

Changes in Packaging/Transportation: Transitioning From a Government Program to a Corporate Business

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INTRODUCTION

The United States Enrichment Corporation (USEC) was created by the Energy Policy Act of 1992 to ensure a domestic supply of enriched uranium, to manage and operate the Portsmouth and Paducah Gaseous Diffusion Plants (GDPs) profitably, and to transition to a fully private corporation. The two-step privatization process--first a government corporation, then a private corporation--is expected to be completed within the next year. The GDPs, which have operated under the Department of Energy (DOE) and its predecessor agencies since the mid-1950s, are leased by USEC from the DOE. With the enactment of the Energy Policy Act, the Nuclear Regulatory Commission (NRC) was mandated to develop nuclear safety regulations for the GDPs. The NRC will assume regulatory oversight of the GDPs under the newly promulgated Title 10 Code of Federal Regulations (CFR) Part 76, *Certification of Gaseous Diffusion Plants* in 1996 (10CFR1995). During the transition period, regulatory oversight is being performed by DOE under the terms of the lease agreement between USEC and DOE. Like other parts of the uranium enrichment enterprise, the packaging/transportation program has been undergoing many changes during the privatization process. The purpose of our paper is to discuss the issues associated with transitioning the packaging/transportation activities of a government program--one that is self-regulated and tied to a large government bureaucracy--to those of a corporate business regulated by external groups and challenged with the need to be competitive in a complex international market.

DEVELOPING A REGULATORY INFRASTRUCTURE

Making the transition to an independent corporation has created challenges as well as opportunities for USEC. Historically, DOE had regulatory oversight for GDP packaging and transportation operations, which were directed by DOE Orders. In addition, DOE had approval authority for certain packaging certificates used by the GDPs and for the quality assurance programs. The GDPs' in-transit security and emergency response programs were dependent on and incorporated with DOE national or regional programs.

USEC's challenge has been to develop its own infrastructure to handle these regulatory issues.

Regulatory compliance is a cornerstone of GDP operations and is a continuance of the emphasis on compliance found in DOE facilities nationwide. While several Federal and State agencies oversee DOE, the GDPs were under DOE's self regulation for nuclear safety and transportation safety. The transition from a self-regulated transportation program under DOE to one regulated directly by the U. S. Department of Transportation (DOT) and the NRC is still in progress. For example, DOE is responsible for nuclear safety oversight of the GDPs until NRC assumes regulatory oversight in the summer of 1996. This responsibility is outlined in the Regulatory Oversight Agreement (ROA), an exhibit of the *Lease Agreement between the United States Department of Energy and the United States Enrichment Corporation*.

USEC is directly regulated by the DOT under Title 49 Code of Federal Regulations (CFR) Part 49, Subtitle B, *Other Regulations Related to Transportation*, for shipments of radioactive and other hazardous materials. Upon its inception, USEC registered with DOT as the shipper of record and is registered with both DOT and NRC as a user of certified packagings. However, USEC continues to ship the Paducah Tiger Overpack under the DOE certification while awaiting NRC approval of the USEC's quality assurance program.

Paducah Tiger Overpack

The process of transferring to and updating the NRC certificate of compliance (CoC) for the Paducah Tiger Overpack (the "Tiger") has involved research into the history of the Tiger, its past and present CoCs, and an understanding of the upgrades needed for an application acceptable to the NRC. The Tiger was developed in 1971 as a protective structural packaging for 10-ton cylinders of uranium hexafluoride enriched to greater than 1% of ²³⁵U. When USEC began operating in 1993, both NRC and DOT certificates existed for the Tiger. DOE was the registered holder of both CoCs, and shipments were made under the DOE certificate. USEC continues to ship under the DOE certificate during the transition period. USEC's goal is to become the "holder" of the NRC certificate for the Tiger and begin shipping under the NRC certificate in the spring of 1996. This timing is compatible with the timing for NRC's approval of USEC's quality assurance (QA) plan for packaging and transportation and NRC's assumption of regulatory oversight of the gaseous diffusion plants.

