

**GUIDANCE MANUAL ON THE
RCRA REGULATION OF RECYCLED
HAZARDOUS WASTES**

Prepared for

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THE PURPOSE OF THIS MANUAL

On January 4, 1985, the U.S. Environmental Protection Agency (EPA) amended the definition of solid waste used in regulations that implement Subtitle C of the Resource Conservation and Recovery Act of 1976, as amended (RCRA). This change (50 FR 614-668) primarily addresses the question of which materials are solid and hazardous wastes when they are recycled. In particular, the amendments define the Agency's jurisdiction under RCRA regarding materials that are considered solid wastes when they are recycled, and impose Subtitle C regulations on wastes that are hazardous and pose a substantial hazard to human health and the environment.

The purpose of this document is to provide guidance to State and EPA Regional personnel who must apply the new definition to determine which materials, when recycled, are solid and hazardous wastes.^{1/} In addition, persons who recycle materials or generate materials that are recycled may use this manual to determine which regulations apply to them. Because the rule is complex, guidance is provided primarily in the form of examples

^{1/} RCRA defines a solid waste as any discarded material (except materials specifically excluded from designation as solid waste under 40 CFR 261.4 (a) or under a variance granted under 40 CFR 260.30 and 260.31). Discarded materials include both materials that are abandoned and materials that are recycled (40 CFR 261.2). This manual only concerns materials that are solid wastes when recycled. It does not address wastes that are abandoned.

illustrating application of the rule to actual recycling practices. These examples will help parties interested in similar cases determine whether a particular recycled material is subject to the RCRA Subtitle C requirements.

This manual considers only the provisions of Subtitle C of RCRA. Individual states may have extended regulation to materials or recycling practices not covered by the Federal regulations, or may impose additional requirements on materials or practices that are covered by Subtitle C of RCRA. The regulations applicable in each state must be reviewed to reach a final determination of the regulatory status of a given waste.

Users of this manual should exercise care in reaching conclusions about the regulatory status of recycling practices, to ensure that such practices fit exactly into one of the classifications presented. EPA retains final authority to judge the regulatory status of any recycling practice. Further, because the definition is subject to change, users should be certain to refer to the latest regulations. This manual will be updated periodically to reflect changes in the definition.

ORGANIZATION AND USE OF THE MANUAL

This manual is organized into three chapters:

- o the Introduction, which provides an overview of the regulatory status of recycled wastes and defines the terms used in this manual;
- o Examples of the application of the definition of solid waste to specific recycling practices; and
- o an Index to the examples.

The remainder of this Introduction includes two sections. The next section provides an overview of the definition of solid waste, briefly defines categories of materials and activities that are relevant to determining whether a material is a solid (and hazardous) waste and thus is subject to Subtitle C regulations, and indicates which combinations of materials and activities are regulated. The second section provides more detailed definitions of specific activities, and for each type of activity discusses in detail what materials are subject to regulation.

The Examples provided in the second chapter of the manual are organized for convenience primarily by type of recycling activity. The examples are presented in a worksheet format shown in Exhibit 1. This worksheet includes a series of questions that illustrates the steps necessary to categorize the sample cases, and may be used to evaluate other recycling activities. By following the worksheet and correctly answering all questions, users should be able to determine the Subtitle C regulatory status of any recycled material. Examples are provided for each category of recycling and for materials or activities that are subject to the special provisions. The first page of Chapter 2 describes the organization of that chapter.

The final chapter provides an Index designed to help users locate examples similar to those they wish to evaluate. The index cross-references examples according to the following terms:

- o Common descriptors of recycling activities (e.g., distillation, secondary smelting, etc.);
- o The regulatory definition of the recycled material (e.g., characteristic sludge, listed by-product, etc.);
- o Common descriptors of recyclable materials (e.g., solvents, plating baths, etc.); and
- o The industry practicing this type of recycling activity.

Before attempting to evaluate a specific recycling practice, the user should read the remainder of the Introduction. This chapter gives an overview of the terms and categories relevant to determining whether a recycled material is regulated under Subtitle C of RCRA and provides a detailed discussion of the regulated practices and regulatory requirements. The user then should consult the Index to locate cases similar to the one he or she wishes to classify, and review these examples to determine how the definition applies to his or her particular case.

Once the user has reviewed the relevant examples and has reached a conclusion about the regulatory status of the material in question, we recommend that he or she re-read the relevant parts of the final section of this Introduction. The detailed

discussions of each recycling practice in that section will serve as a final check on the conclusions developed from reviewing specific examples.

If no appropriate examples are located, the user should attempt to classify the practice by using the worksheet and consulting the detailed regulatory definitions provided in the final section of this Introduction. Additional assistance in using the manual is available through EPA's RCRA Hotline at (800) 424-9346 or (202) 382-3000.

AN OVERVIEW OF THE DEFINITION OF SOLID WASTE

Materials That Are Solid Wastes When Recycled

Under Subtitle C of RCRA, EPA has the authority to regulate the management of hazardous wastes. Hazardous wastes are defined in the statute as a subset of "solid wastes" (40 CFR 261.3(a)). EPA thus must determine whether a hazardous secondary material is a solid waste before it can assert Subtitle C jurisdiction over the management of that waste.^{2/}

In the case of recycled materials, one must know both what the material is and how it is being recycled in order to determine whether it is a Subtitle C waste. The definition of solid waste (codified in 40 CFR 261) identifies four types of recycling activities that may involve solid waste management:

- o Use constituting disposal - This activity involves any direct placement of wastes or waste-derived products (products that contain a waste as an ingredient) onto the land (40 CFR 261.2(c)(1)).^{3/}

^{2/} Throughout this manual, we refer for convenience to "hazardous secondary materials." This term refers to any hazardous material that can be a solid and hazardous waste when recycled. As described below, hazardous secondary materials include spent materials, sludges, by-products, commercial chemical products, or scrap metals (50 FR 616).

^{3/} Use of a waste to produce a product that is placed on the land is also considered use constituting disposal.

- o Burning wastes or waste-derived fuels for energy recovery, or using wastes to produce a fuel (40 CFR 261.2(c)(2)).
- o Reclamation - This activity involves the regeneration of wastes or the recovery of material from wastes (40 CFR 261.2(c)(3)).
- o Speculative accumulation - This activity includes (1) accumulating wastes that one legitimately expects to recycle, but for which no recycling market (or no feasible recycling method) currently exists, and (2) accumulating wastes for recycling without recycling at least 75 percent of the accumulated material within a one-year period (40 CFR 261.2(c)(4) and 261.1(c)(8)).

