transportation Integration Working Group at Headquarters is helping overcome fragmentation of the transportation function among the Office of the Deputy Assistant Secretary for Site Operations (EM-70), Office of Civilian Radio Active Waste Management (OCRM), Defense Programs (DP), and Naval Reactor Programs.

10. Establishment of the Transportation External Coordination Working Group is helping DOE to better accomplish its transportation program through involvement of external stakeholders.

Weaknesses - Ranked from 1 to 10
From 1= Major weakness to 10= Least important weakness

1. DOE HQ level, while providing important policy and program guidance to the field and sites, has very weak operational monitoring/supervision capabilities which leads to fragmentation of the transportation system.

2. Inexperienced staff and management being assigned to highly complex transportation positions will lead to citations, fines and incorrect regulatory interpretations that will establish precedents that will severely impact DOE's future transportation activities.

3. While national rates are negotiated by HQ, the rates of regional carriers who handle the majority of shipments for the sites are largely uncontrolled.

4. 70% of all shipments are "inbound prepaid," meaning that transportation costs are buried in the invoice and can't be separated out, monitored and controlled.

5. Both a lack of career advancement opportunities to retain and foster development of skilled transport staff and budget cutbacks will lead to a loss of DOE transportation operations experience/expertise at the HQ and field levels.

6. Procurement and Distribution Systems are managed separately and distinctly from each other on most DOE sites, with transportation services volume purchasing power diminished by not aggregating inbound and outbound shipment volumes.

7. Lack of documentation about current physical infrastructure capabilities and upgrading needs of sites to meet anticipated shipment increases.

8. Information systems are not effectively integrated across the transportation complex, with critical operational performance data and specialized knowledge getting lost.

9. Quality partnerships with carriers, governed by performance standards and metrics, have not yet been put into place.

10. A comprehensive approach to transportation risk management, including risk analysis and regular operations auditing, does not exist within DOE.

2. External Factor Evaluation

Opportunities - Ranked from 1 to 10

From 1= Greatest opportunity to 10 = Least favorable opportunity

1. DOE complex-wide environmental clean-up mode is intensifying, with an estimated 1,400 more facilities to be transferred to Environmental Restoration and Waste Management for decontamination and decommissioning-increasing demand for transportation services.

2. The pervasive use of information technology in internal logistics management is opening up new possibilities to better manage activities and minimize costs.

3. New training/coaching technologies such as desktop video conferencing, could assist in rapid and continuous upskilling of transportation workers.

4. High-level focus on logistics/transportation management at DOE (e.g. Secretary Alignment Initiative #38) as an important source of future productivity gains and cost savings.

5. Shifting to performance-based regulations packaging and other activities could provide more flexibility in accomplishing transportation tasks.

6. The utility industry is fighting in the courts and Congress to force DOE to move the industry's spent nuclear fuel rods to a storage repository, increasing demand for transportation services.

7. There have been significant academic and commercial advances in the field of risk analysis in transportation operations decision making and systems in recent years.

8. Major transformations are underway in the transportation industry as a whole that could benefit DOE.

9. Intelligent highway technology could reshape the infrastructure for the routing and shipment of materials.

10. High-profile nuclear materials smuggling cases in Germany and elsewhere have highlighted need for surveillance and response capabilities at the U.S. federal government level.

Threats - Ranked from 1 to 10

From 1= Greatest threat to 10= Least important threat

1. Regulatory issues have raised and could continue to raise costs of transportation considerably.

2. Budgetary cutbacks could deplete agency resources for transportation.

3. Anticipated short and medium term leap in number and volume of spent fuel and other hazardous waste shipments could overwhelm current transportation systems and staff.

4. Environmental and special interest lobbies could severely constrain transportation, particularly of nuclear materials.

5. Pressure from local communities and states could force re-routing of shipments to alternate routes that are inefficient or inappropriate.

6. Changing dynamics of the transportation industry could allow certain carriers to charge high prices, such as railroads running at peak capacity.

7. Instability at the executive level of Federal Government could slow down or derail DOE reforms.

8. Transportation disruptions from domestic terrorism could increase.

9. Possible Congressional or Executive Branch transfer of DOE transportation responsibilities to another federal entity, such as Department of Defense (DOD), as an efficiency move.

10. As more and more shipments become intermodal and the number of hand-offs increase, risks of accidents can also increase.

Appendix 6-External Survey Respondents

NAME	TITLE	COMPANY	PRODUCT/ SERVICE	GEOGRAPHICAL AREAS
Tom Carpenter	General Manager-Transportation and Logistic	Georgia-Pacific Corporation	Forest Products	North America
Gerard Kolle	Manager Transportation	Cytec Industries	Chemicals	North America
Ermes DeMaria	Senior Transportation Safety Consultant	Du Pont Merck Pharmaceuticals	Short Life Radionuclides for diagnostic and therapy	Worldwide
Frank Zeitlhofer	Logistics manager	Nordion International	Irradiation Equipment	Worldwide
Robert Nicholson	Vice-President of Sales	Caliber Logistics	Contract Logistic Services	U.S. and Canada
Francis Galluzzo	Assistant Deputy Chief of Staff for Operations Transportation Services	Head Quarters Military Traffic Managen	Surface transportation to include freight, DOD household goods and privately owned vehicles	Worldwide
Jim McClellan	Distribution Leader	Mallinckrodt Medical, Inc.	Manufacturing and distribution of radiopharmaceutical products	Worldwide
Mike McGrath	*	Du Pont	*	Worldwide
Richard C. Walters	Manager North American Distribution Chemicals Group	Air Products and Chemicals, Inc	Chemicals industrial Gases	United States
Paul Gottschalk	Total Quality Coordinator	Military Sealift Command	Move all classes of materials for DOD or other goverment agencies	Worldwide
John Buck	Carrier Relations Manager	Johnson & Johnson Health Care	Hospital, medical, surgical supplies, and integratec health management services	United States
*	*	Defense Logistics Agency	Supply, distribution, and contract support to the US Armed Forces	Worldwide
William D. Lees	Vice-President of Operations	Marriott Distribution Services	Food and supply wholesale distribution	USA
*	*	ABC	Global manufacturing and marketing of chemicals	Worldwide
T. Stephen Hamilton	Vice-President Corporate Sales	Chemical Leaman Tank Lines	Transportation of bulk, dry, and liquid chemicals	USA

Note:
* Data not reported

Appendix 7- Strategic Analysis of Proposed
Transportation Management Models by Experts--Overall Results

Models	Index Score
Centralized pool of Multi-skilled individuals	100.00
Hybrid centralized model	95.34
Pure centralized model	90.58
Central outsourcing by head quarters to a professional third party logistics provider	82.87
Hybrid centralized/decentralized model	80.34
Central outsourcing by Headquarter Level of Transportation with Centralized Risk Management and Emergency Response	77.04
Hybrid decentralized model	73.67
Central outsourcing by Headquarters with single M&O contractor	68.41
Central outsourcing by Headquarters to a single M&O contractor who, in turn, outsources to one or more 3rd party logistic provider	63.56
Complete outsourcing by headquarter level of all functions	56.55
Multiple-site or field office contractors managed by a single centralized internal organization	51.72
Pure decentralized model	45.54
Multiple sites or field offices engaged in outsourcing to multiple contractors	38.71

Note: The scale used for this evaluation is as follows:

65 to 100 Points= Very Effective Performance
52 to 64 Points= Effective Performance
36 to 63 Points= Neither Ineffective nor Effective Performance
24 to 35 Points= Ineffective Performance
0 to 23 Points= Very Ineffective Performance