

## **AUTHORIZED RELEASE OF NON-REAL PROPERTY CONTAINING RESIDUAL RADIOACTIVE MATERIALS**

*As nuclear facilities are decommissioned, the U.S. Department of Energy (DOE) is faced with the need to manage an increasing amount of material containing residual radioactive contamination. In the absence of national standards for releasing such materials for reuse or recycle, EAD has developed processes and tools that implement the authorized release of these materials while protecting the health and safety of the public and the environment.*

### **■ PROBLEM/OPPORTUNITY**

Within the next few decades, several million tons of materials will be removed from nuclear facilities across the DOE complex as a result of decontamination and decommissioning (D&D). These materials, which include scrap metals and concrete, together with large quantities of tools, equipment, and other items that are commonly recovered from site cleanup or D&D activities, constitute non-real property that warrants consideration for recycle. The reuse and recycle of some of these materials have been permitted under the current DOE policy, and EAD has helped in preparing a guidance handbook for DOE and in developing implementation protocols and tools to facilitate such releases. The handbook incorporates the assessment of human health and environmental risk as a key element in the authorized release process.

*active Material.* This handbook prescribes a process that includes characterization, disposition evaluation, cost-benefit analysis, authorization, and release. To further facilitate the release process, EAD has also developed a computerized management tool – P2Pro (RSM) – with protocols for implementing the handbook procedures. P2Pro follows the process prescribed by the handbook and incorporates databases on cost, dose, and technology to help DOE site project managers reach a reasonable decision regarding release of non-real property. Computer models developed by EAD (RESRAD, RESRAD-BUILD, RESRAD-RECYCLE, and TSD-DOSE) were used to analyze radiological health impacts on workers and members of the public involved in various activities associated with processing, release, and reuse of the materials.

### **■ APPROACH**

Over the past few years, EAD has taken a leading role in analyzing policies and issues and developing guidance for clearing radioactive scrap metals from regulatory control and releasing them for reuse and recycle. It has used a life-cycle assessment modeling approach to establish a basis for recycling radioactive metals. EAD has also helped DOE develop the *Draft Handbook for Controlling Release for Reuse or Recycle of Property Containing Residual Radio-*

### **■ RESULTS**

The process described in the handbook has been used at DOE field offices to secure authorized release of materials. In one case that involved EAD, the process was applied to release 59 tons of copper from the DOE Fernald Site for reuse and recycle. Potential disposal alternatives for copper ingots were identified; they included authorized release for recycling in the public domain and off-site disposal as low-level radioactive waste. In the analysis, exposure

scenarios were postulated for recycling the ingots at a refinery and eventually reusing the recycled copper in electric wires and tubes for residential applications. Results showed a potential cost savings of \$56,000 for the sale of the metal. The analysis indicated that the level of public radiological exposure as a result of this reuse would be about 5,000 times below the current allowable exposure limit.

It is estimated that a successful DOE Complexwide deployment of the handbook would result in savings of tens of millions of dollars.

## ■ HISTORY/STATUS/FUTURE

EAD's effort in evaluating risk-based strategies for recycling radioactive metals has formed the foundation of the policy position on recycling taken by the Nuclear Energy Agency within the Organization for Economic Cooperation and Development. An EAD staff member is currently leading the National Council on Radiation Protection and Measurements scientific commit-

tee for setting a national policy on the disposition management of scrap metals containing radioactive materials. EAD staff continue to contribute to the development of the national clearance standards for release of slightly contaminated materials.

EAD has also initiated new case studies for DOE field office implementation of the handbook. The subjects include the release of the steel magnet yoke at Argonne's cyclotron at Building 211 and the recent Accelerated Site Technology Deployment Program at Idaho National Engineering and Environmental Laboratory for demonstrating concrete release.

## ■ COMMUNICATION OF RESULTS

EAD staff have authored more than 20 publications in journal articles, conference proceedings, and Argonne reports related to material disposition with regard to residual contamination. The authorized release handbook can be accessed through two DOE Web sites: <http://www.em.doe.gov/recyc> and <http://tis-nt.eh.doe.gov/oepa>.



Scrap metals are actually resources for being recycled and reused.

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