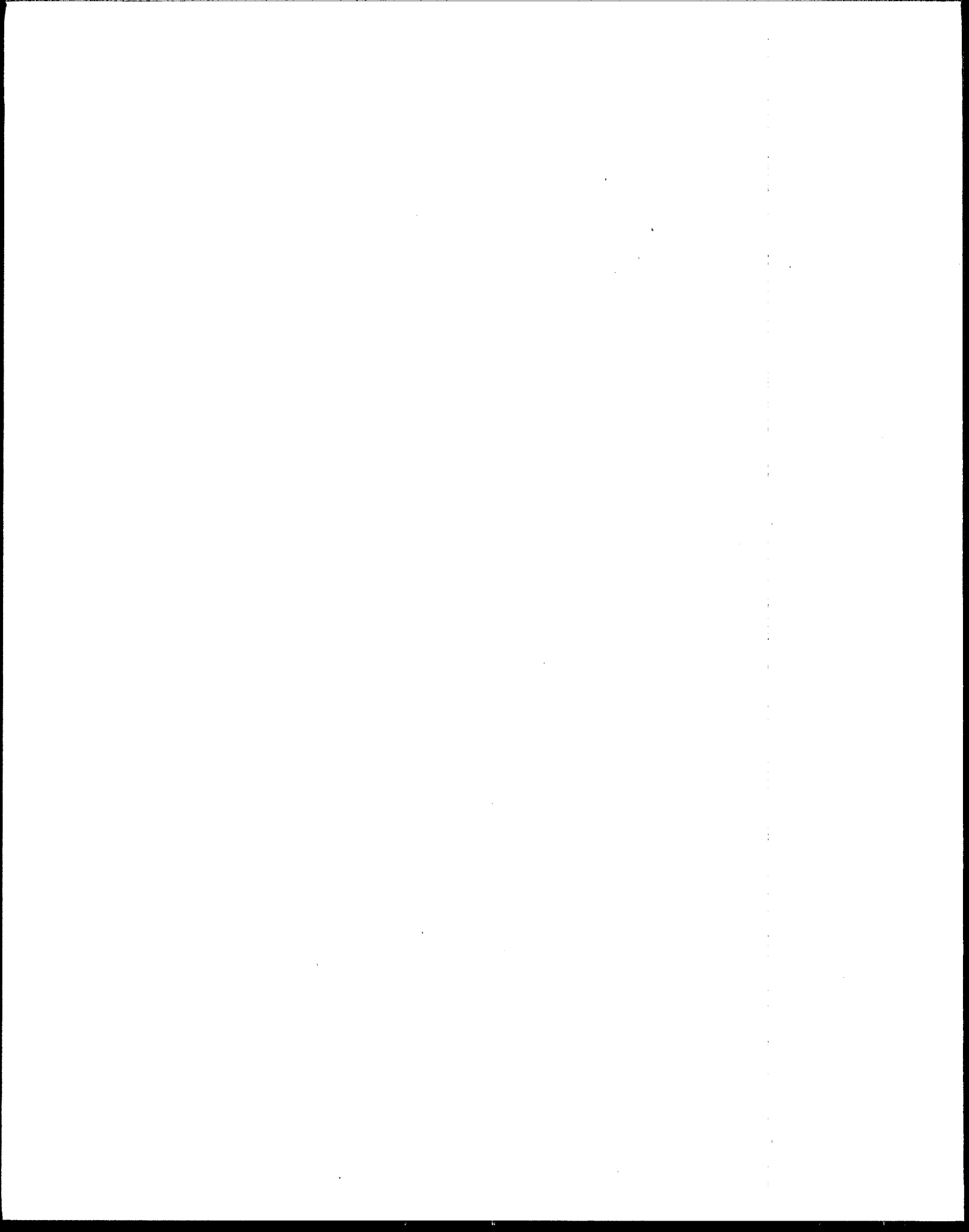




Report to Congress on Metal Recovery, Environmental Regulation & Hazardous Waste

EXECUTIVE SUMMARY



Executive Summary

In 1992, Congress directed the Environmental Protection Agency (EPA) to conduct a study of how current hazardous waste regulations affect metal recovery of the Nation's waste, how metal recovery can be encouraged, and how such metal-bearing hazardous wastes should be regulated to protect human health and the environment as well as effectuate the resource conservation and recovery goals of the Resource Conservation and Recovery Act (RCRA). To complete this report, EPA reviewed relevant literature and consulted with the Departments of Interior and Commerce as well as members of the metal recovery industries. EPA has conducted a series of case studies of metal recovery operations in order to obtain case-specific information about how RCRA Subtitle C regulation affects their operation.

Under current RCRA Subtitle C regulation, metal recovery is one type of recycling (the use or reuse of a waste directly is the other) and can be defined as the recovery of metal as separate end products from a metal-bearing secondary material. Metal-bearing hazardous wastes comprise a wide variety of secondary materials including sludges, by-products, and spent materials. These wastes are often defined as hazardous because they leach heavy metals in excess of regulatory levels. These metals can include lead, chromium, cadmium, mercury, and arsenic. Because metals are elements, they cannot be destroyed and exist in perpetuity. They can be stabilized to prevent their release to the environment or recovered and reused again. When mismanaged, metal-bearing hazardous wastes have contaminated the surrounding environment. Some metal recovery operations are listed on the National Priorities List (NPL) for Superfund cleanup.

