

Sustainable Disposition of Unneeded Materials and Chemicals at Y-12 National Security Complex – 15181

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ABSTRACT

The Y-12 National Security Complex (Y-12) strives to integrate sustainability into all aspects of operations. In 2006, Y-12 conducted a site inventory to identify Unneeded Materials and Chemicals (UMC). The final inventory included over 9,400 materials and equipment and over 9,000 chemicals. A cross-functional UMC Project Team (Team) was established to manage and facilitate disposition of inventory items. A Site Plan was developed to outline the strategy to methodically disposition UMC's with the commitment to put sustainability practices first. The Team works to overcome challenges and find new lives for inventory items prior to dispositioning the materials as waste. Cost-effective strategies are used to transfer UMC items to a new owner. The Team utilizes a systematic disposition evaluation process, which does not simply manage UMC's as waste but focuses on reuse with waste disposal as last resort. The dedicated efforts of the Team to divert items from disposal as waste are reflected in the results. Through Fiscal Year 2013, 35 percent of all chemicals and 55 percent of equipment and materials have been reused or recycled. Through Fiscal Year 2013, the Team has dispositioned over 9.62 million pounds of materials (11,600 items) and downposted over 97,000 square feet of radiological areas. In Fiscal Year 2014, a UMC Phase II inventory was developed to address UMCs that have accumulated since the original inventory was finalized. Lessons learned from the original UMC scope are being applied to phase II activities.

INTRODUCTION

The Y-12 National Security Complex (Y-12) strives to integrate sustainability into all aspects of operations. In 2005, the NNSA administrator issued a memo to all NNSA offices directing each organization to implement the "Strategy for the Management of Unneeded Materials and Chemicals (UMC)." This strategy included requirements for budgeting and funding the disposition of UMC's and developing site-specific plans. Y-12 wholeheartedly embraced the opportunity to sustainably disposition UMC's.

In 2006, Y-12 conducted a site inventory to identify UMC's. Materials and chemicals without a designated future use were deemed unneeded. UMC labels were applied to the inventory items, over 9,400 materials and equipment and over 9,000 chemicals. Most chemicals had exceeded their shelf life, were not usable, or were no longer used at the Y-12 complex.

DESCRIPTION

A cross-functional UMC Project Team (Team) was established to manage and facilitate disposition of inventory items (Figure 1). A Site Plan was developed to outline the strategy to methodically disposition UMC's with the commitment to put sustainability practices first.

