

WASTE DISPOSAL AUGMENTATION AT RFETS

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ABSTRACT

In 1995 the mission for the Rocky Flats Environmental Technology Site (RFETS) was changed from resumption of plutonium operations to site closure. To support this new mission, augmentations to the waste disposal operations were necessary to accommodate the large volumes of waste materials to be shipped for off-site disposal. It was recognized that successful site closure would involve the shipping of tremendous volumes of waste off-site for disposal. This would necessitate changes to the RFETS infrastructure and the administration of new contracts for the services of various disposal facilities: changes which would require significant cultural modifications. Since the overall funding for the RFETS facility was generally being reduced yet site closure was being accelerated, new teamwork relationships were required so that waste generation and waste disposal processes worked together efficiently and cost effectively.

Current data demonstrates that recent augmentations are proving beneficial, although as the decommissioning and site closure proceeds, new challenges will need to be overcome. Most likely, as the legacy wastes currently stored on-site are disposed of, there will be many smaller waste streams which have yet to be generated, characterized, and shipped for disposal. These smaller volume waste streams will require more resources and will realize a lower efficiency due to their small size. Additionally, there will be several very large waste streams, which, while technically routine, will present a challenge because of their size. Nonetheless, it is anticipated that the waste disposal team recently assembled will be flexible and capable of supporting disposal of the waste volumes associated with site closure, which are projected to be an order of magnitude beyond the current shipping volume.

INTRODUCTION

During production at RFETS, huge volumes of waste materials were routinely shipped off-site for disposal. Since the Department of Energy (DOE) initially was not under the jurisdiction of RCRA regulations, shipping activities were conducted in a relatively unimpeded manner with minimal costs. Radioactive wastes were shipped to the Nevada Test Site (NTS) without consideration of hazardous constituents. Trans-Uranic (TRU) wastes were shipped to Idaho National Engineering Laboratory (INEL) for storage.

Because the DOE was not required to comply with RCRA regulations, minimal resources were allocated to waste disposal activities. This condition was reflected in the funding and staffing levels for waste disposal and compliance.

It is anticipated that compliance with RCRA regulations with respect to site closure will drastically impact the RFETS waste disposal infrastructure.

TRANSITION PERIOD

Between 1989 and 1990, the DOE complex enacted a self-implemented policy of adherence to the RCRA regulations. At this time there was increased political and social sensitivity toward

environmental issues. This climate had direct negative impacts on waste disposal activities as the DOE prohibited all but the most routine Low Level Waste (LLW) shipments from RFETS. Consequently, large amounts of waste materials were stored on-site. To accommodate the storage of these waste materials, the Waste Management department's primary focus was the operation and maintenance of temporary storage facilities. Since the mission at RFETS remained as a production facility, funding was focused toward weapons production and product inventories. Therefore, the management of waste materials was primarily directed towards removal from the production buildings for storage.

Meanwhile, programs were developed to address the highly regulated environment concerning disposal of the waste materials being generated and stored. It is estimated that more than \$20 million were expended on program development before waste shipments resumed. In 1991 waste shipping resumed, although at very low volume rates (significantly less than 100 cubic meters per year).

MISSION CHANGE

In 1995, the mission was officially changed from weapons production to site closure. It was clear that the shipping rate needed to be increased significantly to support site closure by 2010. To support this closure schedule, since 1996 specific waste volumes have been targeted for shipment each fiscal year. Figure 1 presents the actual waste volumes shipped for disposal from fiscal years 1991 to 1998. This figure demonstrates significant increases in waste shipments since 1995 following the change in mission.

