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Mining Waste and the Resource Conservation and Recovery Act: An Overview

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INTRODUCTION

Beginning with the industrial revolution in the latter part of the nineteenth century and continuing with the growth and further industrialization of the United States during the twentieth century, the nation has witnessed an exponential growth in the amount of hazardous waste generated as a result of such development.[1] The mining industry played an important part in this industrial development and continues to be an integral part of the nation's economy by providing a number of products or ores to serve a variety of needs.[2] However, an incident of the extraction, beneficiation, and processing of minerals and ores is the generation of large volumes of wastes.[3]

As raw materials are extracted from the earth and processed to recover a refined product, huge volumes of waste materials are created. The volume of mining waste handled by the metal mining industry in 1982 alone amounted to approximately 926 million metric tons.[4] In general, the refined product represents only a small fraction of the total volume of raw material extracted and processed. For example, the ratio of units of material handled to obtain one marketable unit of ore is 420:1 for copper

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[1] U.S. ENVIRONMENTAL PROTECTION AGENCY, RCRA ORIENTATION MANUAL § I-3 (1986) [hereinafter RCRA Manual].

[2] U.S. ENVIRONMENTAL PROTECTION AGENCY, REPORT TO CONGRESS: WASTES FROM THE EXTRACTION AND BENEFICIATION OF METALLIC ORES, PHOSPHATE ROCK, ASBESTOS, OVERBURDEN FROM URANIUM MINING, AND OIL SHALE 2-1 to 2-9 (1985) [hereinafter EPA Report]. The nonfuel mining industry alone produces lead for use in storage batteries and ammunition; copper for use in electrical equipment; iron for the construction and transportation industries; zinc for galvanizing; silver for photographic materials; gold for electronic equipment and jewelry; and uranium for use by electric utilities. *Id.* at 2-1.

[3] *Id.* at 2-10 to 2-11, 2-18 to 2-23.

[4] *Id.* at 2-18, 2-20.

and 7,500:1 for silver.[5] Therefore, to recover one ounce of copper, approximately 26 pounds of raw material must be handled, whereas nearly 470 pounds of raw material must be handled to recover one ounce of silver. Incredibly, almost eleven tons of raw material must be handled and processed to recover one ounce of gold.[6] Like many industrial wastes, the resulting mining waste materials can be hazardous or can contain constituents which are toxic and a danger to human health and the environment.[7]

In response to the growing volume of industrial, mining, and other types of both hazardous and nonhazardous wastes, Congress enacted the Resource Conservation and Recovery Act of 1976 (RCRA)[8] to impose controls on the handling and disposal of these by-products of an industrialized society. In 1980, Congress amended RCRA to suspend temporarily the authority of the Environmental Protection Agency (EPA) to regulate mining wastes as hazardous waste.[9] EPA regulation of mining wastes has evolved from this temporary exclusion of all mining wastes from regulation as hazardous waste in the early 1980s to recent hearings and rulemakings in which the EPA has signaled an intent to strengthen regulations relating to the control and management of mining wastes exhibiting hazardous waste characteristics.[10]

What are the implications of these recent EPA actions for the mining industry? This note seeks to answer this question by focusing on the historical development of RCRA in order to define more accurately Congress' intent with respect to the regulation of mining wastes. Further, EPA reports, rulemakings, and informal actions addressing mining wastes are reviewed to determine how the EPA has interpreted its responsibilities under RCRA in order to predict how future EPA regulation of mining wastes will impact the mining industry.

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[5] *Id.* at 2-11.

[6] *See id.* at 2-11.

[7] EPA Report, *supra* note 2, at 4-2.

[8] Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (1976) (codified at 42 U.S.C. §§ 6901-6992k (1988)) [hereinafter RCRA].

[9] Solid Waste Disposal Act § 3001(b)(3)(A) (codified at 42 U.S.C. § 6921(b)(3)(A) (1988)) [hereinafter SWDA].

[10] *See* 21 Env't Rep. (BNA) 363 (Current Developments June 22, 1990); 21 Env't Rep. (BNA) 812 (Current Developments August 24, 1990).

I. FEDERAL REGULATION OF MINING WASTE

Congress enacted the RCRA[11] in October 1976 in order to control the disposal of increasing volumes of hazardous and solid wastes. Mining industry segments subject to regulation under RCRA include metal and nonmetal mine operations.[12]

Wastes from coal mining operations are subject to regulation under the Surface Mining Control and Reclamation Act of 1977 (SMCRA).[13] SMCRA was enacted to regulate surface mining and reclamation activities. Certain provisions of SMCRA set minimum requirements for the handling and treatment of toxic materials associated with coal mining wastes.[14] Therefore, the use of the phrase "mining industry" in the remainder of this note refers to non-coal mining segments.

