

UTILIZING NON-REAL PROPERTY TO LEVERAGE CLEANUP ACTIVITIES AT U.S. DEPARTMENT OF ENERGY SITES

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ABSTRACT

The U.S. Department of Energy (DOE) National Center of Excellence for Metals Recycle (NMR), established in September 1997, is changing the way the government deals with scrap metal. NMR is moving from traditional service contracts that dispose of contaminated equipment and materials as liabilities to the sale of radioactive and clean materials as assets. NMR has successfully leveraged cold war legacy equipment and materials to accelerate cleanups and promote reindustrialization at DOE sites by facilitating the development and implementation of project-specific and national sales agreements. To date, these completed agreements have resulted in the recycle or sale for reuse of 10,097 metric tons of material and a saving to the government of \$5 million. The amount of material recycled/reused is expected to increase significantly in the coming years as NMR continues to work with DOE sites, regulators, and industry to expedite over 70 recycle/reuse opportunities which have been identified throughout the DOE complex.

INTRODUCTION

The National Center of Excellence for Metals Recycle (NMR) is the DOE complex-wide lead for aggressively pursuing recycle and reuse of scrap and surplus metals. Established in September 1997, this program is designed to educate, promote, and facilitate recycling and reuse opportunities. The program stands ready to assist project managers in identifying and expediting recycling activities and will provide tools to facilitate the recycling/reuse process.

The NMR has successfully leveraged cold war legacy equipment and materials to accelerate cleanups and promote reindustrialization activities at several DOE sites. The program's focus has been to move from traditional service contracts that dispose of contaminated equipment and materials as liabilities to the sale of both radioactive and clean materials as assets. NMR has succeeded in the development and implementation of project-specific sales agreements, a national sales agreement, and a national partnering agreement to get materials (where applicable) back into the commercial markets. Unrestricted release of clean materials or restricted release of

contaminated materials to licensed facilities accomplishes this goal. This approach has achieved great success in cost and waste avoidance as well as accelerated cleanup schedules.

The remainder of this paper summarizes six completed NMR projects that have successfully recycled 10,097 metric tons of materials and equipment and avoided over \$5 million in cost to DOE. Also included are a brief summary of the DOE-ORO Three Building D&D Project and three new NMR projects. These are expected to avoid disposal of at least 124,436 metric tons of material and save over \$57 million over the life of these projects. The amount of material recycled/reused is expected to increase significantly in the coming years as NMR continues to work with DOE sites, regulators, and industry to expedite over 70 recycle/reuse opportunities which have been identified throughout the DOE complex.

REUSE OF METAL PALLETS

NMR facilitated the reuse of suspect radioactively contaminated metal pallets from the East Tennessee Technology Park (ETTP) Pond Waste Management Project (PWMP), thereby preventing the unnecessary disposal of these assets. The metal pallets were originally used to store and stack PWMP drums. Prior to the sales contract, the plan was to ship the pallets to a commercial metal melt facility for disposal, at a unit cost of approximately \$1.69 per pound. Due to the increase in the reindustrialization efforts at ETTP and the facilitation efforts of NMR, a need for pallets by the commercial sector was identified and an invitation for bids was generated. Approximately 1200 metal pallets were sold to American Technologies Inc. for reuse in their facility. The pallets were sold for \$5.00 each, yielding \$6,000 in revenue for the government. Reuse of these pallets avoided the disposal of 244.29 metric tons and saved the Department an estimated \$912,638 in FY1998. Based on this success, additional pallets from the Oak Ridge Operations Office are being offered for sale for recycle/reuse.



Figure 1. Metal pallets available for reuse

MATERIAL RECYCLE AT THE TOWER SHIELDING FACILITY

NMR facilitated a sales agreement for the Oak Ridge National Laboratory (ORNL) Tower Shielding Facility (TSF) in order to recycle/reuse scrap metal and concrete rather than dispose of

these materials. The TSF was designed and built in 1954 for the Aircraft Nuclear Propulsion Project. In October 1992, DOE directed ORNL to permanently shut down the TSF. Currently, the TSF is owned and operated by the DOE EM-60 Nuclear Material and Facility Stabilization Program, and is being leased to BioNeutrics Inc. A sales agreement was signed in May 1998 for the recycle/reuse of 190.5 metric tons of clean scrap metal and 277 metric tons of clean concrete at the TSF. The initial sales agreement was for \$16,000 to be returned to the government. Later, additional concrete was added to the sale so that the final amount returned to the government was \$14,090. The metal was recycled by Southern Foundry and the concrete was reused by I-75 Crushed Stone. An additional 2.7 metric tons of activated stainless steel and 27 metric tons of concrete were sent to the High Flux Isotope Reactor Facility (HFIR) for reuse. Total waste and cost avoidance to DOE resulting from recycling these materials rather than disposing of them was approximately 497 metric tons and \$2.76 million in FY1998.