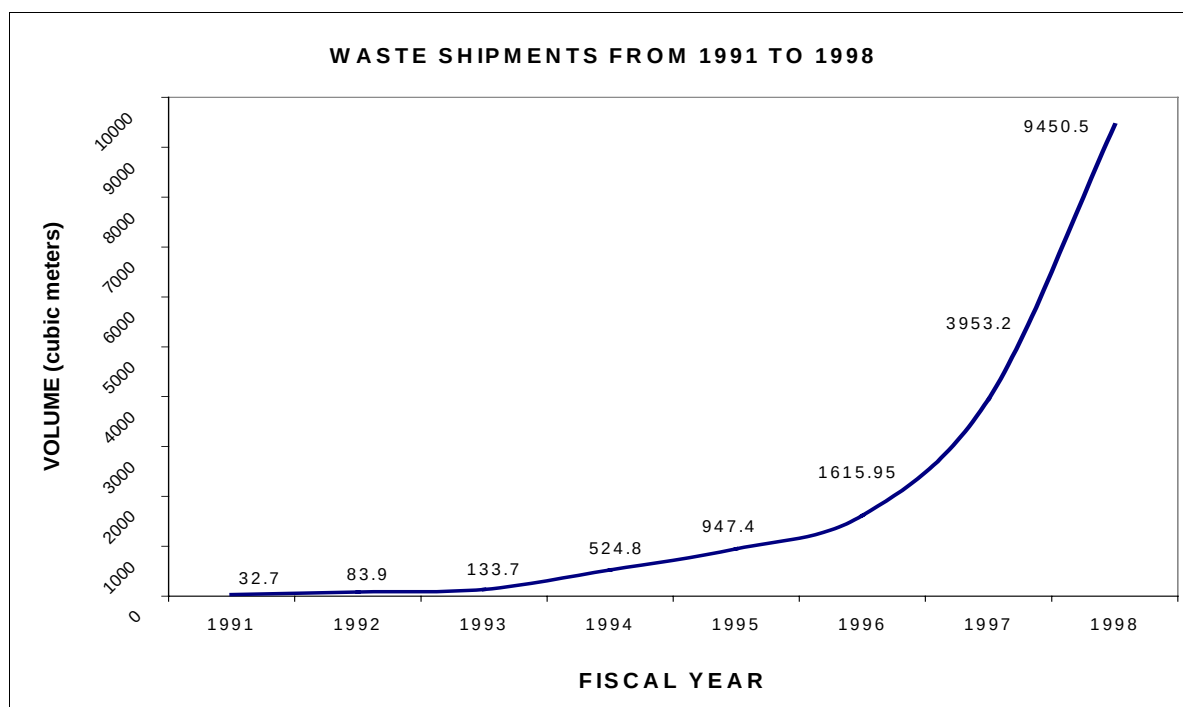


FIGURE 1. WASTE SHIPMENTS FROM 1991 TO 1998.

The majority of the wastes shipped to date have been legacy wastes stored since 1990. Although much of the legacy waste can be readily certified for disposal, some of this waste still requires extensive preparation prior to certification and disposal. Preparation activities have involved significant resources and time, yet the net result has been the shipment of volumes of waste beyond the initially scoped targets for each fiscal year.

The increases in waste volumes shipped in 1996, 1997 & 1998 are directly related to this realization that site closure is contingent on waste shipped off-site. This realization is reflected at all levels of oversight and management at the facility, as discussed below. Additionally it is demonstrated in current funding levels and resource allocations.

In addition to increased funding and reallocation of internal resources, independent contracts with waste disposal facilities were required. During the years of production, waste disposal was accomplished through agreements with other DOE facilities for non-mixed LLW, non-radioactive waste was disposed through a contract negotiated among several DOE facilities and LLMW had never been shipped since the DOE had not accepted regulation under RCRA. As stated above, this created a growing inventory of LLW and LLMW waste. It also set the stage for a cultural change when off-site shipping became a site priority.

As the newly developed waste disposal program was implemented during the last quarter of the 1995 fiscal year, disposal costs per cubic meter were unacceptably high. Due to reduced site budgets, it was essential to identify productivity improvements necessary to achieve the desired shipping rates within limited funding. As a result of the changes implemented at RFETS, the disposal costs per cubic meter have moderated significantly over the past two years, as is shown in Figure 2. This moderation coincides with the DOE's contract award to the Kaiser-Hill Team to implement the site's new mission. As part of the Kaiser-Hill Team's reorganization of the facility's infrastructure, the waste disposal group was changed from a large, inefficient, and non-specialized organization to a much smaller, highly specialized organization with a focused work scope. This smaller organization was then strategically augmented with experienced sub-contractors. Furthermore, increased training was provided for personnel involved with waste shipping.

