

EFCOG Best Practice #171

Best Practice Title: Metals Moratorium Working Group

Facility: Los Alamos National Laboratory, Los Alamos, NM

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Brief Description of Best Practice: The Metals Moratorium Working Group was established as a Governance Reform activity between Los Alamos National Security, LLC (LANS) and the Department of Energy (DOE) Los Alamos Field Office to develop a path forward on a vexing environmental, safety and operational problem – the management of non-contaminated metals previously used in radiation control areas. As a prerequisite to lifting a moratorium on the recycling of metals that has been in place since 2000, DOE sites have been required to assure that no contaminated metals are released to the public. This multi-disciplinary, thoroughly cross-organizational Team has completely prepared the site to recycle thousands of tons of valuable metal and return a funding stream to the Laboratory that will enable future cleanups. These cleanups have begun resolving long-standing safety issues, eliminating compliance problems, increasing the attractiveness of the site and freeing up valuable research space for new mission applications.

Why the best practice was used: The Metals Moratorium Working Group addressed a long-standing operational problem that poses serious space utilization, health, environmental and financial risks to the institution. Since July 2000, when then Secretary Bill Richardson issued a metals Moratorium/Suspension, DOE contractors have been prohibited from releasing clean scrap metal managed in radiological areas for the purpose of recycling:

- The Moratorium encumbers metals potentially contaminated in volume through activation or melt consolidation.
- The Suspension encumbers only scrap metal managed in a radiological area per 10 CFR 835 "Occupational Radiation Exposure) on or after July 13, 2000 regardless of radiological character.

The basis for Secretary Richardson's action in imposing the Moratorium/Suspension was public concern for potential residual radiation in consumer products. At the time, the K-25 D&D Project planned to recycle thousands of tons of scrap. Further, the lack of a consistent approach for metals clearance between DOE sites and instances of illegal recycling of contaminated scrap metals abroad emphasized recycling risks. The Secretarial Moratorium/Suspension was originally intended to be in place for six months while DOE radiological release practices were re-evaluated for sufficiency.

In the ensuing 14 years, the stockpile of clean but encumbered metals has been increasing and sites have been faced with the options of storing metals indefinitely or disposing of them as low-level or industrial waste. Idaho National Laboratory (INL), for example, disposed of the bulk of its encumbered metals in its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund) disposal area. Limited disposition budgets have led to both controlled and uncontrolled storages areas (boneyards) risking the loss of acceptable knowledge, poor utilization of space for mission activities, and increased environmental concerns including speculative waste accumulation, non-point source pollution and pest control. Finally, the loss of resale value for encumbered metals is significant. A 2013 Energy Federal Contractors Group (EFCOG) analysis estimated that the difference between the resale of currently clean but encumbered metal and disposition as low level waste ranged from a low of \$67.4 M to a high of \$191.6 M. The range for Los Alamos National Laboratory (LANL) is estimated to be \$6.8 to \$19.3 M. Sites with large encumbered volumes include LANL, Nevada National Security Site (NNSS), and Savannah

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River Site (SRS). Sites with moderate volumes include Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Fermi National Accelerator Laboratory (FNAL), Lawrence Livermore National Laboratory (LLNL), Oak Ridge National Laboratory (ORNL), Y-12, Princeton Plasma Physics Laboratory (PPPL), Sandia National Laboratory – New Mexico (SNL-NM), Stanford Linear Accelerator Center (SLAC) and Thomas Jefferson National Accelerator Laboratory (TJNAL).

On September 28, 2011 Energy Secretary Steven Chu released an Action Memorandum (AM) authorizing program offices to resume clearance, contingent on completion of Programmatic Environmental Assessment (PEA). The AM required that sites participate in the PEA in order to qualify for suspension policy relief and meet several conditions:

- Sites actively share processes, procedures, data.
- Performance improvements must be met and verified by Site Offices.
- Documentation of the property must be considered.
- Appropriate authorized limits must be used (DOE Order 458.1 *Radiation Protection of the Public and the Environment* standard < 1 mrem above background).
- Procedures must be described for conducting radiation surveys and documenting the results of the surveys.
- Notification of applicable Federal, State, or local regulatory agencies or tribal governments must be made.
- Comparison of the measured levels against the authorized limits that are shown to be protective of the public and the environment.

What are the benefits of the best practice: Some of the key team results, benefits and the organizations involved include:

- Processes and procedures to manage disposition of moratorium metals were developed and implemented. Environmental Division (ENV-ES) radiation dosimetry experts worked with Radiation Protection (RP) Division measuring and monitoring experts to develop two new Laboratory procedures. The first, *Data Quality Objectives for Measurement Of Radioactivity In Or On Items for Transfer Into The Public Domain* was approved by ENV-ES and describes the statistical basis and physics of clearance of both potential surface and volumetrically contaminated materials. The second, *Technical Basis Documentation Regarding Health Physics Measurements for the Unrestricted Release of Metals from LANSCE - RPSVS-RIC-TBD-03, R0 10/31/13* was issued by RP Division as a field guide for radiation control technicians to conduct physical sampling of materials prior to clearance and recycling. These activities constituted completion of the DOE Programmatic Environmental Assessment (PEA) requirements and defined survey techniques for different combinations of materials and geometries – both surface and volumetric.
- Separately, the procedures and processes for the implementation of DOE Order 458.1, *Radiation Protection of the Public and the Environment* were reviewed by DOE, which issued formal notification that the Laboratory has met the implementation requirements of the Order
- RP-PROG, Principle Associate Director for Operations Strategic Improvement Office (PADOPS-SIO) and ENV personnel have also worked on a national level to encourage DOE's to adopt the ANSI N13.12-2013 standard, *Surface and Volume Radioactivity Standards for Clearance*. If used in conjunction with DOE 458.1, it would provide consistent release standards and exceed the requirements of DOE Order 458.1, which only deals with surface contamination.
- Acquisition Services Management (ASM) Division and management of the Metals Recycle Facility (MRF) in the Utilities and Infrastructure (U&I) Facility Operations Director (FOD) established a new metals recycling contract that will create revenues from recycled metal streams. This contract was executed subsequent to challenges

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and extensive legal review. Discussions have already occurred with the new contractor to stage, measure and transport metals for recycle.