Figure 2. Before Tower Shielding Facility scrap sale



Figure 3. After Tower Shielding Facility scrap sale

SALE OF LLW DRUMS

As part of NMR's efforts to partner with industry, an agreement was put into place to sell for reuse an estimated 14,000 drums from the Oak Ridge Operations Office. This agreement also allows for the inclusion of additional drums from the DOE Complex. The vast majority of the empty drums were generated through solids repackaging efforts, sludge repackaging efforts, and liquid waste bulking efforts. Prior to the sales agreement, the MLLW drums would have been either surveyed clean and sent to the on-site landfill for disposal or sent to a commercial disposal facility. The mixed-PCB drums would have been surveyed radiologically clean and sent to a commercial facility for treatment and disposal as PCB wastes. This project made it possible to reuse these drums rather than dispose of them. All of the drums are being accepted by an industrial vendor, to be used as containers for waste being compacted at their radioactively licensed waste treatment facility. The drums will be used in place of new waste drums, which are currently purchased to facilitate compaction. In FY1998 this agreement realized a waste avoidance of 2339 drums or 53.5 metric tons and a cost avoidance of approximately \$103,000 to DOE. The cost avoidance to the industrial vendor was on the order of \$75,000 since they did not have to purchase new drums to be used at their facility. Thus, in FY1998 the total project waste avoidance to DOE was 53.5 metric tons and the cumulative cost avoidance to DOE and industry was \$178,000.

REUSE OF B-25 BOXES

B-25 boxes provide another example of how NMR is partnering with industry to meet the needs of the DOE complex. Much DOE waste is sent to Envirocare of Utah, Inc. for treatment and disposal in B-25 boxes. Not all of the boxes are required for disposal. Instead of burying these boxes along with the waste, Envirocare of Utah, Inc. and NMR have put together a partnering agreement that allows for reuse of these boxes. The driving factor in the need for these boxes across the DOE complex is the rate of cleanup, stabilization and decommissioning activities at the sites, which is on the rise. Studies completed in the mid 1990's suggest that the demand averages 5,000 plus boxes per year. Envirocare of Utah, Inc currently has 6,000 B-25 boxes available for reuse. A new B-25 box costs approximately \$600 and the reuse cost will range between \$150 and \$300 depending on transportation costs. Thus, there is a minimum savings to a project of \$300 per box and a waste avoidance of 0.36 metric tons every time a box is reused. The boxes will meet DOT "Strong/Tight" container requirements as required by the sites. The boxes can be reconditioned and recertified and will be decontaminated externally. In FY1998 35 boxes were shipped to East Tennessee Technology Park for reuse on a reindustrialization project. This represents a waste and cost avoidance of 12.6 metric tons and \$10,500 to DOE.



Figure 4. B-25 boxes awaiting reuse

WELDON SPRING SITE REMEDIAL ACTION PROJECT

In August 1997, the Weldon Spring Site was selected by the DOE National Center of Excellence for Metals Recycle to demonstrate a concept in which a sales agreement would be negotiated with a private contractor, who had an NRC License, for recycling of potentially radioactive scrap metal. A scrap metal sales agreement and a limited site license were awarded on January 12, 1998, to Doug King and Associates. The sales agreement allowed the buyer to set up operations at the scrap metal pile and then survey and identify clean metal for recycling, which could then be shipped off-site without any NRC restrictions. The Weldon Spring Project realized the positive environmental benefits of recycle and waste minimization, and the sales approach allowed the project to proceed without having to request additional funds from the shrinking DOE budget.