EPA determined that the best means to assess the impacts of Subtitle C on metal recovery would be to focus on materials that are currently regulated as hazardous waste. Therefore, this study focusses on secondary materials such as emission control dust from electric arc furnaces, spent lead-acid batteries, spent pickle liquor from steel finishing operations and wastewater treatment sludge from electroplating operations. These are examples of metal-bearing hazardous wastes which are currently subject to most or all RCRA Subtitle C regulatory requirements. (Note: spent lead-acid batteries being reclaimed are subject to reduced regulatory requirements prior to being reclaimed).

According to EPA data, there are at least 8 million tons of metal-bearing hazardous waste generated annually. Some of these wastes are managed for recovery. Many of these wastes are not amenable to recovery either because they are too low in content of recoverable metals or because they contain too many impurities that would interfere with the recovery process. Currently, EPA estimates that 1.9 million tons of hazardous waste are managed for metal recovery. These wastes include spent lead-acid batteries, emission control dust from electric arc furnaces, wastewater treatment sludge from electroplating operations, spent pickle liquor from steel finishing operations and other wastes.

A number of RCRA Subtitle C regulations may affect metal recovery operations. Under RCRA Subtitle C, a generator of a metal-bearing hazardous waste has 90 days after generation to store wastes on-site in tanks, containers, or containment buildings. After that time the generator must either dispose of the waste on-site (either as non-hazardous waste or in compliance with applicable hazardous waste standards) or ship the waste off-site for storage, treatment, recovery or disposal. If shipped off-site, the generator must ship the waste under manifest by a hazardous waste hauler. All metal-bearing hazardous waste is subject to the applicable land disposal restriction (LDR) treatment standard. These standards specify either a technology (such as thermal recovery) or more commonly a performance level (either a total or extract level concentration) that must be met prior to land disposal.

When hazardous waste is shipped off-site for metal recovery, the metal recovery operation is required to have a permit if the waste is stored prior to recovery. RCRA storage permit requirements trigger other regulatory requirements such as facility-wide corrective action (requiring remediation of affected solid waste management units on-site) and financial assurance (requiring a financial mechanism to assure proper closure of facility operations). If the metal recovery operation does not store the waste prior to reclamation, it generally does not require a permit since the recycling process is generally not regulated under RCRA. One exception to this general rule is if the operation meets the definition of an industrial furnace and is not burning solely for metal recovery (e.g., the process also destroys hazardous organic constituents or is recovering fuel value). In this case, the metal recovery operation is subject to Boiler and Industrial Furnace Permit requirements. Finally, any residuals from a metal recovery operations must be managed as a hazardous waste if either it exhibits a hazardous characteristic (i.e., corrosivity, reactivity, ignitability, or toxicity) or it was derived-from a listed hazardous waste.

Industry has complained that RCRA Subtitle C regulation is too stringent and has served as a disincentive to metal recovery in the United States. Major RCRA Subtitle C disincentive identified include the derived-from rule, storage permit requirements and facility-wide corrective action. Trade associations representing generators of steel or electroplating wastes and trade associations representing metal reclaimers of spent lead-acid batteries and industrial sludges and by-products have indicated to EPA their view that high compliance costs and increasing liability risk from RCRA Subtitle C regulation has decreased metal recovery capacity in the United States and decreased capital investment for new projects in their respective industries.

In general, these representatives favored some form of conditional exclusion from RCRA Subtitle C jurisdiction or conditional exemption from RCRA Subtitle C regulation. They favored conditions resulting in self-implementing management standards for the wastes such as a time limit on accumulating wastes prior to recovery or banning storage wastes on the ground prior to recovery. They also support regulatory modifications to the permitting process and expanded federal guidelines on recycling and storage although these are generally regarded as less satisfactory than conditional exclusions and exemptions.

EPA's review of economic analysis completed for the Agency in 1991 indicates that under current RCRA Subtitle C regulation metal recovery is a more cost-effective management alternative than traditional treatment and disposal. Additional data shows that RCRA Subtitle C regulation (particularly the Land Disposal Restrictions program) encourages metal recovery of hazardous waste by increasing treatment and disposal costs which are substitute forms of management to recovery. Increases in world metal demand have also been an important factor in encouraging metal recovery.

For spent lead-acid batteries, current data indicate that recovery rates have remained high in spite of a recent decrease in the world price of lead. It appears that RCRA is not a disincentive and may actually encourage recovery of spent lead-acid batteries. For industrial sludges, by-products and spent materials, metal recovery levels have increased substantially from 1980 levels. EPA currently estimates that over 1 million tons of these materials were recovered in 1992. In 1980, the GAO reported that fewer than 15,000 tons of metal (from an estimated 100,000 tons of waste) were being recovered from industrial sludges, by-products and spent materials.