The definition also distinguishes among five types of hazardous materials:

- o Spent materials: materials that have been used and as a result of such use become contaminated by physical or chemical impurities, such that they can no longer serve the purpose for which they were produced without being regenerated (40 CFR 261.1(c)(1)).
- o Sludges: residues from treating air or wastewater, or other residues from pollution control operations (40 CFR 260.10).
- o By-products: residual materials resulting from industrial, commercial, mining, and agricultural operations that are not primary products, are not produced separately, are not fit for a desired end use without substantial further processing, and are not spent materials, sludges, commercial chemical products, or scrap metals (40 CFR 261.1(c)(3)).
- o Commercial chemical products: commercial chemical products and intermediates, off-specification variants, spill residues, and container residues that are listed in 40 CFR 261.33 or exhibit one or more of the hazardous waste characteristics (50 FR 14219).

- o Scrap metal: bits and pieces of metal parts that are generated by metal processing operations or result from consumer use (40 CFR 261.1(c)(6)).

Exhibit 2 lists examples of wastes in each of these categories.

Finally, it is necessary to know on what basis a material would be defined as hazardous to determine its status, if recycled. Some materials are specifically listed as hazardous under 40 CFR 261.31-33 (listed wastes). Others exhibit one of the characteristics of hazardous wastes defined in 40 CFR 261.20-24 (ignitability, corrosivity, reactivity, and extraction procedure (EP) toxicity -- characteristic or non-listed wastes). Materials not defined as hazardous are not subject to Subtitle C regulation. Thus, we describe solid wastes as potentially subject to Subtitle C regulation. Solid wastes must also be hazardous -- either as a listed or a characteristic waste -- before being subject to such regulation (40 CFR 261.1(b)(1)).^{4/}

Except for certain materials (discussed below), one must consider both the material and the recycling practice to determine whether a recycled material is defined as a solid (and potentially a hazardous) waste (40 CFR 261.2 (c)). Exhibit 3 shows the combinations of secondary materials and recycling activities for which the secondary material is defined as a solid waste. If such a secondary material is also defined as hazardous (i.e., it is specifically listed in 40 CFR 261.31-33 or exhibits a characteristic of hazardous wastes defined in 40 CFR 261.20-24), it is a hazardous waste and is subject to Subtitle C regulation.

As Exhibit 3 indicates, all scrap metals and all listed and characteristic spent materials, sludges, and by-products are solid wastes when used in a manner constituting disposal, burned for energy recovery, used to produce a fuel, or speculatively accumulated. In addition, all listed and characteristic commercial chemical products are solid wastes when used in a manner constituting disposal, burned as a fuel, or used to produce a fuel, unless this is their ordinary manner of use. (Commercial chemical products are not solid wastes when speculatively

^{4/} Certain solid wastes, listed under 40 CFR 261.4(b), are specifically excluded from the definition of hazardous waste.

accumulated.) Finally, the definition provides that only spent materials (both listed and characteristic), listed sludges, and listed by-products are solid wastes when reclaimed. The regulation excludes characteristic sludges and by-products and both listed and characteristic commercial chemical products that are reclaimed from the definition of solid waste, to avoid possible over-regulation of certain recycled materials that are more product-like than waste-like.

Materials That Are Not Spent Materials

Distinguishing spent materials from products that are not yet "spent" may present some difficulty. As noted above, a spent material is any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing. EPA interprets "the purpose for which a material was produced" to include all uses of the product that are similar to the original use of the particular batch of material in question. For example, EPA cites the case of materials used as solvents to clean printed circuit boards (50 FR 624). If the solvents become too contaminated for this use but are still pure enough for similar applications (e.g., use as metal degreasers), they are not spent materials. Use of slightly contaminated solvents in this way is simply continued use of the original material rather than recycling of a spent material. However, the solvents would be spent materials if they had to be reclaimed before reuse or if the manner in which they were used was not similar to their original application. Examples of the latter are burning solvents as fuel, or using materials originally used as solvents as feedstocks in chemical manufacturing. (It should be noted that in the last example the solvent still may not be a solid waste, but this conclusion would be based on its use as a feedstock. See next section for details.) As another example, used plating baths reused directly in other plating processes would not be spent materials. If used for a purpose other than plating, however, the used plating baths would be a spent material.

Leftover unreacted raw materials from a process also are not spent materials, since they have never been used (50 FR 624). Similarly, leftover fuel is not classified as a spent material, since fuel, by definition, is spent only when it is destroyed to produce energy. In addition, off-specification fuels that are burned for energy recovery are not spent materials, since the

contamination is not sufficient to prevent its use for the intended purpose (as a fuel) (50 FR 630). Off-specification fuels used in other ways may be solid wastes, however. For example, use of the off-specification fuel in a manner constituting disposal would be solid waste management.

Materials That Are Not Solid Wastes When Recycled

In addition to identifying materials that are solid wastes when recycled, the regulation specifies which materials are not wastes when recycled (40 CFR 261.2 (e)). Specifically, the definition excludes three activities (except as noted below) that ordinarily are not considered to involve waste management because (1) they resemble ordinary production operations, or (2) they resemble ordinary use of commercial products. These activities are:

- o Use or reuse of secondary materials as ingredients in industrial processes, provided the materials are not being reclaimed - This activity involves the direct use of a secondary material as an ingredient without prior reclamation. An example is the use of distillation bottoms from the production of carbon tetrachloride as a feedstock in producing tetrachloroethylene (50 FR 619).
- o Use or reuse of secondary materials as effective substitutes for commercial products - This activity involves direct use of secondary materials in non-manufacturing applications or functions. (This situation differs from the one just described in that the material substitutes for a finished product rather than a raw material ingredient in a production process.) An example is the use of certain sludges as a substitute for commercial wastewater conditioners (50 FR 619-620).
- o Return of secondary materials to the original primary production process in which they are generated without first reclaiming them - This activity is termed "closed-loop recycling." Materials qualify for the closed-loop exclusion if: (1) the secondary materials are returned for reuse in the process that generated them without

first being reclaimed; (2) the process to which these unreclaimed materials are returned is a primary production process (i.e., is based primarily on virgin raw materials as feedstocks); and (3) the materials are returned to the process as an ingredient or feedstock. An example of closed-loop recycling is resmelting of emission control dusts in the primary metal smelting furnace that originally generated them (50 FR 620).