Approximately twelve 20-ton shipments of scrap metal were made from the site for recycling. The metal, which resulted from cleanup activities at the Site, came from stockpiles located within two designated areas on the Weldon Spring Site. These areas are zoned areas of fixed dimensions where metallic and nonmetallic waste piles were being staged for eventual placement within the Weldon Spring disposal cell. Materials included: 15,000 yds³ of structural steel; 1,000 yds³ of stainless steel; 34,000 yds³ of carbon steel; 900 yds³ of copper-bearing material; 1,600 yds³ of aluminum; 11 off-gas condensers; individual metal items such as cars, trucks, engines, etc.; and 19 roll off containers 20 yds³ each with nickel alloy piping. Due to jurisdiction problems and the aggressive project schedule the recycling effort was halted and the remaining materials were disposed of at the on-site disposal cell. In all, 240 tons of suspect LLW scrap metal (217.72 metric tons) were recycled with a cost avoidance of \$336,000 in FY1998.

ETTP – REINDUSTRIALIZATION/K1401 – ATI DECONTAMINATION PROJECT

In preparation for the future use of space at the ETTP, activities were planned to clean, decontaminate and remove property from an area in the K-1401 building. Although no major uranium processing operations have occurred in the K-1401 building, past machining and other operations including development activities resulted in fugitive emissions of vapors, fumes and liquids that contained uranium and other radioactive substances. The Reindustrialization Team of Bechtel Jacobs Company (BJC), LLC and DOE issued a contract to ATI in which ATI was required to remove and return to BJC, LLC for disposal transferable radioactive contamination from accessible surfaces of a specific footprint of the interior of the K-1401 Building in exchange for the property located in that area. The area contained hundreds of machine tools that lay idle prior to implementation of this project.

Prior to making the equipment available for use by the subcontractor ATI, a local review of surplus equipment determined that many of the items could be utilized at other DOE facilities. A large number of tooling, jigs and fixtures were reused by other facilities avoiding \$400K in new equipment and material purchases. Upon DOE Management Contractor verification that the equipment in K-1401 was decontaminated to free release standards, ATI was conveyed ownership of the equipment. ATI then held a commercial public auction of their equipment on the DOE site. The auction resulted in nine hundred lots of equipment and materials being sold to wholesalers and end users for recycle/reuse. This approach resulted in significantly greater value for the equipment and material relative to scrap value. This auction included approximately

three hundred pieces of specific machine tools ranging from a standard machine lathe to a surface grinder with a bed capable of supporting a small automobile. This approach resulted in sales revenues of \$2.2M, which would be used to offset the subcontractors' cost. Thus, the auction process resulted in an additional cost avoidance to DOE of \$500K, for a total cost avoidance of \$900K and a total waste avoidance of 9072 metric tons.

THREE BUILDING D&D AND RECYCLING PROJECT

The ETTP gaseous diffusion process buildings were built in the 1950's and permanently closed in 1987, and the uranium enrichment mission transferred to the United States Enrichment Corporation at Portsmouth and Paducah. The challenge for this project was to link the ability to remove equipment/material and to cleanup the buildings with some economically viable salvage/recycle of the equipment/material in an effort to lower the overall cost to the government.

BNFL Inc. was awarded a \$238M fixed price contract on August 25, 1997 to deliver vacant and decontaminated buildings to DOE-ORO. The work will be performed utilizing external licensing by the Tennessee Department of Environment and Conservation (which has NRC oversight) and under OSHA rules (off-site) and DOE oversight (on-site). BNFL Inc. will finance the project; design the decontamination facilities; apply for and receive required permits and licenses; construct necessary facilities and bring them on-line; operate the facilities to decontaminate metals and equipment; salvage metal and equipment; and deactivate the decontamination facilities. BNFL Inc. will recover the resources it has invested both through recycle activities and through the delivery of vacated and decontaminated building space paid for by DOE on a fixed-unit-price basis. The underlying intent was to transfer the primary share of the financial, performance, and operational responsibility from the Government to BNFL Inc.

The baseline M&O cost estimate to complete the Three Building D&D was \$817,045,000. The current cost estimate with the BNFL approach is \$272,126,000. Therefore cost savings are estimated at \$544,919,000. Recycling activities began in the 4th calendar year quarter of 1998 and will continue throughout the duration of the contract which has a scheduled end date of 12/31/03. The following materials were recycled in the fourth calendar year quarter of 1998: lube oil, hazardous waste, 82.58 metric tons; transformers, MLLW, 119.06 metric tons; and scrap metal, LLW, 395.35 metric tons. The estimated cost savings for this quarter due to recycling was \$2,646,178. A total of approximately 117,162 metric tons of material is to be recycled from the three buildings; 70,232 metric tons from K-33, 12,138 metric tons from K-29, and 34,792 metric tons from K-31.