Additionally, through a series of improvements in both the on-site preparation activities and off-site contracts, RFETS has been able to reduce the dollar per cubic meter costs from a high of \$380,000 per cubic meter in 1990 to \$5,000 per cubic meter in 1998. Note that the values in Figure 2 exclude sanitary landfill wastes since these wastes do not present a significant impact to the site's infrastructure.

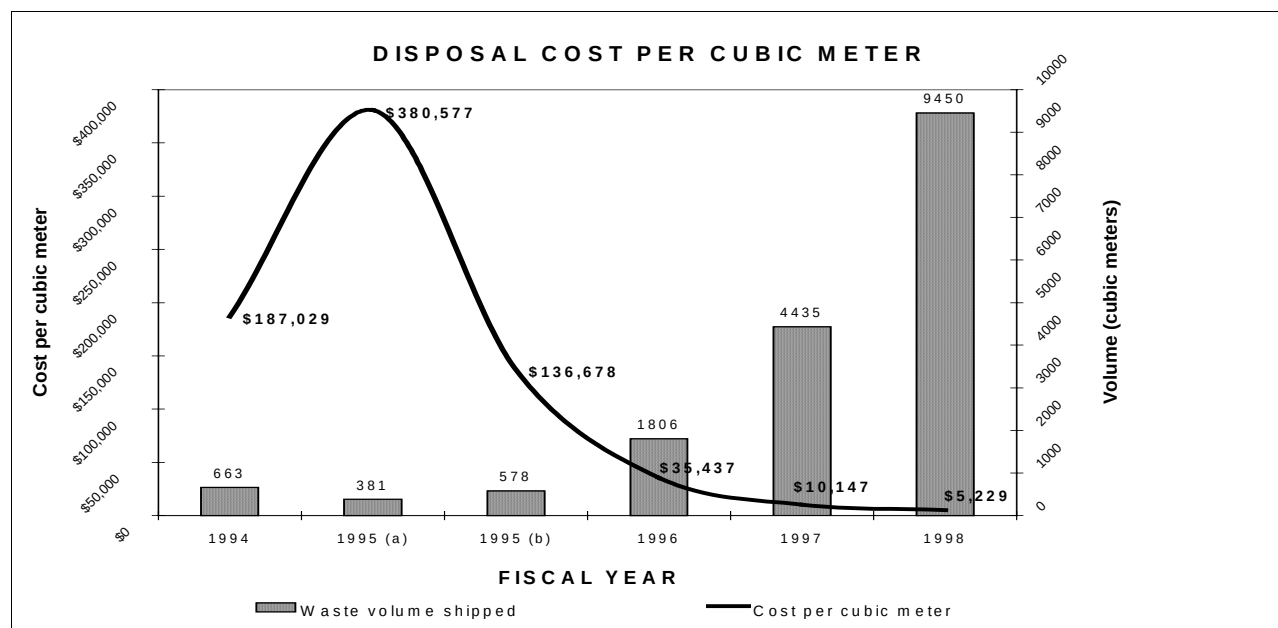


FIGURE 2. DISPOSAL COST PER CUBIC METER.

Specific improvements contributing to this dramatic reduction are as follows:

- A team relationship was fostered between the traffic department, waste certification, waste disposal, and waste operations departments in a manner to most efficiently provide services for waste preparation, certification and shipping. This relationship is new in the sense that these groups previously operated independently with little attention toward effort coordination on a large scale. Furthermore, effective July 1995, the site structure was changed from an M&O contract to an Integrating Management Contract (IMC) under Kaiser-Hill, L.L.C. This resulted in several highly specialized contractors working together on new and complex shipping processes. While the integration was difficult initially, the diverse contractors have developed into a team with the common goal of shipping the maximum volume of waste at a significantly lower average cost.
- Contractor support has been secured to provide waste certification services and to augment the waste disposal and waste operations groups. This support includes personnel from the waste handling industry who bring many years of experience addressing unique waste disposal problems. Under the IMC enacted in July of 1995 there was a concerted effort to replace long term production employees with specialized personnel who could be rapidly assigned to specific projects. The shipping project was chosen as one of the first groups to implement this policy. Currently over 50% of the personnel in the shipping organization are “staff augmentee” subcontractors brought in for the express purpose of shipping the large volumes of waste required for site closure.
- Members of the traffic, waste certification, and waste disposal departments have been provided with specific training on Department of Transportation regulations governing hazardous waste, radioactive waste, and mixed waste shipping. In order to take full advantage of the opportunities afforded through the commercial sector, it was recognized that additional training would be required for all team members. Therefore, advanced training in