It is important to note that these exclusions do not apply to hazardous secondary materials used as fuels or as ingredients in waste-derived fuels; to hazardous secondary materials placed directly on the land or used in waste-derived products that will be placed on the land; or to hazardous secondary materials that are speculatively accumulated. In these situations, the material is a solid and hazardous waste, and subject to RCRA Subtitle C jurisdiction. (See 40 CFR 261.2(e)(2).) In addition, residues derived from listed wastes remain subject to RCRA Subtitle C jurisdiction. Residues derived from characteristic hazardous wastes are subject to Subtitle C regulations only if the residues themselves exhibit any of the hazardous waste characteristics.

Variances

The regulation defines three circumstances in which recycled materials that ordinarily would be considered solid wastes may be eligible for case-by-case variances (40 CFR 260.30):

- o Materials accumulated without sufficient amounts being recycled - Cases in which less than 75 percent of recyclable material is recycled (or shipped for recycling) within a year may be eligible for a variance if the applicant demonstrates that sufficient amounts of the material will be recycled or transferred for recycling in the following year. Without a variance, any hazardous secondary material left unrecycled would be defined as a solid waste, and subject to all applicable hazardous waste requirements. With a variance, the remaining accumulated material would be excluded from the definition of solid waste for the following year (40 CFR 260.31(a)).

- o Materials that are reclaimed and then reused as a feedstock within the original primary production process in which they were generated - These materials may receive a variance if the reclamation operation is deemed to be an essential part of the production process and the materials are handled in a manner commensurate with the management of raw materials or products. Without a variance, this activity would be defined as reclamation, and materials that are defined as solid wastes when reclaimed would be subject to the appropriate Subtitle C requirements. With a variance, the materials would be excluded from the definition of solid waste. For example, an ignitable solvent that is regenerated and returned to a chemical reactor as an ingredient ordinarily would be considered a solid waste, since reclamation of the spent material is required before reuse. Under the case-by-case variance provision, however, the material could be excluded from classification as a solid waste (40 CFR 260.31(b)). 5/

- o Materials that are reclaimed but must be reclaimed further before material recovery is completed - These materials may receive a variance if, after initial reclamation, the resulting material is commodity-like (even though it is not yet a commercial product, and must be reclaimed further). Thus, materials that have undergone processing that substantially completes the recycling process might be excluded from definition as solid wastes. An example is ore concentrate reclaimed from electroplating wastes that must be

5/ It should be noted that on December 16, 1985, EPA requested comment on a generic exclusion from the definition of solid waste when: (1) the materials are returned, after being reclaimed, to the original process in which they were generated; (2) only tank storage is involved, and the entire process, through completion of reclamation, is "closed" (i.e., entirely connected with pipes or other comparable enclosed means of conveyance); (3) the materials are never accumulated in such tanks for over 12 months without being reclaimed; and (4) reclamation does not involve controlled flame combustion (50 FR 61265).

processed in a smelter before use. The ore concentrate is much like a raw material in this case and may be excluded from the definition of solid waste if a variance is granted. A variance will not be granted if the initial recycling step is minimal (40 CFR 260.31(c)).

Standards and criteria for EPA Regional Administrators to follow in granting or denying variances from classification as a solid waste are detailed in 40 CFR 260.31. In addition, 40 CFR 260.33 delineates the procedures for evaluating applications for variances, including public notification and comment periods. The Regional Administrator must follow these procedures in responding to requests that meet one of the three eligibility criteria described above. (If a variance application does not meet the eligibility criteria, the Regional Administrator may deny the request without following the formal evaluation procedures.)

Inherently Waste-Like Materials

Certain "inherently waste-like" materials are defined as solid and hazardous wastes regardless of how they are recycled (40 CFR 261.2 (d)). To identify an inherently waste-like material, EPA must go through formal rulemaking to demonstrate how the material in question meets the criteria specified in 40 CFR 261.2(d). Wastes currently included in this category are the chlorinated dioxin- and dibenzofuran-containing wastes listed in Exhibit 4 as F020, F022, F023, F026, and F028. Waste F021 is not designated as a solid waste if it is used as an ingredient to make a product at the site of generation, but is a solid waste if recycled or disposed of in any other way.

Additional Exclusions

Finally, certain materials are explicitly excluded from the definition of solid waste (40 CFR 261.4 (a)). These materials are listed in Exhibit 5. The list includes two cases in which materials are excluded from the definition of solid waste only if they are recycled in specific ways:

- o Pulping liquors that are reclaimed in a pulping liquor recovery furnace and then reused in the pulping process (50 FR 14218) unless accumulated speculatively; and

- o Spent sulfuric acid used to produce virgin sulfuric acid, unless accumulated speculatively.

Applicable Regulations

The requirements that apply to recycled hazardous wastes are defined by regulations issued by EPA under Subtitle C of RCRA. Additional requirements may be imposed by individual states. This section describes the Subtitle C regulations that impose minimum requirements for such wastes.

In most cases, materials that are solid and hazardous wastes when recycled are subject to the general hazardous waste management requirements (i.e., the requirements applicable to hazardous wastes being stored or disposed rather than recycled) prior to recycling. Thus, generators of wastes destined for recycling are subject to waste characterization, notification, manifest, pre-transport, and (where applicable), short-term storage requirements for these wastes up to the point of recycling (40 CFR Part 262).^{6/} Transporters of wastes destined for recycling are subject to the requirements of 40 CFR Part 263. Parties storing wastes prior to recycling are subject to requirements under 40 CFR 262.34 or 40 CFR 264 and 265 Subparts A through L. Recyclers who are not the generators of the waste are subject to the full Part 264 and 265 storage requirements, regardless of the length of the storage period.

Certain recycled materials -- for example, spent lead-acid batteries that are reclaimed and materials from which precious metals are recovered -- are subject to a lesser set of controls (40 CFR 266). These materials and the reduced requirements that apply to them are discussed in the detailed description of regulations in the next section.