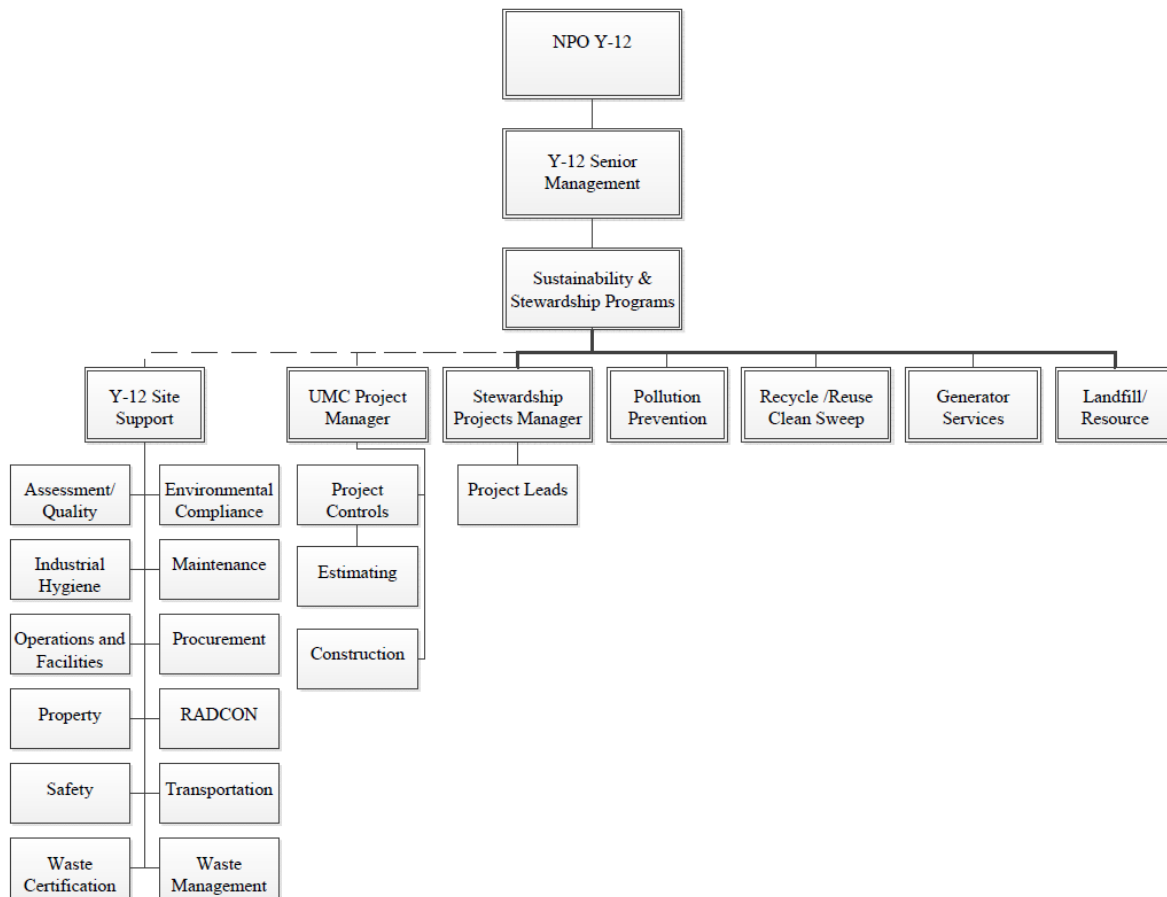


Fig. 1. Y-12 UMC Project Team.

Dispositioning items at Y-12 can be challenging because of radiological and chemical conditions that may severely restrict or dictate disposition methods that may be used. The Department of Energy (DOE) Suspension on unrestricted release for recycling of metals from a radiological area continues to impact recycle consideration. Other constraints result from potential beryllium or polychlorinated biphenyl (PCB) contamination, which require extensive characterization, equipment history research, and/or evaluation of sampling results to determine proper disposition methods.

The Team works to overcome challenges and find new purposes for inventory items prior to dispositioning the materials as waste. The Team utilizes a systematic disposition evaluation process, which does not simply manage UMC's as waste but focuses on reuse with waste disposal as last resort. Y-12 first tries to identify another use within Y-12, within DOE, within government, through sale to public, through recycle, and finally through waste disposal. The Team uses cost-effective strategies to transfer UMC items to a new owner.

Overall goal of the UMC Program is reuse of existing resources while providing cleaner/safer facilities and improved compliance. Not only is the disposition of UMC's beneficial to human health and environment, but it also supports Y-12's goal of freeing existing space for other purposes and environmental management system objectives and targets.

Routine meetings are conducted between the points of contact and Team representatives to prioritize the disposition of the UMC inventory; determine and implement the appropriate disposition method; monitor the costs and schedule; update the UMC inventory, and identify any challenges. The Team interfaces with the Y-12 Reduce, Reuse, Recycle Team as necessary. When determining disposition priority and path, the following are considered: potential safety, health, and environmental issues; items or conditions not meeting regulatory requirements (i.e., storage requirements); items stored outside (housekeeping concerns, stormwater impacts, etc.); items that can be used by upcoming projects/programs; items with historical significance; items utilizing space needed for other uses; and items that can be easily excessed or recycled, and generate revenue or cost avoidance.

Based on these considerations and available funding, a prioritized project listing by year has been developed to document the proposed disposition schedule for the entire inventory. At the current funding levels the disposition of the UMC 2006 inventory is projected to be complete in Fiscal Year 2019. On an annual basis, a detailed schedule and estimate are developed for the current year priority projects.

The UMC Program is a part of the Sustainability and Stewardship (S&S) Organization. UMC Project Leads leverage the abilities and resources of the other S&S programs such as Generator Services and Recycling to complete disposition activities as efficiently as possible. The project leads continually improve project execution methods as the inventory disposition efforts progress. Lessons learned during project execution are applied to future efforts. Protocols have been established to streamline characterization and disposition of materials.

