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United States Environmental Protection Agency  
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Office of Solid Waste and Emergency Response

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SUBJECT: Regulatory Status of Printed Circuit Boards

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TO: Waste Management Division Directors,  
Regions I-X

Printed electronic circuit boards are major components of personal computers in widespread use in the U.S. today. As updated computer equipment becomes available, the older (but still usable) equipment is often placed into surplus, or is reclaimed/reused. The old equipment may be disassembled and the usable parts salvaged. Parts may also be scrapped and processed for metal values due to their obsolescence, even though they are still usable.

After the printed circuit boards themselves are disassembled, recovering usable components, the boards are often shredded or otherwise processed, and/or burned as part of the reclamation process. Later, base metals (lead, copper) or precious metals (e.g., gold, silver, or platinum) can be reclaimed through additional processing.

The International Precious Metals Institute (IPMI) has written to EPA and requested a determination under RCRA Subtitle C for the status of used printed circuit boards. The regulatory status of unused circuit boards (considered commercial chemical products) and by-product wastes from circuit board production are not affected by this memorandum. The Agency is planning to study the area of used printed circuit boards in more depth; however, our interim interpretation is discussed below.

The EPA believes that based upon the way in which used printed circuit boards are originally generated, these materials most clearly meet the definition of spent materials (§261.1(c)(1)).

However, we have further examined whether these boards can also be classified as scrap metal under §261.1(c)(6). Scrap metal is defined based in large part on the physical appearance of a secondary material, dependent on the presence of metal, and includes secondary materials that would otherwise be spent materials or by-products.

As a matter of policy, the Agency has decided that unprocessed, spent (i.e., used) printed circuit boards are subject to regulation as scrap metal for the purposes of §261.6(a)(3)(iv), and are therefore exempt from RCRA Subtitle C regulation when recycled. The Agency has made this determination largely because 1) metals can be recovered from the pieces of metal parts that are an integral part of these circuit boards, and 2) unprocessed circuit boards are in a physical state similar to the type of recycled materials the Agency intended to be exempted by providing examples in the scrap metal definition (e.g., "metal parts . . . which when worn or superfluous can be recycled"). The physical state of the unprocessed spent circuit boards limits the dispersion of metal constituents during the handling and transport of the spent printed circuit boards similar to the materials defined as scrap metal in the regulatory language. (Note that this determination is limited to spent circuit boards and does not apply to other spent materials.)

After the boards are processed (including shredding, grinding, burning or smelting), the resulting material (e.g., shredded pieces, sweeps/ash, fluff, or baghouse dust) may no longer be similar to the materials that meet the definition of a scrap metal. The Agency believes that certain materials generated from the processing of spent printed circuit boards may be in a physical state which is inherently different from the more "traditional" scrap metal materials, the latter of which includes bars, turnings, rods, sheets, wire, bolts, etc. Spent circuit board processing, particularly those reclamation steps that do not involve simple physical processing, may generate materials in a form which allows the dispersion of hazardous constituents during subsequent handling. Therefore, some of these materials may not meet the definition of, nor the intent of, the scrap metal definition (analogous to the fluff generated by the shredding of scrap automobiles). Thus, at this point, the processed material may no longer be exempt from regulation as scrap metal, and could be

subject to regulation as a spent material (e.g., shredded boards derived from spent circuit boards), a by-product (e.g., sweeps/ash), or a sludge (e.g., baghouse dust).

The processor must determine whether the processed material is a solid waste, and if so, whether it exhibits a characteristic of a hazardous waste, and manage the material accordingly (assuming the material no longer meets the definition of scrap metal). If the generator/processor determines that a material meets the regulatory definition of solid waste but believes the processed (i.e., partially reclaimed) material should be classified as a product rather than a solid waste, an application can be made to the Regional Administrator or authorized State regulatory agency for a case-by-case variance under section 260.30(c) of RCRA. In addition, if the processed material is a hazardous waste that contains economically significant amounts of recoverable precious metals then the materials would be subject to reduced regulations under Part 266, Subpart F.

This determination is limited to circuit boards. For further information about this interpretation, please contact Allen Maples or Ross Elliott of the Regulatory Development Branch at (202) 260-8551.

cc: RCRA Enforcement Branch Chiefs, Regions I-X; NEIC; OWPE; OE; IPMI