^{6/} Short-term storage regulations apply to generators of at least 1,000 kilograms of hazardous waste per month who store wastes in tanks or containers for no more than 90 days prior to recycling them on-site or sending them off-site for recycling. Short-term storage regulations also apply to generators of between 100 and 1,000 kilograms of hazardous waste per month who store wastes in tanks or containers for no more than 180 to 270 days before recycling them on-site or sending them off-site for recycling. (40 CFR 262.)

Wastes generated by generators of less than 100 kilograms per month are conditionally exempt from most Subtitle C requirements (40 CFR 261.5).^{7/} (Acutely-hazardous wastes are exempt only if generated in quantities less than one kilogram per month.) Moreover, secondary materials that are excluded from the definition of solid waste or are exempt from regulation when they are to be recycled are excluded from the calculation of the 100 kilogram per month limit (40 CFR 261.5(c)). In addition, generators who recycle solid wastes but are not subject to 40 CFR Parts 262.34, 263, 264, or 265 because they neither store, transport, treat nor dispose of hazardous wastes (e.g., generators who regenerate solvents on-site in continuous distillation columns and recycle the reclaimed materials directly back to their original use) are excused from all other Subtitle C requirements for these wastes and need not include them in calculating the 100 kilogram per month exemption (50 FR 652). Therefore, whether other wastes are subject to Subtitle C regulation may depend in some cases on whether a waste destined for recycling is defined as a solid waste.

The useful products produced by recycling generally are not defined as wastes and therefore are not subject to Subtitle C regulation, with some exceptions. Hazardous materials produced by recycling that require further processing before use are still wastes rather than products, and remain subject to applicable regulations (50 FR 634).^{8/} (This exception does not apply to products of the reclamation of characteristic by-products or characteristic sludges, since characteristic by-products and sludges that are reclaimed are not defined as solid wastes.) In

^{7/} This exemption was lowered from 1,000 kilograms per month to 100 kilograms per month under a rule promulgated in March 1986. This rule also establishes requirements for hazardous wastes from generators of between 100 and 1,000 kilograms per month; these requirements differ somewhat from requirements for wastes from larger quantity generators.

^{8/} For example, lead and oxides obtained by cracking a spent lead-acid battery (a characteristic spent material) must be reclaimed by a secondary lead smelter or otherwise processed to recover the lead. Because battery-cracking does not complete the recycling process, and the material exhibits a hazardous characteristic (EP-toxicity), the lead and oxides remain a solid and hazardous waste and are subject to Subtitle C regulations.

addition, reclaimed materials that are not ordinarily considered to be commercial products, such as wastewaters or stabilized wastes, are defined as solid wastes; if hazardous, these wastes are subject to Subtitle C requirements (50 FR 634). Recycled materials destined for use as a fuel or for placement on the land for beneficial use are also subject to Subtitle C requirements if they contain a listed waste as an ingredient or exhibit a hazardous waste characteristic (see page 1-18 for possible exceptions). Finally, any residues produced by recycling are themselves hazardous wastes if (1) the material being recycled is a listed hazardous waste or (2) if the waste is not a listed waste, the residue exhibits one of the characteristics of a hazardous waste; these residues are subject to any applicable Subtitle C requirements (40 CFR 261.3). (It is important to note that waste-derived products that are placed on the land have been temporarily exempted from regulation under Subtitle C (40 CFR 266.20(b)). Moreover, as of March 1986, the Agency has only developed administrative and storage requirements for fuels derived from hazardous wastes; the technical standards for burning these fuels have not yet been proposed.)

Most recycling activities themselves currently are not subject to Subtitle C requirements. However, use constituting disposal (placement of a hazardous waste or a material derived from or otherwise containing a hazardous waste on the land) is subject to Subtitle C requirements under 40 CFR Parts 264 and 265, Subparts M and N (see page 1-18 for possible exceptions). In addition, burning of hazardous wastes or fuels derived from or otherwise containing a hazardous waste in boilers or industrial furnaces eventually will be subject to requirements currently being developed by EPA under 40 CFR Parts 264, 265, and 266, and currently is banned in all devices but industrial boilers and furnaces (see 40 CFR 266.31, as amended by the Federal Register of November 29, 1985).

Exemptions

Some materials, listed in Exhibit 6, are defined as solid wastes when recycled but currently are exempt from all RCRA Subtitle C requirements (40 CFR 261.6(a)(3)). These include scrap metals, reclaimed industrial alcohols, used oils recycled other than by burning, certain used batteries, certain waste-

derived fuels produced from petroleum refining hazardous wastes, and certain coke and coal tar wastes from the iron and steel industry.9/

Burden of Proof

Persons accumulating hazardous secondary materials not otherwise defined as wastes have the burden of proving that they are not accumulating materials speculatively; that is, that they are recycling sufficient amounts of secondary materials (50 FR 636). Absent such proof, materials stored prior to recycling will be presumed to be hazardous wastes. At a minimum, EPA expects those who accumulate potentially recyclable materials to maintain records for each class of material recycled in the same way. These records should indicate (1) the amount of secondary material that is on-hand at the beginning of the calendar year, (2) the amount of material added during the year, and (3) the amount remaining at the end of the year. Records customarily maintained, such as records of throughput for an industrial process, should be satisfactory for this purpose. In addition, names and addresses of recyclers receiving secondary materials should be

9/ EPA has proposed to list used oil as a hazardous waste (50 FR 49258) and to establish special management standards for used oil that is recycled (50 FR 49212). Prior to promulgation of these rules, only characteristic used oil to be burned as a fuel -- or fuel produced from used oil that exhibits a characteristic -- is subject to Subtitle C requirements. Used oil fuel that does not meet a specification for arsenic (5 ppm), cadmium (2 ppm), chromium (10 ppm), lead (100 ppm), flash point (100 degrees F), or total halogens (4,000 ppm) is subject to special standards under 40 CFR Part 266 Subpart E when burned for energy recovery. Furthermore, used oil containing more than 1,000 ppm total halogens is presumed to be mixed with listed hazardous waste, and is subject to all applicable Subtitle C requirements for hazardous waste fuel, unless the presumption of mixing can be successfully rebutted. If burned for energy recovery, used oil that meets the specification for used oil fuels is subject to limited requirements under 40 CFR 266. Used oil that exhibits a characteristic currently is exempt from Subtitle C requirements if recycled other than by burning for energy recovery.

maintained, as well as any other information that substantiates compliance with the minimum turnover rate (e.g., contracts or correspondence with a recycler).