As the project leads begin the prioritized UMC project activities each year, the UMC inventory items must first be located. Locating the items can be challenging because of the movement of items over the years and the low level of item detail included in the 2006 inventory. Often the items were only identified at the building level and key details such as property numbers were sometimes omitted. Project leads work with UMC custodians such as facility engineers, to confirm the identity, location, and current status of inventory items. A listing of confirmed UMC inventory items for each project is submitted to Export Control for review to determine if there are any additional release requirements for the items. Each item is then evaluated to determine what steps are required for proper characterization. Surveying, sampling and analysis are completed as appropriate. The project leads meticulously document the process knowledge for each item. The item then goes through the systematic disposition evaluation process outlined in Figure 2.

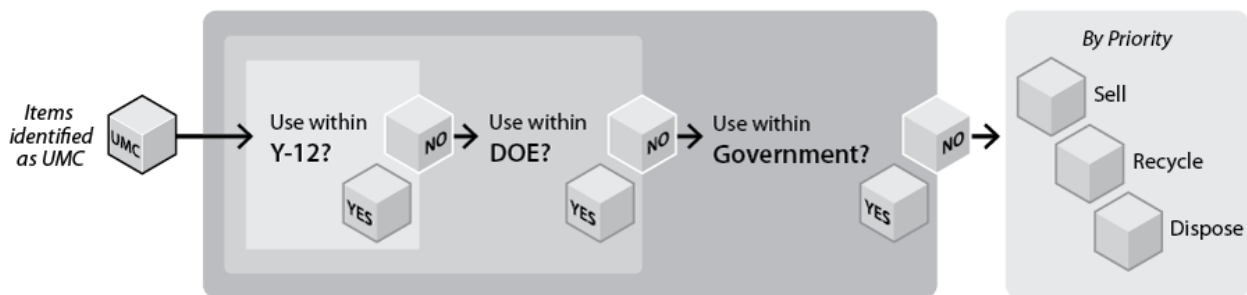


Fig. 2. Management and disposition of UMCs

Project leads coordinate all the activities required to process and disposition each item based on the results of the evaluation. A high level of collaboration is required between multiple skilled crafts to ensure that materials are processed safely and efficiently. Project leads submit all required service notifications, task work authorizations and scopes of work and oversee the work throughout the disposition process. Before and after pictures are taken to illustrate the results of UMC activities. Recovered floor space in Production facilities is typically put to use quickly for mission needs.

DISCUSSION

The dedicated efforts of the Team to divert items from disposal as waste are reflected in the results. Through Fiscal Year 2013, 35 percent of all chemicals and 55 percent of equipment and materials have been reused or recycled. To date, the Team has dispositioned over 9.62 million pounds of materials (11,600 items) and downposted over 97,000 square feet of radiological areas. This is due in part to pollution prevention techniques being fully integrated into the disposition of the UMC inventory.

Whether large or small in size, each UMC item presents unique disposition challenges. A 1953 80 ton locomotive was on the inventory. The locomotive had detectible beryllium levels due to the natural composition of the metal. The batteries and fluids were removed from the locomotive and recycled. The locomotive was encapsulated with some excess paint and sent for recycling (Figure 3). This recycling activity diverted 150,000 pounds of scrap metal from the landfill.



Fig. 3. 1953 Locomotive

The Team was faced with a different set of challenges in order to safely disposition approximately 60 kilograms of unneeded pyrophoric chemicals. The properties of the pyrophoric chemicals in powder form made the chemicals dangerous to handle. The Team worked with Development personnel to develop a technique to passivate the materials to facilitate safe handling. Approximately 99.9% of the materials were converted to a usable, passivated form for reuse in a new on-site process that is located in an area previously cleared by the Team.

The site's rich history goes back to the Manhattan Project. The project team has diligently worked to preserve items with historical significance. Two rare 1940's era railroad tanker cars were on the inventory. The tanker cars had varying degrees of radiological contamination that made waste disposal the obvious choice but the Team was determined to preserve the tanker cars. The tanker cars were able to be decontaminated. The decontaminated cars were then transferred to Southern Appalachia Railway Museum for preservation.