A. Resource Conservation and Recovery Act

Congress' first attempt at federal solid waste legislation occurred in 1965 with the passage of the Solid Waste Disposal Act (SWDA).[15] This legislation was amended in 1976 by RCRA, which effectively replaced SWDA with new provisions aimed at addressing the problems of both solid and hazardous waste management. The stated goals of RCRA are to control the disposal of hazardous waste, to protect human health and the environment, and in general to reduce waste and conserve natural resources.[16] RCRA remodeled the nation's solid waste management system and greatly expanded governmental control of hazardous waste management.[17]

SWDA was amended again by the Solid Waste Disposal Act Amendments of 1980[18] and by the Hazardous and Solid Waste

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[11] 42 U.S.C. §§ 6901-6992k (1988).

[12] Metals include copper, gold, iron ore, lead, silver, titanium, tungsten, uranium, and zinc. Nonmetals include asbestos and phosphate rock. EPA Report, *supra* note 2, at 2-3.

[13] Surface Mining Control and Reclamation Act of 1977, Pub. L. No. 95-87, 91 Stat. 445 (codified at 30 U.S.C. §§ 1201-1328 (1988)) [hereinafter SMCRA].

[14] 30 U.S.C. §§ 1265(b)(3), (11), (14) (1988). *See also* 30 U.S.C. §§ 1265(f), 1266(b)(4), (5) (1988).

[15] Solid Waste Disposal Act, Pub. L. No. 89-272, 79 Stat. 997 (1965) (codified as amended at 42 U.S.C. §§ 6901-6992k (1988)).

[16] 42 U.S.C. § 6902 (1988). *See also* RCRA Manual, *supra* note 1, at I-3.

[17] RCRA Manual, *supra* note 1, at I-5.

[18] Solid Waste Disposal Act Amendments of 1980, Pub. L. No. 96-482, 94 Stat. 2334 (1980).

Amendments of 1984 (HSWA).[19] Included as part of the 1980 Amendments was the so-called Bevill Amendment,[20] which temporarily suspended mineral extraction, beneficiation, and processing wastes from regulation as hazardous waste. The Bevill Amendment directed the EPA to conduct tests to determine the need for regulating such wastes as hazardous materials.[21]

These statutes, along with the implementing regulations[22] promulgated by the EPA, currently represent the nation's solid and hazardous waste management program. The key to this program is RCRA and in particular Subtitle C[23] and Subtitle D[24] of RCRA.

1. *Subtitle C*

Subtitle C establishes a cradle-to-grave management system which controls the generation, transportation, treatment, storage and disposal of hazardous wastes.[25] Section 3001 of RCRA authorizes the EPA to identify specific materials that will be subject to regulation as hazardous waste under Subtitle C.[26] The language in RCRA also granted broad authority to the EPA to issue regulations necessary to protect human health and the environment. The Subtitle C program has subsequently developed into possibly the most comprehensive regulatory program ever administered by the EPA.[27]

2. *Subtitle D*

Subtitle D provides a framework for establishing programs for the management of nonhazardous solid waste on the state level. The primary goal of Subtitle D is to encourage solid waste management programs that (1) promote environmentally sound

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[19] Hazardous and Solid Waste Amendments of 1984, Pub. L. No. 98-616, 98 Stat. 3221 (1984) [hereinafter HSWA].

[20] Solid Waste Disposal Act Amendments of 1980, Pub. L. No. 96-482, 94 Stat. 2334 (1980).

[21] SWDA §§ 3001(b)(3)(A), 8002(p) (codified at 42 U.S.C. §§ 6921(b)(3)(A), 6982(p) (1988)).

[22] 40 C.F.R. §§ 240-271 (1990).

[23] SWDA §§ 3001-3020 (codified at 42 U.S.C. §§ 6921-6939b (1988)).

[24] SWDA §§ 4001-4010 (codified at 42 U.S.C. §§ 6941-6949a (1988)).

[25] RCRA Manual, *supra* note 1, at I-3 to I-11.

[26] SWDA § 3001 (codified at 42 U.S.C. § 6921 (1988)).

[27] *See* R. FORTUNA & D. LENNETT, HAZARDOUS WASTE REGULATION - THE NEW ERA 9-21 (1987).

disposal practices, (2) maximize the recycling and reuse of resources, and (3) promote resource conservation.[28] Subtitle D is a voluntary program through which states can receive federal financial and technical support to develop and implement solid waste management plans. The EPA is responsible for establishing regulations for states to follow in developing their own plans, and the state programs must comply with minimum EPA standards.[29]

The critical difference between Subtitles C and D for purposes of this discussion is that Subtitle D focuses on establishing environmentally sound management plans for solid waste on the state level, while Subtitle C represents a comprehensive, mandatory federal program for managing hazardous wastes from cradle-to-grave.[30] However, pending EPA rulemakings are expected to increase the regulation of certain mining wastes under Subtitle D to levels arguably similar to those of Subtitle C.