While on balance RCRA Subtitle C regulation has contributed to increased metal recovery in the United States since 1980, some regulatory provisions may have constrained additional metal recovery capacity in the United States. It is possible that RCRA has made metal recovery in the United States less profitable than it would otherwise be. The derived-from rule that requires residuals from listed wastes to be managed as hazardous wastes, facility-wide corrective action and RCRA permit requirements are among the most expensive and time consuming provisions in RCRA to comply with. However, these are also among the most important provisions to prevent or remediate releases to the environment of metal-bearing hazardous wastes. Any proposals to modify these provisions must carefully evaluate the net benefits, if any, of the modification resulting from any additional metal recovery against any increased risk to public health and the environment due to any increase in the likelihood or severity of a release.

Conclusions from EPA's examination of case studies of metal recovery operations corroborate EPA's findings that RCRA has mixed effects in terms of providing incentives or disincentives to metal recovery. To assess the broadest possible impact of RCRA on different types of metal recovery operations, EPA completed case studies on a diverse selection of metal recovery operations with different processes and stages of commercial development. Each case study indicated a series of RCRA Subtitle C incentives and disincentives to metal recovery with varying impacts on the operation as a whole.

As other data have indicated, case study subjects benefited from markets created for their services largely due to RCRA treatment and disposal standards. However, case study subjects were also burdened with cost and liability concerns from the derived-from rule for process residuals. One case study subject, Molten Metal Technology, indicates that RCRA provisions to encourage innovative technologies may not be working adequately to meet that goal.

In addition to environmental benefits obtained from it, metal-recovery of hazardous waste may help to ameliorate the U.S. balance of trade deficit of mineral and metal commodities. Nickel, copper, zinc, lead and iron may be found in sufficient quantities in metal-bearing hazardous wastes to contribute to increased supplies of these materials for domestic consumption or export.

Metal recovery of hazardous wastes can also play an important role in conservation of strategic metals such as chromium, cobalt, manganese and platinum. Strategic metals are metal commodities that perform critical functions in the U.S. economy and which the U.S. is largely dependent on imports from vulnerable supplies from politically instable sources. More specifically, EPA data indicates that there are large quantities of chromium-bearing wastes generated in the United States. Chromium is an important strategic material used as an alloy for corrosion resistance in steel production.

Metal recovery from hazardous waste may be encouraged directly through changes to existing command and control regulation such as self-implementing standards or through non-regulatory and incentive-based approaches such as waste exchanges, pollution fees and transferable waste permits. EPA is currently conducting on-going activities to optimize environmental protection and safe recycling of hazardous wastes. These activities include the Definition of Solid Waste Task Force, the proposed Part 273 Special Collection System regulations, and the proposed universal treatment standards for metal hazardous constituents under the Land Disposal Restriction program. EPA has also provided financial support for non-regulatory approaches such as waste exchanges. The Agency has also examined a number of possible incentive-based approaches to encourage metal recovery in completion of this report. These incentives include pollution fees, tradeable permits, deposit-refund systems and removal of federal subsidies for production of virgin metals. Each approach has its own advantages and limitations depending upon the objectives sought and implementation required.

Based on information collected and analyzed in completion of this report, EPA finds the following with respect to metal recovery of hazardous waste and its relationship to RCRA Subtitle C regulation:

1. **RCRA Subtitle C regulation includes both incentives and disincentives to metal recovery of hazardous waste. Overall, RCRA Subtitle C regulation has been a substantial contributing factor to the increase in metal recovery of hazardous waste over 1980 levels.**
2. **RCRA Subtitle C regulation is also apparently constraining metal recovery from reaching its potential in the United States. Compliance costs and liability concerns with RCRA Subtitle C regulation may limit waste generators selection of metal recovery as an option. These costs and concerns also limit the ability of metal recovery operations to expand their capacity and invest in new projects.**

3. **RCRA Subtitle C regulation may inhibit innovative metal recovery technologies. RCRA regulatory provisions designed to encourage innovation such as the treatability exemption and the research, development and demonstration permits may not always be adequate to encourage innovation.**
4. **Notwithstanding the disincentives posed by RCRA Subtitle C regulation, damage incidents (including Superfund sites) involving metal recovery operations indicate that mismanagement of these materials can pose a significant risk to human health and the environment. For this reason, proposals to modify RCRA Subtitle C statutory or regulatory authority must assess the benefit of reduced compliance cost and liability from Subtitle C regulation against any incremental increase in risk due to reduced regulatory requirements. EPA has created the Definition of Solid Waste Task Force to assess these types of proposals.**
5. **Recovery of metals from metal-bearing hazardous waste has the potential to ameliorate the current U.S. balance of trade deficit. It may also become an important source of supply of strategic metals, particularly chromium.**
6. **Available data shows that metal recovery of hazardous waste should continue to increase in the 1990's as landfill capacity decreases and alternative forms of management are increasingly needed to support the U.S. hazardous waste management system.**
7. **EPA is currently in the process of conducting a series of activities which may encourage environmentally sound metal recovery of hazardous waste. These activities include the Definition of Solid Waste Task Force, proposed Special Collection System regulations, and proposed Universal Treatment Standards for hazardous wastes. EPA expects that each of these activities may encourage environmentally sound recycling.**