UMC Phase II

The NNSA 2005 UMC directive required that all inventories be finalized in September 2006. Additional items identified at a later date could not be added to the original 2006 UMC inventory. Despite existing programs to disposition excess materials, unneeded materials and chemicals have continued to accumulate since the 2006 inventory was created. Projects have not typically budgeted to disposition unneeded materials/equipment once the items have been replaced with new materials/equipment. Additional UMCs will be identified on an ongoing basis as the site transforms to meet changing mission needs.

Based on the Team's success in dispositioning the UMC 2006 Inventory items, a UMC Phase II inventory

was developed in Fiscal Year 2014. Lessons learned from the 2006 inventory effort were applied to the new inventory process. Site wide walk downs were coordinated and led by a single point of contact in order to develop a consistent and comprehensive inventory. The out of service property and standby production lists were also reviewed for items that should be added to the UMC Phase II inventory. The hazardous material inventory system records were evaluated to identify area specific chemical inventory levels that appeared to be static which indicated a lack of use/need. Specific customer concerns were also addressed within the inventory process.

The Sustainability and Stewardship Information Management System (S2IMS) was developed to track the Phase II inventory items from identification through disposition. Each inventory item was labeled with a unique project identification number that links the object to the applicable S2IMS project (Figure 4).

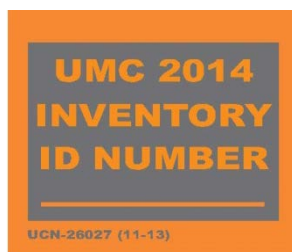


Fig. 4. UMC Phase II Inventory Label

UMC Phase II inventory items will be maintained in the generators' areas to reduce double handling and maintain process knowledge. Established centralized disposition areas will be utilized for the Phase II items where feasible to increase the efficiency of disposition activities while maintaining the focus on reuse and recycling.

The S2IMS is being used to track the inventory. Each project in S2IMS will include a risk-ranking score, cost estimate, funding status and source, and current status. Each S2IMS project includes specific information related to each inventory item including the item name, thorough description, property number, detailed location, and custodian name. The high level of detail in S2IMS provides process knowledge for use when the item is eventually dispositioned. Pictures and other supporting documents will also be captured in S2IMS at the inventory item level. The UMC team will evaluate the status of the projects on a routine basis. The UMC Phase II inventory has not been fixed. UMCs will continue to be added to the inventory as the items are identified. The newly developed property items under evaluation list will be reviewed periodically for potential UMCs.

Phase II inventory disposition efforts were initiated in Fiscal Year 2014 utilizing the established disposition process. The overall disposition schedule will be generated based on risk ranking and available funding.

Prevention

Increased focus must be placed on real time material disposition to prevent the ongoing accumulation of UMCs. Real time disposition provides the greatest opportunity for material reuse or recycle and reduces the potential environmental impacts from stored materials.

Site programs to disposition routinely generated excess materials have focused on improving efficiency while increasing the ease of program use for the material generators. A one call phone number has been implemented, 574-JUNK, to ensure that materials generators can easily locate assistance for material disposition related questions. The "How Do I Get Rid of Stuff" intranet site also provides guidance for

routinely generated materials.

CONCLUSIONS

Y-12 has shown through the diligent efforts of the Team that UMCs can be sustainably dispositioned from a NNSA site. The systematic disposition evaluation process has been one of the keys to the success of the UMC Program. Exploring all other disposition options prior to waste disposal has ensured that materials are not arbitrarily shipped for waste disposal because it is perceived to be the easiest disposition path. The UMC Program has reduced potential stormwater concerns and improved the visual aesthetic of the Y-12 site by cleaning up legacy outdoor storage areas. The positive impact of the UMC Program has been noted by state regulators.

UMC Phase II activities will be completed with the same commitment to sustainability practices. The Sustainability and Stewardship Organization continues to reinforce the importance of sustainable behaviors to reduce the generation of additional UMCs in the future. Changes in project funding practices to include the disposition of the old along with installation of the new are required to prevent the accumulation of unfunded UMCs.

Y-12's UMC philosophy could be utilized at other DOE and federal facilities as well as commercial facilities that need to accelerate cleanup, facilitate site transformation, and maintain a safe, clean, and more organized/secure facility. This philosophy and associated techniques will allow federal facilities to be more efficient and commercial facilities to be more competitive in the global economy while improving health and safety and minimizing environmental impacts.

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