- DOT regulations has been provided for all team members. This has also presented opportunities to compare and contrast our shipping program with other facilities. It also created contacts with key disposal facility personnel; which has been a great benefit.
- A consolidated contract with the Envirocare disposal facility is maintained by Kaiser-Hill. This contract provides a turn-key service to include transportation, thereby reducing the burden on the RFETS infrastructure.
- Lower treatment and disposal costs were secured due to long-term / high-volume shipping commitments with disposal facilities. Not only have disposal costs to Envirocare been reduced on a cubic volume basis, but disposal costs with NTS have dropped from \$17/ft³ to \$7.50/ft³. Similarly, large volumes of metals and equipment have been sent for metal melt to further reduce burial volumes and therefore burial costs.
- Further investigation is being conducted to pursue additional innovative disposal paths such as contracts to incinerate waste oils.

Another significant on-site improvement was to batch-prepare large volumes of legacy mixed waste in an assembly-line manner and routinely maintain a shipping rate exceeding 10 (200-300 cubic meters) shipments per week. This strategy required the development of a well-defined shipping process and enabled the team to collectively experience the learning curve and develop practical and effective solutions to problems encountered. This focused approach, along with the well-orchestrated on-site groups, has yielded the most effective use of resources toward the shipping volume milestones targeted for each of the past two years.

One large waste stream (13,000 cubic meters) in particular required that each container be opened and inspected in order to be certified for disposal. This unusually large effort required specific coordination between the waste certification and operations departments while each department continued to support their other assigned activities.

Similarly, through the improved training and the assignment of specialized teams to the shipping project, RFETS was able to increase the number of cubic meters shipped per Full Time Equivalent (FTE) employee from a low of 0.5 cubic meters in early 1995 to 41.6 in 1998. Figure 3 demonstrates this trend in operational efficiencies.

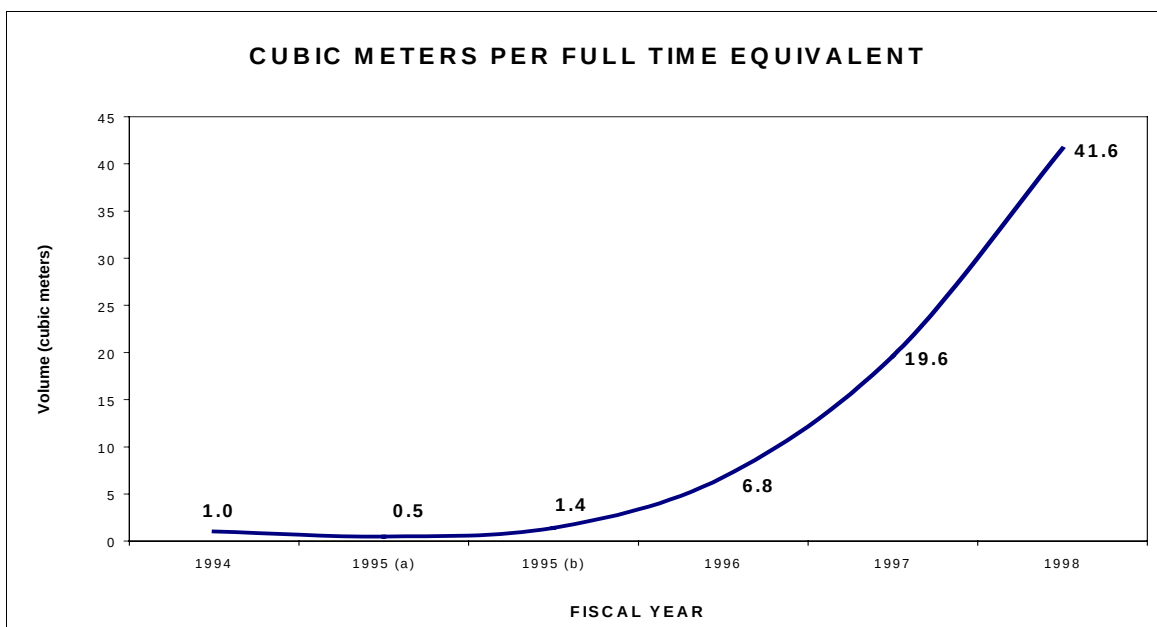


FIGURE 3. CUBIC METERS PER FULL TIME EQUIVALENT.

