

## MATERIALS NOT CLASSIFIED AS WASTE STUDY

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### ABSTRACT

The Department of Energy (DOE) has large quantities of valuable materials in storage that are managed for future reuse, recycle, or recovery activities. These materials include nuclear scrap and residue being held for recovery of the special nuclear materials, spent fuel, depleted uranium, and irradiated lead. Many of these materials contain components that, if recategorized as waste, could be considered hazardous, or radioactive mixed waste under the Resource Conservation and Recovery Act.

DOE has conducted a survey to collect data on the materials that are in storage at DOE sites to allow a consistent evaluation of these materials. The data has been reviewed and placed into material categories. It provides a good first cut for identifying the types of materials that are being held for future use. A second survey is planned to validate the original data and to collect additional data elements. The data will be used to support the preparation of policy and guidance for the DOE sites to use in determining which of these materials should be managed as waste.

### BACKGROUND

On September 26, 1990, a memorandum was sent out by Department of Energy (DOE) Under Secretary John C. Tuck, initiating a survey of Materials Not Classified as Waste in storage throughout the DOE complex. The focus of the survey were materials, both radioactive and nonradioactive, held in storage at DOE sites for future recovery, recycle, or reuse. In addition, information was requested on items being held for future research activities. Some of the materials contain components, that if categorized as waste, may be considered hazardous or radioactive mixed waste under the Resource Conservation and Recovery Act (RCRA).

On April 12, 1990, in the case of the Sierra Club vs. DOE/Rockwell a Federal court found that materials containing plutonium residues at Rocky Flats were subject to RCRA Subtitle C hazardous waste requirements because of the hazardous component. In this decision, United States District Court Judge Lewis T. Babcock ordered that:

"All [listed and characteristic substances] that defendants have burned in an incinerator or are storing pending treatment in a plutonium recovery process are RCRA Subtitle C wastes."

"All substances (except plutonium) mixed with listed hazardous wastes are RCRA Subtitle C hazardous waste."

"All [material] (except plutonium) from incineration or other treatment in a plutonium recovery process of hazardous waste are RCRA Subtitle C hazardous wastes."

Though not applicable outside of the State of Colorado, the Babcock decision could be cited in attempts to force the regulation of similar types of materials at other DOE sites as RCRA Subtitle C waste. In response, DOE initiated the inventory in order to develop a national strategy for management of similar types of materials. The inventory will be used to support discussions with regulators on this and several other mixed-waste and materials management issues.

### THE PROBLEM

While you may consider a certain material valuable, the language in the RCRA regulations may indicate that the material should be managed as a waste. The definition of "solid waste" is a complex issue. To fully appreciate the dilemma faced by a material owner, the RCRA regulations need to be examined.

Under RCRA you must have a "solid waste" before you can have a hazardous waste subject to the Subtitle C requirements. To determine whether a material is a solid waste, a generator must apply RCRA requirements found at 40 CFR 261.1 and 261.2. These regulations define a solid waste as any discarded material not excluded in some other way from RCRA. A discarded material is defined as something that is abandoned, recycled, or considered inherently waste-like. Nuclear material is an example of a material that is excluded from RCRA regulation. Special nuclear material, by-product material, and source material as defined by the Atomic Energy Act of 1954, as amended, are explicitly excluded from regulation under RCRA. However, hazardous waste is often mixed with this exempt material and, as discussed above in the Rocky Flats decision, the hazardous waste component of the mixture may become subject to RCRA.