To update the NRC certificate for the Tiger, it was necessary to review the changes that had been made to the packaging and the documentation of those changes. The DOE certificate had been revised several times to reflect minor packaging modifications, as well as changes to the reference documents. Documentation changes included recording updates to procedures, and revisions to the American National Standards Institute (ANSI) N14.1-1990, *Uranium Hexafluoride - Packaging for Transport*, (ANSI 1990) and the guidelines found in *Uranium Hexafluoride: A Manual of Good*

Handling Practices, (USEC-651 1995). In addition to these revisions to the documentation, a more substantive revision was necessary, that of updating the drawings for the Tiger. Several different purchases of Tigers had been made since 1971, and the DOE certificate reflected the various procurement drawings. Developing "as-built" drawings for the Tiger for inclusion into the NRC certificate was determined to be the most straightforward method to incorporate and clarify the variations in the packaging design. Within a 4-month period, USEC developed the new drawings and conducted inspections of each of the 70 Tigers in service, to verify that the new drawings reflected the overpacks' critical dimensions and features. USEC expedited the drawing preparation and overpack inspections to coincide with the process for NRC approval of the packaging and transportation QA plan.

Packaging and Transportation Quality Assurance Program

The regulations contained in 10 CFR 76(g) require full compliance with 10 CFR 71, *Packaging and Transportation of Radioactive Material*, with requirements for NRC approval of a QA plan. Prior to the issuance of 10 CFR 76, the need for an NRC-approved QA program had been recognized and a requirement for one was included in the ROA. The effort to transition the existing QA program to one that meets the requirements of 10 CFR 71 has had three main phases: (1) appraisal of the existing quality assurance program for packaging and transportation, (2) development of a quality assurance plan, and (3) implementation and assessment of the newly developed plan.

Phase I required that USEC look at the existing packaging and transportation QA program with a fresh perspective and new guidelines. The new program was designed based upon 10 CFR 71 and the NRC Regulatory Guide 7.10, *Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material* (NRC 1986). An independent appraisal had several findings, the most critical of which was the need for integrating the packaging and transportation QA with the plant-wide QA program. Other findings were that the configuration management program for packaging was not tied to the overall configuration management program, resulting in poor awareness at the plants of the safety significance of packaging, the lack of a well-defined records management plan, the need for upgrades to procedures, and the need to review training, to ensure these changes were being communicated to the workers.

A major stumbling block to a successful, NRC-approved program was the lack of a unified plant and packaging/transportation QA program. The existing programs for packaging and transportation developed had focused on a transportation safety function, located in the Safety and Health division at both plants. Quality assurance for packaging and transportation was loosely tied to the plant QA program, with the main interface being an annual program audit. The plants' packaging/transportation organizations subsequently have been changed, to separate the QA responsibilities from those of line management.

In Phase II, USEC developed a QA program, which followed Regulatory Guide 7.10 and incorporated the changing organizational structure at the GDPs. Since the existing programs were in need of revision and had significant differences, an entirely new plan was written. The USEC document, *Radioactive Material Packaging and Transportation Quality Assurance Program*, was drafted, building on the knowledge gained from the appraisal (USEC 1995). This document was submitted to the NRC for review in September 1995. As this document took shape, a separate plan for implementing the changes necessary to ensure programmatic compliance also was developed. The implementation plan is the GDPs' road map for Phase III of the project.

In Phase III, USEC focused on correcting the programmatic weaknesses identified earlier, to ensure the packaging/transportation QA program is effective at the GDPs. As mentioned above, packaging and transportation programs are being integrated with the overall plant QA program and organization, which is a significant departure from prior plant practice. Plant-wide recognition of the safety-significance of packaging and its incorporation into plant configuration management is also a new way of business at the GDPs. Programmatic upgrades in the records management, procedures, and training areas occurring at the GDPs are addressing deficiencies identified earlier.

Assessment of the effectiveness of the implementation of the QA program is the last step. The GDPs are reviewing identified deficiencies to verify that the corrective actions have been taken in the workplace. This assessment phase also is reviewing the documentation of the implementation of the QA program, the upgraded procedures, and the quality records. This internal assessment is being performed in preparation for future NRC inspections of the QA program. USEC will continue internal reviews and assessments to ensure the safety and compliance of USEC packaging and transportation.