In addition, persons accumulating hazardous secondary materials that they claim are not solid wastes because they are recycled in a particular manner have the burden of proving that they indeed recycle materials in the way claimed (50 FR 642). Although the regulations contain no formal recordkeeping requirement, persons who recycle potentially hazardous secondary materials must keep records or other means of substantiating a claim that they are not managing a solid waste. In addition, owners or operators of facilities claiming that they are engaged in recycling must show that they have the necessary equipment to do so, and that such equipment is operational. Absence of documentation not only would make it difficult or impossible to carry the burden of proof, but would itself be seen by EPA as evidence that the claimed recycling is a sham.

Finally, EPA considers certain characteristics of the recycling practice in question to determine when the practice constitutes legitimate recycling (50 FR 638). In general, practices will be considered disposal rather than use/reuse where the secondary material is ineffective (or only marginally effective) for the claimed use, where secondary materials are used in amounts in excess of the amount necessary for operating a process, where the secondary material is considerably less effective than the material it replaces, or where materials are not handled in a manner consistent with use as a substitute for raw materials or commercial products (e.g., when not stored or handled so as to prevent significant economic losses). For example:

- o For wastes incorporated into products to be placed on the ground (which may be eligible for an exemption from the requirements), the waste must contribute to the effectiveness of the product. Wastes used in a fertilizer must contain nutrients or micronutrients, and wastes used in cement must have pozzolanic properties.
- o To be eligible for reduced requirements for precious metals reclamation, wastes must contain precious metals in economically-recoverable quantities.

- o Burning of wastes in industrial furnaces would be deemed to be disposal rather than materials recovery if the materials recovery is economically insignificant or where the quantities of waste burned would provide materials in excess of what can feasibly be recovered and used.

DETAILED DESCRIPTION OF REGULATED PRACTICES AND REGULATORY REQUIREMENTS

This section provides detailed descriptions of recycling activities. It identifies wastes that are defined as solid (and potentially hazardous) wastes when recycled by each method, and lists the Subtitle C requirements that apply in each case. The following activities are discussed in separate subsections:

- o Use Constituting Disposal
- o Burning for Energy Recovery/Use to Produce Fuel
- o Reclamation

In addition, the final part of this section discusses speculative accumulation. These descriptions should be consulted to verify the user's conclusions about the regulatory status of a particular material.

Use Constituting Disposal

Use constituting disposal is defined as:

1. Applying materials to the land or placing them on the land in a manner constituting disposal;
2. Applying materials contained in a product to the land or placing them on the land in a manner constituting disposal (40 CFR 261.2(c)(1)).

Examples of such use include use as fill or cover material; use for structural support; use as a fertilizer; use as a soil conditioner or dust suppressor; or use in asphalt or building foundation materials. "Placement on the land" is construed broadly

also to include most types of placement in water (except where some type of chemical reaction occurs, such as use as a water conditioner) (50 FR 628).

As noted above, all hazardous secondary materials are considered solid wastes when applied to the land in these ways, except for listed commercial chemical products whose ordinary use involves application to the land (40 CFR 261.2(c)(1)). Therefore, hazardous waste generator (40 CFR Part 262), transporter (40 CFR Part 263), and storage requirements (40 CFR Parts 264 and 265, Subparts A through L) apply prior to use, and applicable land disposal requirements under 40 CFR Parts 264 and 265, Subparts M and N, apply to the activity itself.

Products that include listed hazardous wastes as ingredients -- i.e., waste-derived products -- are classified as solid and hazardous wastes when placed directly on the land for beneficial use, unless and until the product is formally delisted. Products that include characteristic hazardous wastes as ingredients (also considered waste-derived products) are classified as solid and hazardous wastes only if the product itself exhibits any of the hazardous waste characteristics (see 50 FR 627-628 and 40 CFR 261.3(c) and (d)). However, EPA has temporarily exempted waste-derived products placed on the land from regulation if the waste (a) has undergone a chemical reaction so as to become inseparable by physical means and (b) the resulting combined material is marketed to the general public as a commercial product. In addition, waste-derived fertilizers that are marketed to the general public are also temporarily exempted from regulation (40 CFR 266.20). Products derived from hazardous wastes in which the production process does not significantly alter the waste's chemical or biological character (e.g., where production involves simple mixing of wastes and other ingredients) are not eligible for the temporary exemption. Waste-derived products that are not marketed to the general public as a commercial product also are not exempt from regulation, even if their composition and potential use is identical to that of products on the commercial market. Although the specified waste-derived products are exempt from regulation, all applicable Subtitle C requirements still apply to the wastes before they are incorporated into the waste-derived product (50 FR 629).

Burning for Energy Recovery/
Use to Produce Fuel

Under the Definition of Solid Waste, wastes may be deemed to be burned for energy recovery if they are burned (directly or as part of a waste-derived fuel) in boilers or industrial furnaces (40 CFR 261.2(c)(2)). These combustion devices are defined in 40 CFR 260.10 as follows:

- o Boilers - enclosed devices using controlled flame combustion with specified design and operating characteristics related to the recovery of energy; and
- o Industrial Furnaces - one of a specific list of devices that are integral components of manufacturing processes and that use controlled flame devices to accomplish recovery of materials or energy.

The list of devices defined as industrial furnaces is shown in Exhibit 7. Additional devices may be added to the list of industrial furnaces in the future.

Burning of wastes in industrial furnaces may also be undertaken solely to reclaim materials (see discussion of reclamation in the next section) or to dispose of materials. (EPA interprets any legitimate burning of wastes in boilers to be intended at least in part for energy recovery, since energy recovery is the primary purpose of boiler operations.) The rules applicable to burning for energy recovery apply for recycling in industrial furnaces, unless the burning is solely for recovery of materials (50 FR 630-631). Thus, characteristic sludges and by-products that generally are not subject to Subtitle C requirements if reclaimed will be subject to requirements when burned in boilers or industrial furnaces when energy recovery is also accomplished. Burning in devices other than boilers and industrial furnaces is regulated as incineration or thermal treatment under Subtitle C, and wastes destined for such burning are subject to full requirements under Subtitle C, even if recycling is intended.