Some materials are excluded from regulation as a solid waste when recycled. For example, when a material is recycled by being used or reused as an ingredient in an industrial process to make a product, provided the material is not first "reclaimed." However, during the year, you must recycle at least 75 percent of the material you had at the beginning of the year or else the material is speculatively accumulated and once again a "solid waste." Scrap metal, when recycled, is another class of material excluded from regulation as long as it is not speculatively accumulated. RCRA defines "scrap metal" as "bits and pieces of metal parts (e.g.,) bars, turnings, rods, sheets, wire) or metal pieces that may be combined together with bolts or soldering...which when worn or superfluous can be recycled." (40 CFR 261.1 (c)(6))

The regulations and court decisions interpreting them, create a complex regulatory maze through which the materials manager must negotiate to maintain compliance. This

materials survey will support DOE's efforts to comply with RCRA and other statutory requirements while optimizing limited DOE resources.

### THE SURVEY

The intent of the Materials Not Classified as Waste Survey was to develop information on materials being held for future reuse, recycle, or recovery necessary to: (1) support a consistent evaluation of the various classes of materials, (2) facilitate decisions with respect to the proper management of the materials, and (3) support guidance development on the management of these materials. Some of the materials present unique circumstances that do not fit easily within the Federal (or state) regulatory structure due to conflicts between some regulatory requirements. A thorough understanding of the problem is required to support ongoing discussions with regulators and facilitate the safe and legal management of materials throughout the complex.

In completing the survey form, the sites were asked to identify all of their stored material to allow the Department of Energy to fully assess management requirements for these materials. The intent was to "acquire data on all materials that may be in process or in storage for future action ..." including, but not limited to:

"...a wide variety of materials such as off-specification products, scrap, or residues that are being held for future recovery of all or some fraction of their contents; radiologically uncontaminated material being held for possible future use or reuse; material to be recycled; items being held for research; and materials retained for strategic purposes or classification reasons. Additionally, it includes spent fuel; stored uranium product; depleted uranium; and sodium, lead, or other material intended for reuse, except those whose shelf life has expired." (September 26, 1990, Under Secretary Tuck memorandum)

The survey identified a large volume of materials that have the potential to become hazardous or radioactive mixed waste, if declared waste. DOE is concerned that valuable materials will be discarded and significant waste management problems will likely arise if such broad declarations are made without adequate opportunity to reassess materials management operations and needs on a complex-wide basis. Declaring valuable materials waste means treatment technology, capacity development, and disposal technology/space will be consumed. Such an approach is counter to pollution prevention and waste minimization principles.

The survey was designed to gather general information on each material or material type being held by the sites, including storage data and status. Information gathered on the material included whether or not it might be potentially RCRA hazardous and what sampling constraints exist (e.g., radiation exposure, contamination, laboratory techniques). Storage information included the name and location of all units that store the material, the quantity in storage, and the length of time the material has been in storage. Information on materials that may be in process or in storage for future action was also requested. The future action could include processing, reclamation, or disposal. For those materials being held for material recovery, information on the processing facility was required.

The data received from the survey provided a very good overview of the range of materials that are being held by the DOE sites. A wide variety of materials were reported by the sites. Although it is unlikely that information was received on all items of interest, enough information was received to understand the general types of materials being held. Some of the materials identified clearly would not be regulated as solid waste - such as inventories of unused materials, radiologically uncontaminated scrap metal being held for commercial recycle, and stock chemicals whose shelf life has not expired. The other materials were placed into material categories to facilitate data analysis. Because of the wide range of materials reported, some of the categories may seem vague and a few of the materials may not fit cleanly into the designated category.

### RESULTS

Twenty-eight sites holding material that fit the description of materials not classified as waste responded to the survey. Approximately 575 data forms were received from the sites. The data were reviewed for consistency and completeness. However, since the majority of the materials are not well characterized, some information could not be provided. The volume of the material in storage and whether or not it contained any hazardous components, is key information that was unavailable in some cases. For many materials, the rationale for continued storage was not specifically provided.

As a result of the very broad scope of the request, a wide variety of materials were reported. Since the survey did not specify that only materials that have the potential of becoming hazardous or mixed wastes be reported, many of the materials identified have no potential RCRA hazard. The materials identified in the survey were grouped into several categories: reactor materials (e.g., spent fuel, reactor coolant, and test materials), program accountable materials (e.g., nuclear scrap and residues, lithium, and deuterium), and non-nuclear materials (e.g., cadmium components, explosives, and lead).