ANTICIPATED CHALLENGES

As the mission change was implemented, various closure plans were developed until an Integrated Site Closure Plan was adopted as a baseline for closure activities. This plan identifies baseline waste volumes, by waste type, for each fiscal year from 1999 to 2010 and is summarized in Figure 4. Note that waste disposed at sanitary landfills are a large contributor to the site's overall waste volumes through closure (up to 50%). This is primarily due to building demolitions. However, as the site closure process continues, future characterization of certain large buildings may require that waste currently identified for landfill disposal be handled as regulated waste.

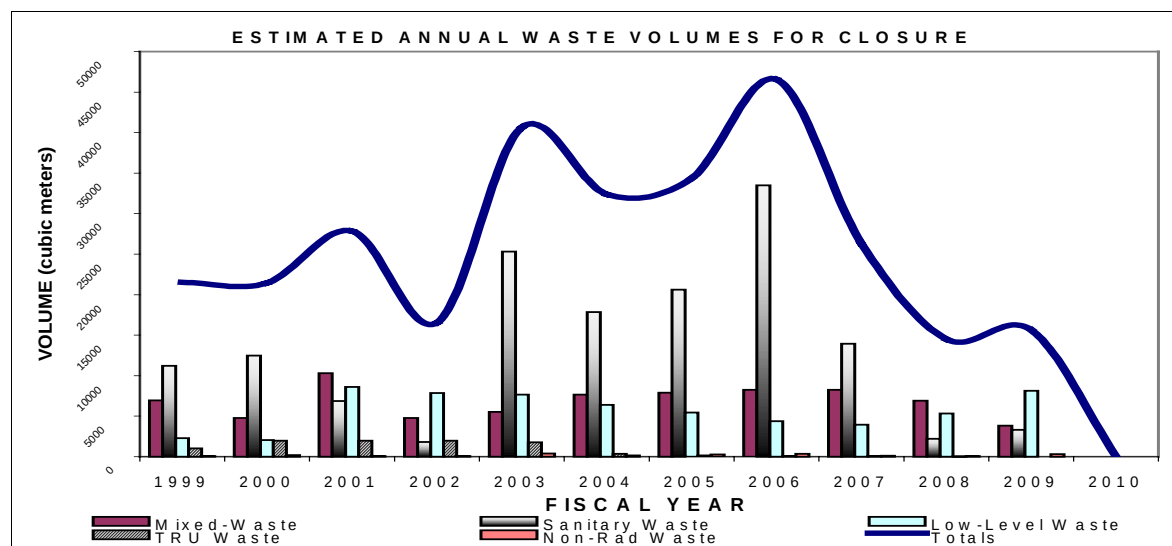


FIGURE 4. TOTAL WASTE VOLUMES FOR CLOSURE.

Because regulatory issues associated with wastes other than sanitary landfill wastes, it is expected that these other “regulated” wastes will pose the greatest impact on the RFETS’ waste disposal infrastructure. As each of the facilities / buildings are decommissioned and dismantled, portions of the resultant waste streams may be unique and require specific characterization and disposal protocols.

MEETING THE CHALLENGE

In order to address the challenges yet to be encountered during site closure, the following mechanisms are being pursued:

- A customer services group was formed to work closely with waste generators so that newly generated wastes can be readily characterized and certified for disposal.
- Additional disposal facilities are being investigated so that future contracts may be more competitive in nature.
- Alternative treatment avenues have been and will continue to be researched.
- The size and configuration of the workforce will be adjusted as necessary to accommodate the accelerated closure mission.
- Alternative transportation methods (e.g. rail) for bulk wastes will continue to be evaluated.
- Continuation to work as a team with the DOE and the contractors to support closure.