As described in the previous section, all hazardous secondary materials are solid and hazardous wastes when burned directly as a fuel, or when processed or blended to produce a fuel. The only exceptions are commercial chemical products that

are originally intended for use as fuels, including off-specification fuels (e.g., natural gas pipeline condensate generated in the pipeline transmission of natural gas) that are burned for energy recovery (50 FR 630 and 40 CFR 261.2(c)(2)). In addition, used oils that are hazardous only because they exhibit a characteristic of hazardous wastes are subject to special standards in Part 266, Subpart E when used as fuels, and may be subject to additional regulation in the future.

EPA currently is developing, in two phases, regulations that will govern burning of wastes as fuels. On 29 November 1985, EPA promulgated a first set of rules that extend generator (Part 262), transporter (Part 263), and interim status storage requirements (Part 265) to fuels derived from solid and hazardous wastes not previously subject to Subtitle C requirements. The rule also establishes a rebuttable presumption that used oil containing more than 1,000 ppm total halogens is mixed with listed hazardous wastes, and therefore is subject to the same requirements as other hazardous wastes when burned as fuel. In addition, the rule prohibits the burning of hazardous waste fuel and contaminated used oil (used oil that does not meet specifications for arsenic, cadmium, chromium, lead, flash point and/or halogens) in non-industrial boilers. Finally, the rule imposes requirements for generators, marketers, and burners of used oil burned as fuel, including notification, use of a manifest or invoice, fuel analysis, and storage requirements.

In the second rule-making phase, EPA is developing permit standards for burning of used oil fuels, hazardous waste, and waste-derived fuels in boilers and industrial furnaces. (These rules will affect all burning of hazardous wastes in such devices, regardless of the purpose of burning.) The permit standards are scheduled for proposal in 1986, and will specify additional storage and administrative requirements and technical controls on burning.

Reclamation

Reclamation is defined as:

1. The regeneration of waste materials; or
2. The recovery of material with value from wastes (40 CFR 261.1(b)(4)).

Reclamation includes such activities as dewatering, ion exchange, distillation, and smelting. Simple collection (such as collection of solvent vapors) or the agglomeration of materials (e.g., in a sintering furnace) is not reclamation. Use of materials as feedstocks or ingredients (e.g., use of a material as a reactant in the production of a new product) also is not reclamation (50 FR 633).

Spent materials, scrap metals, listed sludges, and listed by-products are solid wastes when reclaimed (40 CFR 261.2(c)(3)).^{10/} Prior to reclamation, these materials are subject to hazardous waste generator (40 CFR 262), transporter (40 CFR 263), and storage requirements (40 CFR 264 and 265, Subparts A through L). Residues derived from reclaiming listed spent materials, by-products and sludges are also listed hazardous wastes and are subject to Subtitle C regulation, unless and until they are delisted. Residues from the reclamation of characteristic spent materials are regulated as hazardous wastes if they also exhibit one of the characteristics of a hazardous waste. Reclamation processes themselves are not regulated (40 CFR 261.3(c) and (d)).

Certain types of materials recovery in industrial furnaces are not within the jurisdiction of RCRA, and materials that are defined as solid and hazardous wastes prior to such reclamation (and subject to storage and other applicable standards) may not be defined as solid wastes during the reclamation process. These are situations where the secondary material being reclaimed is indigenous to the process in which the industrial furnace is being used, for example, because the secondary material contains the same types and concentrations of constituents as the raw materials normally burned in the industrial furnace. Since the burning process itself is not currently subject to Subtitle C standards, the only practical implication of the difference in

^{10/} Although scrap metal that is reclaimed is defined as a solid waste, it is temporarily exempt from all RCRA hazardous waste requirements (40 CFR 261.6(a)(3)). Characteristic sludges and by-products may be subject to Subtitle C requirements if reclaimed in boilers or industrial furnaces, if some energy recovery occurs as well (see 50 FR 630-631). As described above, these wastes are subject to requirements when burned as fuels (40 CFR 261.2(c)(2)).

status of these wastes prior to and during burning is the status of residuals from burning. A residue from burning an indigenous material that is burned solely for materials recovery in an industrial furnace would not be subject to Subtitle C requirements, unless the residue itself exhibits one or more of the characteristics of hazardous waste. For example, a listed process residue from a smelting furnace that is resmelted in the same furnace would not be a solid waste at the point of resmelting, although it would be subject to Subtitle C requirements if stored prior to being resmelted. (See 50 FR 49167, November 29, 1985.)

The products of reclamation are generally not wastes and are not subject to RCRA unless:

1. They are burned as fuel or placed on the land;
2. They are not ordinarily considered to be commercial products (e.g., reclaimed wastewater); or
3. Reclamation processing is minimal or does not complete the recovery process (50 FR 634).11/

As described above, listed sludges, listed by-products, and listed or characteristic spent materials that are reclaimed are solid wastes and subject to Subtitle C generator requirements; if stored or transported, these materials are also subject to Subtitle C storage and transport requirements. Some wastes, however, are subject to reduced requirements when reclaimed:

11/ Products of reclamation that are burned as fuel or placed on the land are not solid wastes if they are commercial chemical products ordinarily produced for these uses (50 FR 634). In addition, the requirement that the recovery process be complete before a product of reclamation is no longer considered a waste does not apply to the reclamation of characteristic by-products or sludges; the intermediate products of reclamation of these materials are not solid wastes since the sludges and by-products themselves are not solid wastes.

- o Materials from which precious metals are recovered are subject to the limited provisions under 40 CFR 266 Subpart F (i.e., notification, manifest, and recordkeeping requirements only). To qualify, the reclamation process must recover economically significant amounts of gold, silver, platinum, palladium, iridium, osmium, rhodium, ruthenium, or some combination of these metals from the waste in question.

- o Generators, transporters, and collectors of spent lead-acid batteries who do not also recover the lead from the batteries are not subject to the hazardous waste regulations. Reclaimers of lead from these batteries must notify and, if they store the batteries prior to reclamation, comply with the storage facility requirements of 40 CFR 264 and 265 Subparts A through L, with the exception of waste characterization (264.14 and 265.23) and manifest-related requirements (264.71-72, 265.71-72). The limited provisions applicable to persons who reclaim spent lead-acid batteries are summarized under 40 CFR 266 Subpart G.

Spent lead acid batteries that are to be reclaimed are excluded from the calculation of the 100 kg/month exemption level (40 CFR 261.5) because they are not subject to regulation in the hands of the generator (50 FR 14218). Precious metal wastes, however, must be included in the calculation of the exemption (50 FR 652 and 50 FR 14218).