The data were divided into three main categories to facilitate data analysis. The categories, their definitions, and examples of materials in each category are provided below.

- **Reactor Materials**

Reactor materials are materials, both irradiated and unirradiated, that have been used in a nuclear reactor and still have a use or are materials that have been designated for use within a nuclear reactor. These materials include fuel, test materials, and reactor components.

- **Unirradiated Material.** These are reactor materials that have not been subjected to reactor irradiation. Examples of materials in this category are unirradiated nuclear reactor fuel, alkali metals, and cadmium poison elements.

- **Irradiated Non-Fuel.** These are reactor materials that have been subjected to reactor irradiation, excluding spent fuel. There are a wide variety of materials in this category including sodium for use as a reactor coolant and irradiated reactor components.

- **Spent Fuel.** Spent fuel is defined as fuel that has been withdrawn from a nuclear reactor following irradiation, but that has not been reprocessed to remove its constituent elements. Experimental

test fuel pins are also included in this category. Spent fuel being held for reprocessing to recover nuclear materials, commercial fuel stored at DOE sites, Naval fuel, and experimental fuel was reported.

- **Program Accountable Materials**

Program accountable materials are radioactive and nonradioactive materials utilized in the nuclear industry, that are not designated as reactor components. These materials must be held in accordance with accountability inventory controls and all applicable safeguards and security requirements.

- **Special Nuclear Material.** Special nuclear material is fissile material that is used in nuclear weapons. Plutonium 239, Uranium 233, and Uranium 235 are special nuclear materials. The materials in this category include material that may be used "as is" and scrap and residues. Scrap and residues are materials that are produced during the weapons production cycle and contain, or are composed of, special nuclear materials. They are held for processing to recover the fissionable isotopes of Pu-239, U-233, and U-235.

- **Non-Special Nuclear Material.** The materials in this category are all other radioactive isotopes (non-fissile) and other materials that are an important element in weapons research, development, and production. Examples of materials in this category are thorium, depleted uranium, neptunium, lithium, and deuterium.

- **Non-Nuclear Materials**

Non-nuclear materials are materials that are inherently nonradioactive, however they may be radioactively contaminated. Reactor materials and program accountable materials, as defined above, are not included in this category. There are a wide variety of

materials in this category. They include lead shielding, cadmium components, explosives, chemicals, and beryllium.

### NEXT STEPS

A second data collection activity is planned. The purpose of the second survey is to refine earlier data collected and to gather information on data elements not requested in the first survey. This activity is scheduled for the spring of 1992.

The second questionnaire has been designed to focus only on those materials that could potentially be hazardous or mixed waste, if determined to be waste. More detailed questions on material identification and characterization will make it possible to determine if the material has a radiation hazard and/or a possible chemical hazard. The sites will be asked to identify exactly what constituent(s) of a material could cause it to be potentially RCRA hazardous. The survey will seek identification of materials that have a hazardous characteristic that is solely attributable to the radionuclide itself. Examples of such materials are uranium fines and thorium dust.

The second questionnaire will also request a justification for holding materials. The sites must describe the future use of the material, estimate when it will be used, and describe what processing or material recovery will be needed before the material can be used.

The collection and analysis of the additional data, will assist in the preparation of DOE policy and/or site guidance on the management of materials. The guidance will likely address how sites should evaluate materials in storage to avoid potential confusion over their regulatory status. Guidance would also discuss the need to thoroughly document plans for materials that DOE continues to hold as valuable or reusable. Most importantly, guidance will emphasize the management of materials in storage for future use in a safe manner, protective of the environment, and in compliance with all applicable regulatory requirements. The guidance will be based on DOE policy, applicable regulations, and best operating practices.