B. Surface Mining Control and Reclamation Act

RCRA expressly exempts coal mining waste from regulation as hazardous waste when the coal mining operation is permitted under SMCRA.[31] Specifically, RCRA states that coal mining wastes or overburden covered by a surface coal mining and reclamation permit issued under SMCRA are not subject to regulation under Subtitle C of RCRA.[32] The Secretary of the Interior, with concurrence from the Administrator of the EPA, is responsible for promulgating regulations that effectuate the purposes of Subtitle C with respect to coal mining wastes.[33] Notwithstanding this exemption and a corresponding limitation on the EPA's regulatory authority, EPA regulations promulgated under RCRA attempt to regulate such coal wastes.[34]

RCRA also explicitly provides that exempt coal mining wastes remain subject to regulation under other federal or state laws.[35] In particular, SMCRA incorporates provisions for the regulation

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[28] 42 U.S.C. § 6941 (1988).
[29] *See id.*
[30] RCRA Manual, *supra* note 1, at I-8, I-9, II-3 to II-10.
[31] 42 U.S.C. § 6925(f) (1988).
[32] *Id.*
[33] EPA Report, *supra* note 2, at 1-9.
[34] 40 C.F.R. § 261.4(b)(7) (1990).
[35] 42 U.S.C. § 6921(b)(3)(A) (1988).

of mining waste in an overall program dedicated to regulating the environmental impact and reclamation aspects of surface coal mining and any environmental effects of underground coal mining.[36] SMCRA employs a comprehensive permitting process covering mine operation and reclamation activities which include provisions for managing mine wastes, tailings, coal processing wastes, acid-forming materials, and other toxic materials.[37]

Whether hazardous coal mine waste is identified and handled as effectively under SMCRA as it would be under RCRA is questionable. Regulatory requirements for handling mine wastes under SMCRA focus primarily on insuring the stability of waste piles and impoundments rather than formulating plans for handling hazardous materials.[38] There are no provisions under SMCRA for identifying hazardous mining wastes in the manner in which such wastes are identified and managed under Subtitle C. Ironically, other potentially toxic non-coal materials associated with mining operations are regulated under SMCRA. Methods for the disposal of non-coal mine wastes such as grease, lubricants, and flammable liquids are addressed in 30 C.F.R. Section 816.89 (1991).

The coal mining industry clearly benefits from Congress' decision not to impose Subtitle C regulations on coal wastes. A recent study by the EPA of the potential economic effects of Subtitle C regulation on the copper, lead, zinc, silver, and gold mining industries shows that compliance costs could be substantial depending on the extent of regulation. The EPA estimated the average lifetime costs of hazardous waste regulation of certain mine wastes could range from $7 million to almost $800 million per year.[39]

SMCRA affords the coal mine operator more control over how mining waste and coal processing wastes are handled. Whether significant amounts of hazardous waste are escaping Subtitle C control in the coal mining industry is a question not yet answered.

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[36] 30 U.S.C. §§ 1201-1328 (1988).

[37] 30 U.S.C. § 1265(a)(b)(3), (11), (14) (1988). *See also* 30 U.S.C. §§ 1265(f), 1266(b)(4), (5) (1988).

[38] *See* 30 C.F.R. §§ 816.81-816.102 (1991).

[39] EPA Report, *supra* note 2, at 5-14 to 5-18.

II. MINING WASTES AS SOLID WASTES

A prerequisite to hazardous waste classification is that the material must first be a solid waste.[40] The statutory definition of hazardous waste begins with the phrase "a solid waste, or combination of solid wastes."[41] Therefore, before discussing the regulation of mining waste as a hazardous waste under RCRA, the solid waste status of mining wastes must first be established.

Mining wastes are specifically included in RCRA's solid waste definition. RCRA defines solid wastes as discarded materials including solid, liquid, semi-solid, or gaseous material, resulting from industrial, commercial, mining, and agricultural operations.[42] The major categories of non-coal mining wastes include mine overburden and rock waste, mine water from mining operations, and tailings and residues resulting from the beneficiation of ores.[43]

A. Exceptions to Solid Waste Status

Congress specifically excluded certain wastes from solid waste status,[44] and the EPA has added additional exemptions in its regulatory definition of a solid waste.[45] Of particular interest to

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[40] RCRA Manual, *supra* note 1, at III-9 to III-10.