Speculative Accumulation

Any hazardous secondary material not otherwise defined as a solid waste when recycled is considered a waste if it is accumulated before recycling, unless the person accumulating the material can show that (1) the material is potentially recyclable and there is a feasible means of recycling the material, and (2) at least 75 percent of the accumulated material is recycled in

one calendar year (40 CFR 261.2(c)(4)).^{12/} The only exceptions to this rule are hazardous commercial chemical products (listed or characteristic) which are not considered wastes when stored prior to recycling (40 CFR 261.2(c)(4)). Generator (40 CFR 262), transporter (40 CFR 263), and storage requirements (40 CFR 264 and 265, Subparts A through L) apply to speculatively accumulated wastes.

^{12/} The 75 percent turnover rate may be calculated on the basis of volume or weight, and applies to waste accumulated during a calendar year beginning January 1. The 75 percent turnover requirement applies to all materials of the same class (materials of the same type generated from the same process) destined to be recycled in the same way (50 FR 635 and 40 CFR 261.1(c)(8)).

Exhibit 1

Description of Activity:

Questions:

1. Is the material that is recycled a secondary material?
 yes no
If yes, go on to question (2).
If no, the material is not a solid waste.
2. Is the material hazardous? (A material is hazardous if it is listed under 40 CFR 261.30-.33 or exhibits one of the characteristics of a hazardous waste given in 40 CFR 261.20-.24, and is not specifically excluded from the definition of hazardous waste under 40 CFR 261.4(b).)
 yes no
If yes, go on to question (3).
If no, the material is not a solid waste.
3. Is the material specifically excluded from the definition of solid waste under 40 CFR 261.4(a) (see the list in Exhibit 5)?
 yes no
If yes, the material is not a solid waste.
If no, go on to question (4).
4. Is the material inherently waste-like (see the list in Exhibit 4)?
 yes no
If yes, the material is a solid waste. See applicable regulations, below.
If no, go on to question (5).
5. Does the activity serve a beneficial use?
 yes no
If yes, go on to question (6).
If no, the activity is not recycling, and the material is a solid waste. See applicable regulations, below.

6. Is there a feasible means for recycling the waste?
 yes no
If yes, go on to question (6a).
If no, go on to question (6b).
- 6a. Is at least 75 percent of the material recycled within one calendar year?
 yes no
If yes, go on to question (7).
If no, go on to question (6b).
- 6b. Is the material a commercial chemical product that exhibits a hazardous waste characteristic or is listed as a hazardous waste in 40 CFR 261.33?
 yes no
If yes, go on to question (7).
If no, the practice is speculative accumulation, and the material is a solid waste. See applicable regulations, below.
7. Is the material placed on the ground or used in a product that is placed on the ground?
 yes no
If yes, go on to question (7a).
If no, go on to question (8).
- 7a. Is the material a commercial chemical product that exhibits a hazardous waste characteristic or is listed in 40 CFR 261.33 that is produced for application to the land?
 yes no
If yes, the material is not a solid waste.
If no, the activity results in use constituting disposal and the material is a solid waste. See applicable regulations, below.
8. Is the material used as a fuel or used to produce a fuel?
 yes no
If yes, go on to question (8a).
If no, go on to question (9).

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8a. Is the material a commercial chemical product that exhibits a hazardous waste characteristic or is listed in 40 CFR 261.33 and that is produced to be burned as fuel?

yes no

If yes, the material is not a solid waste.
If no, the activity results in burning for energy recovery, and the material is a solid waste. See applicable regulations, below.

9. Is the material used or reused

as an ingredient in an industrial process to make a new product without intermediate reclamation (regeneration or recovery of materials),

as an effective substitute for commercial products in a particular function or application, or

as a substitute for raw material feedstock in the primary production process from which it was generated, without being first reclaimed (a closed-loop process)?

If any of the above apply, the activity is use or reuse, and the material is not a solid waste.
If none of the above apply, go on to question (10).

10. Is the material regenerated or are materials with value recovered from the original material?

yes no

If yes, the activity is reclamation. Go on to question (10a).

If no, please review the definitions of activities in this manual and reconsider your answers, or call the RCRA Hotline for assistance.

10a. Is the material

a hazardous waste listed under 40 CFR 261.31 or 261.32 (this provision excludes commercial chemical products, which are listed under 40 CFR 261.33),

a spent material exhibiting one of the characteristics of a hazardous waste given in 40 CFR 261.20-.24, or

a scrap metal?

If any of the above apply, the material is a solid waste. See applicable regulations, below.

If none of the above apply, go on to question (10b).

10b. Is the material

either a sludge or a by-product that exhibits one of the characteristics of a hazardous waste given in 40 CFR 261.20-.24, and that is not listed under 40 CFR 261.31-.32, or

a commercial chemical product listed under 40 CFR 261.33?

If any of the above apply, the material is not a solid waste.

If none of the above apply, please review the definitions of activities in this manual and reconsider your answers, or call the RCRA Hotline for assistance.

Applicable Regulations

1. Is the process exempt from regulation (see the list in Exhibit 6)?

yes no

If yes, the material is not regulated.

If no, the material is regulated. See item (2), below.

2.

Discussion:

Exhibit 2

EXAMPLES OF WASTES BY TYPE

Spent Materials:

spent solvents
spent activated carbon *
spent catalysts
spent acids
spent pickle liquor
spent foundry sands
spent lead-acid batteries
spent potliners
wastewater

Sludges:

bag house dusts
wastewater treatment sludges
flue dusts

By-products:

distillation column bottoms
mining slags
drosses

Scrap Metal:

bars
turnings
rods
sheet
wire
radiators
scrap automobiles
railroad box cars

Commercial Chemicals:

Commercial chemical products or manufacturing intermediates listed in 40 CFR 261.33(e) or (f);

Off-specification variants of the above substances;

Containers or inner liners from containers used to hold the above substances (unless they have been cleansed in the appropriate manner);

Any residue or contaminated debris from the cleanup of a spill of any of the above substances.