In-Transit Security and Emergency Plans

In addition to the QA program, NRC is reviewing USEC's In-Transit Safeguards and Security Plan. In developing this plan, upgrades have been necessary in the documentation of practices and agreements with other shippers and receivers. An In-Transit Emergency Plan also is being developed, and an emergency exercise for shipments between the plants at Paducah and Portsmouth is scheduled to occur this fiscal year.

To manage these regulatory issues, USEC has developed an infrastructure that is more flexible than one customarily found in a government bureaucracy. With fewer layers of management, decisions and information exchanges can be made more quickly, for more efficient interactions with the regulators. Challenges such as packaging certification and QA program development have been met quickly and successfully by USEC.

STREAMLINING PROGRAM MANAGEMENT

In addition to the challenges found in developing its own regulatory infrastructure, USEC has found opportunities in its ability to manage the plants in a streamlined manner. Several changes in the management structure of the USEC packaging/transportation activities have occurred in the 2-plus years that USEC has been in existence. Before USEC was created, the plants had been operating in a compartmentalized fashion and this lack of a coherent packaging/transportation program created problems in communication and accountability. Through a continuing emphasis on coordination among transportation managers at both GDPs and USEC-Headquarters, a once-splintered group of activities has become a bona fide program, with regulatory compliance, efficient operations, and clearer lines of authority.

The relationship between USEC and its operating contractor, Lockheed Martin Utility Services (LMUS), also has changed, in preparation for NRC certification. The current lines of authority have the transportation management reporting through the LMUS plant manager to the USEC Vice President of Production. Under the former reporting system, the transportation activities were governed and supported by both corporate and DOE managers and staff at the plant sites; the Oak Ridge, Tennessee, offices; and the DOE-Headquarters offices at Germantown, Maryland, and Washington, D.C. Comparing the former system with the current, more streamlined system illustrates how the program under USEC can be more flexible and decisive than it could have been previously.

This restructuring and improved coordination have been instrumental in USEC's fast response to and resolution of a myriad of problems and complex issues. An example of the positive results of this is the collaborative response made to the 21PF-1 overpack dilemma. With an entire fleet of overpacks suddenly taken out of service last year by the regulators, the Portsmouth plant had to quickly change its method for inspecting overpacks; develop a database of equipment, its certification status, and ownership; change its mode of assigning overpacks to shipments; establish a system for notifying overpack owners; substitute and/or lease equipment when necessary; and respond to inquiries and inspections by DOT and DOE. All of this was done in an effort to keep shipments on schedule with as little disruption to the receiver as possible. This year, as regulatory problems surfaced with another fleet of overpacks, USEC developed a plan to evaluate options for a correction for those overpacks, resulting in renewal of regulatory approval for their use.

ACQUIRING NEW SHIPPING RESPONSIBILITIES

A major new responsibility for USEC has been the implementation of the agreement between the United States and the Russian Federation for the purchase of uranium derived from former Soviet Union dismantled weapons. The United States agreed in principle to purchase over 15,000 metric tons (MT) of low enriched uranium (LEU) over a 20-year period beginning in fiscal year 1994. The material is being produced by blending LEU with 500 MT of highly enriched uranium (HEU) obtained from dismantled former Soviet

Union nuclear weapons. The dismantling of the weapons and the conversion/blending process is being done in Russia. The agreement between the United States and the Russian Federation stipulates that USEC will obtain about 300 MT of LEU for the first 5 years and about 900 MT of LEU for the remaining 15 years. The initial deliveries began in FY 1995, with the first shipment arriving at the Portsmouth plant in June. Several more shipments have been received, and all 10 of the contracted shipments are anticipated before the end of calendar year 1995.