- ASM-Property Management participated in incorporating the Laboratory Precious Metals inventory into the evaluation process.
- Chief Financial Officer (CFO) and MRF personnel worked to develop an approved funding model for costs/returns from recycled metals to return to LANL to fund future cleanout projects. Without this model, revenues would have reverted to the U.S. Treasury via DOE, reducing the incentive for organizations to engage in cleanups and recycling.
- Community and Government Affairs (CGA-CO), ENV and DOE Field Office Communication staff developed a communications plan to inform Laboratory staff and the public about the strong technical and environmental basis for the release of clean metals once held in radiation control areas. As mentioned, one basis for the origin of the Moratorium/Suspension was public concern that radioactive metal would be released. The communications plan is critical to a rapid response to news articles or public pressure. This plan has been shared through EFCOG and DOE Headquarters at the national level to facilitate common messaging on this subject across the complex.

What problems/issues were associated with the best practice: All of these activities, while critical to the success of this project, represent the *paper* portion of the effort. To move beyond this level and empirically demonstrate the validity and robustness of the LANL processes and procedures for clearance, the Team implemented a pilot program at the Los Alamos Neutron Science Center (LANSCC) to identify, dismantle, physically assess and then recycle metals representative of those covered by the Moratorium/Suspension. Key steps in this process include:

- Accelerator Operations and Technology (AOT-OPS) and Deployed ESH Services (DSESH-LFO) conducted a preliminary inventory of metals at LANSCC that are either encumbered by the Moratorium/Suspension or not encumbered due to location or time factors. This inventory indicates over 2000 tons of potentially recyclable metals. Unencumbered metals were identified for the pilot at the TA-53 magnet storage pad (Photo 1) and the Experimental Physics Industrial Control System (EPICS) Spectrometer in Area A (Photo 2).



Photo 1 - TA-53 Magnet Pad – hundreds of tons of copper, steel and aluminum exposed to elements and subject to environmental review as a non-point source of water pollution.

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Photo 2 – EPICS Spectrometer in Area A – over 200 tons of magnet and cold-rolled steel encumbering projected new mission workspace.

- The Team, with AOT-OPS and ENV-ES leading, developed proposals for a pilot project that would dismantle large sections of equipment, transport them to a low background area at TA53, measure and monitor for residual radioactive contamination above background levels, and begin the process of recycling clean materials. With the help of PM7, an aggressive program plan and schedule was developed. The proposals were cooperatively funded by the Laboratory Cleanout Program (ADNHHO), the Pollution Prevention Program (PADOPS-OI-PO) and a grant from NNSA NA-73, Office of Special Materials. The HQ deliverable is a lessons-learned monograph to be shared across the complex.
- AOT-OPS and the LANL Crane Crew personnel developed detailed work safety plans to guide the dismantlement of such large pieces of equipment, a far bigger risk than residual radioactivity. Hoisting and rigging of the EPICS spectrometer required a high degree of ingenuity and persistence as multiple components weighing over 10 tons each persistently resisted separation. Multiple approaches were tried before an imaginative hydraulic separation technique finally worked (Photo 3).

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Photo 3 – Large EPICS Spectrometer magnets after initial dismantlement. Each magnet consisted of ten magnet plates, each weighing over 10 tons and firmly attached to each other.

- DSESH-LFO staff worked with Central training to develop and approve field work procedures for the final surveying of the dismantled equipment. This includes detailed records of the source of the materials and the results of monitoring surveys.
- While the offsite shipment for recycle and revenue generation are slated for FY14, the work of the Metals Moratorium Working Group in FY13 created the path for what will be a multi-year effort to clear mission workspaces. Eliminating excess or abandoned equipment and materials will physically and visibly improve the technical workspace of our staff. These efforts make a direct and tangible contribution to two of the goals of the new LANL Strategic Plan: 1) Enable mission delivery through next-generation facilities, infrastructure, and operational excellence, 2) Attracting, inspiring, and developing world-class talent to ensure a vital future workforce.

How the success of the Best Practice was measured: Key deliverables and success metrics include:

- Integrated Work Documentation for the safe dismantlement of large pieces of technical equipment.
- DOE Los Alamos Field Office approval of LANL's implementation of the requirements of DOE Order 458.1.
- Chief Financial Officer approval of return of recycling revenues to cleanup programs to fund ongoing site cleanup.

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- The first movement of clean recyclable metals to test all of these procedures and processes occurred in July 2014.

Description of process experience using the Best Practice: The number of organizations that had to work together seamlessly to execute this effort is impressive. Eighteen different organizations crossing three Principal Associate Directorates and Director's Office Organizations collaborated on this effort. It is particularly remarkable that the majority of the technical and management staff from these organizations contributed their time, effort and passion on a voluntary basis – that is, in addition to their day jobs. Cleanout Program and Pollution Prevention Project funding was used primarily to pay for craft and crane services. The craft and crane services worked closely with facility staff to develop innovative solutions to unique new dismantlement problems. The skills developed on this pilot project will be applied to many future cleanups.