Exhibit 2
(continued)

EXAMPLES OF WASTES BY TYPE

Listed Wastes by Category: **

<u>Spent Materials</u>	<u>Sludges</u>	<u>By-Products</u>	
F001	F006	F008	K034
F002	F012	F010	K036
F003	F019	F024	K039
F004	K001	K008	K042
F005	K002	K009	K043
F007	K003	K010	K049
F009	K004	K011	K050
F011	K005	K013	K052
K021	K006	K014	K060
K028	K007	K015	K071
K033	K032	K016	K073
K038	K035	K017	K083
K045	K037	K018	K085
K047	K040	K019	K087
K062	K041	K020	K093
K086	K044	K022	K094
K098	K046	K023	K095
K099	K048	K024	K096
K104	K051	K025	K097
K111	K061	K026	K101
K117	K069	K027	K102
K118	K084	K029	K103
	K100	K030	K105
	K106	K031	K112
			K113
			K114
			K115
			K116
			K136

* Spent activated carbon is a sludge if it is generated by pollution control activities.

** This exhibit does not include inherently waste-like materials (wastes with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026 and F028). In addition, it does not include listed commercial chemical products (all P- and U- wastes listed under 40 CFR 261.33, plus EPA Waste No. F027), which are a separate physical category. Currently, there are no listed wastes in the scrap metals category.

Exhibit 3
TYPES OF SECONDARY MATERIALS DEFINED AS
SOLID AND HAZARDOUS WASTES WHEN RECYCLED

Type of Material	Type of Recycling			
	Use Constituting Disposal	Burning for Energy Recovery, or Use to Produce A Fuel	Reclamation	Speculative Accumulation
Spent Materials (both listed and nonlisted/ characteristic)	Yes	Yes	Yes	Yes
Sludges (listed)	Yes	Yes	Yes	Yes
Sludges (non-listed/characteristic)	Yes	Yes	No	Yes
By-products (listed)	Yes	Yes	Yes	Yes
By-products (non-listed/characteristic)	Yes	Yes	No	Yes
Commercial Chemical Products (both listed and nonlisted/ characteristic; not ordinarily applied to the land or burned as fuels)	Yes	Yes	No	No
Scrap Metal	Yes	Yes	Yes	Yes

Yes : Defined as a solid waste
No : Not defined as a solid waste

Exhibit 4

INHERENTLY WASTE-LIKE MATERIALS

Inherently waste-like materials are specified in greater detail in 40 CFR 261.2(d).

As of December 1985, they include:

- o Wastes from the production or manufacturing use of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives (FO20);
- o Wastes from the production or manufacturing use of pentachlorophenol, or of intermediates used to produce its derivatives (FO21), unless used as an ingredient to make a product at the site of generation;
- o Wastes from the manufacturing use of tetra-, penta-, or hexachlorobenzenes under alkaline conditions (FO22);
- o Wastes from the production of materials on equipment previously used for the production or manufacturing use of tri- and tetrachlorophenols (FO23);
- o Wastes from the production of materials on equipment previously used for the manufacturing use of tetra-, penta-, or hexachlorobenzene under alkaline conditions (FO26);
- o Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. FO20, FO21, FO22, FO23, FO26, and FO27 (FO28).

Exhibit 5

EXCLUDED MATERIALS

The following materials are excluded from the definition of solid waste (40 CFR 261.4(a)):

- o Domestic sewage and mixtures of domestic sewage and industrial wastes;
- o Industrial NPDES point source wastewater discharges;
- o Irrigation return flows;
- o Source, special nuclear or by-product material as defined by the Atomic Energy Act;
- o Materials subjected to in-situ mining techniques which are not removed from the ground;
- o Pulping liquors (i.e., black liquors) that are reclaimed in a pulping liquor recovery furnace and then reused in the pulping process, unless they are speculatively accumulated;
- o Spent sulfuric acid used to produce virgin sulfuric acid, unless it is speculatively accumulated.

Exhibit 6

EXEMPTED MATERIALS

The following materials are defined as solid wastes, but are specifically exempt from RCRA Subtitle C requirements (40 CFR 261.6):

- o Industrial ethyl alcohol that is reclaimed;
- o Used batteries (or used battery cells) returned to a battery manufacturer for regeneration;
- o Used oil that exhibits one or more of the characteristics of hazardous wastes but is recycled in some manner other than being burned for energy recovery;
- o Scrap metal;
- o Fuels produced from the refining of oil-bearing hazardous wastes along with normal process streams at a petroleum refining facility if such wastes result from normal petroleum refining, production, and transportation practices;
- o Oil reclaimed from hazardous waste resulting from normal petroleum refining, production, and transportation practices, if it is to be refined along with normal process streams at a petroleum refining facility;
- o Coke and coal tar from the iron and steel industry that contains hazardous waste from the iron and steel production process;

Exhibit 6
(continued)

EXEMPTED MATERIALS

- o Hazardous waste fuel produced from oil-bearing hazardous wastes from petroleum refining, production, or transportation practices, or produced from oil reclaimed from such hazardous wastes, where such hazardous wastes are reintroduced into a process that does not use distillation or does not produce products from crude oil so long as the resulting fuel meets the used oil specification under 40 CFR 266.40(e) and so long as no other hazardous wastes are used to produce the hazardous waste fuel;
- o Hazardous waste fuel produced from oil-bearing hazardous waste from petroleum refining production and transportation practices, where such hazardous wastes are reintroduced into a refining process after a point at which contaminants are removed, so long as the fuel meets the oil fuel specification under 40 CFR 266.40(e);
- o Oil reclaimed from oil-bearing hazardous wastes from petroleum refining, production, and transportation practices, which reclaimed oil is burned as a fuel without reintroduction to a refining process, so long as the reclaimed oil meets the used oil fuel specification under 40 CFR 266.40(e); and
- o Petroleum coke produced from petroleum refinery hazardous wastes containing oil at the same facility at which such wastes were generated, unless the resulting coke product exhibits one or more characteristics of hazardous waste.

Exhibit 7

DEVICES REGULATED AS INDUSTRIAL FURNACES
(listed in 40 CFR 260.10)

Cement kilns

Lime kilns

Aggregate kilns

Phosphate kilns

Coke ovens

Blast furnaces

Smelting, melting and refining furnaces*

Titanium dioxide chloride process oxidation reactors

Methane reforming furnaces

Pulping liquor recovery furnaces

Combustion devices used in recovery of sulfur values from spent sulfuric acid

* This category includes pyrometallurgical devices such as cupolas, reverberator furnaces, sintering machines, roasters, and foundry furnaces.