ETTP K-31 & K-33 SWITCHYARDS

DOE has elected to fund Option I under the BNFL ETTP Three-Building D&D and Recycle Project. Option-I of the ETTP and Recycle Project is to perform the removal of the equipment from the Building K-31 & K-33 switchyards that are located immediately west of the buildings. The switchyards were utilized to provide the tremendous electrical power required to run the gaseous diffusion buildings. These switchyards are designated as K-792 (K-33) and K-762 (K-31). The switchyards also include several buildings and structures, with the principal

buildings being K-791, K-791S and K-791N in Yard K-792 and building K-761 in Yard K-762. The equipment removal activities also include the disposition of the equipment as salvage/recycle materials and the disposition of all waste. The switchyard materials and equipment are non-radioactive. The work includes the removal of all of the electrical equipment and appurtenances in the two switchyards, plus the removal of Buildings K-791, K-791S, and K-791N to the top of concrete pedestals or slabs. The K-761 building is in good shape and will be left for Reindustrialization after all interior electrical equipment has been removed. The estimated total weight of all equipment and materials to be dispositioned is 3674.1 metric tons. The dismantlement work began July 14, 1998 and is presently scheduled to be completed May 5, 1999. The M&O estimated cost for the ETTP K-31 and K-33 switchyards is \$1,300,000. The DOE contract cost is \$196,167. Therefore total project savings are estimated at \$1,103,833. 1049.2 metric tons of clean scrap metal from the ETTP K-31 & K-33 switchyards has been recycled as of December 1998.

RECYCLE OF FERNALD COPPER WIRE AND WINDINGS

NMR has also partnered with the Fernald Environmental Management Project and with industry to leverage cold war legacy material to accelerate cleanup at the ETTP. Rather than dispose of contaminated copper wire and windings, NMR and Fernald developed a process to use the value of the copper to accelerate the RCRA closure of the ETTP K1417B yard. Specifically, NMR facilitated transfer from Fernald to Oak Ridge of copper wire and windings. This material will be processed by Decon and Recovery Services of Oak Ridge, LLC for unrestricted release. Approximately 1340 tons of copper will be shipped to Oak Ridge. Of this, it is expected that approximately 1200 tons will be recycled, with the remainder disposed of as waste. This project, which will be completed in FY 1999, will save the government the costs associated with disposal of the copper at NTS and is expected to recycle approximately 1200 tons of material.

OAK RIDGE NATIONAL LABORATORY SCRAP METAL SALE

As a final example, NMR has partnered with Oak Ridge National Laboratory to sell scrap metal and equipment rather than dispose of it as low-level radioactive waste. As a result of this partnership, various equipment items and 223 40-yd³-capacity open-top roll-off containers with their scrap metal (ferrous metals commingled with some non-ferrous metals) contents will be surveyed for radiological contamination, decontaminated (if necessary) and sold. The scrap and equipment will be sold to a commercial recycler for its market value, and containers will be sold for re-use. The total amount of scrap is estimated to exceed 2,400 gross tons. In addition, there are several items of equipment. In addition to producing significant cost savings for the government, this project will accelerate scrap metal cleanup efforts at ORNL, thereby avoiding potential soil and groundwater contamination due to weathering of the radioactively contaminated metal as it remains in storage awaiting ultimate disposal. Sale of the scrap metal, which will be completed in FY 1999, will avoid the disposal of more than 240,000 ft³ of LLRW. Sale of the equipment will avoid the disposal of an additional 11,400 ft³ of LLRW.

CONCLUSION

The six case studies presented here demonstrate the significant accomplishments of the National Center of Excellence for Metals Recycle in leveraging cold war legacy equipment and materials to accelerate cleanups and promote reindustrialization activities at DOE sites. NMR's focus has been to move from traditional service contracts that dispose of contaminated equipment and materials as liabilities to the sale of both radioactive and clean materials as assets. The approach has achieved great success in cost and waste avoidance as well as accelerated cleanup schedules.

With the above successes behind them, the NMR continues to work to find additional opportunities for safe, environmentally protective, and cost-effective recycle and reuse of equipment and materials. NMR is dedicated to providing innovative approaches throughout the DOE complex to facilitate beneficial reuse and recycle. NMR expects to increase the amount of material recycled or reused in FY1999 and the following years by continuing to work with all the DOE sites, regulatory authorities, the private sector, and other stakeholders to achieve its goals.

FOOTNOTE

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