The challenges inherent in this effort have been the procurement of packaging, its delivery to Russia, and the scheduling, logistics, and coordination with external groups in making the shipments and importing the material. The conditions of the agreement require USEC to provide and ship cylinders, overpacks, sample containers, and other hardware to Russia; the Russians to fill the cylinders and sample containers; and USEC to analyze the samples, accept the material, and provide transportation services from St. Petersburg, Russia, to the USEC Portsmouth plant. To support the hardware requirements, USEC purchased 500 new cylinders and 120 new overpacks. The limited supply of 1S sample containers has been an issue because of difficulties in procuring containers with the American Society of Mechanical Engineers (ASME) code stamp required by ANSI N14.1. To address this problem, USEC requested and received an exemption from the DOT and will purchase new containers without the code stamp as soon as the 1995 ANSI N14.1 standard (which deletes the requirement for the code stamp) becomes effective.

Planning and implementing the shipments from Russia were at first a challenge but as more shipments have occurred, the effort has become manageable, if not routine. To facilitate the planning, USEC established communication mechanisms between the Portsmouth plant and the USEC shipping agent. Integrated planning schedules were developed by the plant, which help track the key elements of each shipment, determine whether the inventories are adequate, efficiently use the hardware, and keep updated as to the status of the overall program. Close coordination between USEC and the Department of Commerce (DOC) and the U.S. Customs Service at the incoming port has been necessary, to fulfil DOC's import clearances and documentation requirements and the Customs offices' import accountability and harbor maintenance requirements.

Planning and implementing the Russian shipments have prepared USEC for an expanded role in providing transportation services to customers. Customer contracts historically stipulated that the customer was fully responsible for all shipping arrangements. The plant's role was limited to the responsibilities of the shipper in proper packaging, labeling, inspection of vehicles, and preparation of shipping papers.

FOCUSING ON CUSTOMER SATISFACTION

As USEC is focusing on competing in an international market, it is developing ways to be more flexible in responding to customer needs, including the offering of transportation services and provision of packaging for customer shipments. While the responsibilities of the shipper have not changed, USEC has had to implement new actions, e.g., acquisition

of export licenses, developing agreements with customs brokers, and negotiating contracts with shipping agents. By acquiring these new responsibilities, USEC has had to develop an enhanced integration among the groups involved in packaging, handling, and transportation of its product. This close cooperation has been necessary to ensure that orders are scheduled, filled, and delivered in a smooth and efficient manner.

The concept of customer satisfaction was not salient to the uranium enrichment plants' operations before USEC was established. Many of the various areas of the plants operated with little interaction with each other and without a unifying vision of how their work related to the ultimate customers--the utilities. The plants operated in the "need to know" culture that was a legacy of their having been defense production facilities. For instance, those responsible for assigning cylinders and overpacks to a customer order and scheduling shipments were not required to communicate that information to the traffic department before the shipping date, yet the traffic manager was responsible for ensuring that all shipments were made in certified packaging. Having these responsibilities compartmentalized created barriers to a smooth and efficient process of filling an order and preparing it for shipment.

Since USEC's inception, several changes have been made to address these inefficiencies. A major accomplishment has been made in reducing the order process cycle time, thus saving the customers time and money in acquiring their material. (The fuel cycle is so intertwined that a bottleneck at one step in the process can cause delays at the next step.) To make deliveries even more efficient, the traffic department is represented now in planning sessions of the order management department and a close coordination between these two groups has resulted in successful management of rush orders and rapid responses to the various issues that have emerged.

In an effort to continuously improve its responsiveness to customer needs, USEC has implemented a survey of its fuel cycle partners--the carriers, shipping agents, feed suppliers, and fuel fabricators with whom USEC interacts. Feedback from this survey is being used to develop a streamlined delivery of orders and a flexible process for meeting special customer requests. This, in addition to the new offering of transportation/packaging services to its customers, is all part of the effort in including customer service/satisfaction as a key goal, along with safety, environmental and public health, and cost-effective production.

SUMMARY

In summary, just as the Energy Policy Act put into motion many changes in the way the GDPs are managed, operated, and regulated, the packaging /transportation program has undergone considerable change as well. These changes have been effected through developing a regulatory infrastructure, streamlining program management, implementing new roles in international shipments, and initiating a customer service focus. Much progress has been made during the transition, and new challenges and opportunities await as USEC looks forward to full privatization.

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