[41] 42 U.S.C. § 6903(5) (1988).

[42] RCRA defines "solid waste" as follows:

> [a]ny garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, *including solid, liquid, semisolid, or contained gaseous material* resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of Title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C.A. § 2011 et seq.].

42 U.S.C. § 6903(27) (1988).

[43] Mine waste is the soil or rock generated by the mining process and includes the overburden moved at surface mines and rock or other wastes removed when engaging in underground mine development. Beneficiation wastes or tailings generally include waste rock generated by the grinding, crushing, or chemical processing of the raw material to liberate the valuable minerals. Tailings generally leave the processing area as a slurry. Mine water is the water that infiltrates a mine and must be removed to facilitate mining. Mine water quantities can vary greatly from mine to mine. EPA Report, *supra* note 2, at 2-12 to 2-17.

[44] *See* 42 U.S.C. § 6903(27) (1988).

[45] 40 C.F.R. § 261.4(a)(1)-(8) (1990).

the mining industry are the regulations that exempt wastes generated by in-situ mining techniques, but only if the wastes are not removed from the ground.[46] This exemption would apply to leaching operations which employ water or chemical solutions to separate valuable metals from ore bodies remaining in the earth.[47]

The significance of this exclusion is limited, however, because a majority of mining wastes are removed from the ground in the form of raw materials, which are ultimately replaced as backfill or processed to recover the minerals contained therein.[48] Therefore, the in-situ exemption will not protect most mining wastes from being classified as solid wastes.

B. Regulation of Secondary or In-Process Mining Wastes

Although the mining waste itself may not fall within a statutory or regulatory exclusion, the regulations also exclude wastes generated or associated with certain types of processes.[49] These exemptions extend to wastes used (1) as feedstock or as ingredients in an industrial process, (2) as substitutes for commercial products, or (3) in a closed-loop production process.[50] The EPA exempted these activities because the wastes are recycled or reused as substitutes for ordinary commercial products, and therefore waste management is not ordinarily involved.[51] The basis for the exclusion is derived from the idea that no waste management process occurs when the waste material is directly used without any reclamation.[52]

The implications of the process-specific exemptions could be very important for certain mining wastes. For example, mineral beneficiation can involve dump or heap leaching operations used to recover minerals and ores such as gold, copper, uranium, or silver from mined raw material. Leaching occurs when acid or cyanide solutions are sprayed onto the raw material causing the valuable metals to dissolve and separate from the raw material

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[46] 40 C.F.R. § 261.4(a)(5) (1990).

[47] *See* EPA Report, *supra* note 2, at 3-6 to 3-8.

[48] *Id.* at 3-1 to 3-9.

[49] 40 C.F.R. § 261.2(e)(i)-(iii) (1990) (exemptions for certain materials that are recycled).

[50] *Id.*

[51] R. Fortuna & D. Lennett, *supra* note 27, at 74-76.

[52] *Id.*

over a period of time—usually months or years, depending on the specific process.[53] The waste materials remaining after the minerals have been removed are called tailings.[54]

The tailings can be used on or off site, disposed of in tailings ponds, or used in subsequent leaching operations to recover other valuable metals which may be present in the tailings.[55] It is likely that the tailings will contain residue from the acid or cyanide solutions used in the leaching process.[56] Given the fact that the amount of raw material required to recover a relatively small amount of metal is large, the result of the leaching operations will be a correspondingly large pile of contaminated tailings.[57]

The recovery of the leachate or leaching solution is of primary importance since the leachate contains the dissolved metal. The leachate is collected and subjected to further processing to recover the metal and capture as much of the cyanide or acid solution as possible for reuse in the leaching process.[58] Application of a process-specific exemption to the tailings and leachate would allow mining companies to avoid regulation of these by-products as solid wastes and possible regulation as hazardous waste.

It is likely that the acid or cyanide solution recovered from the leachate and reinserted in the leaching process can qualify for an exemption from solid waste status because it is being used as a substitute for a commercial product. While tailings and beneficiation wastes unequivocally abandoned or disposed of clearly represent solid wastes, the status of tailings or other wastes intended for reuse and recycling is unclear.[59]

While greater than half of all tailings are disposed of in piles or tailings ponds, a significant percentage of such tailings are utilized for beneficial purposes.[60] Typical uses for tailings include widespread use as an ingredient in the production of concrete and bituminous aggregates used for road construction.[61] In ef-

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[53] EPA Report, *supra* note 2, at 3-6 to 3-8.

[54] *Id.* at 2-15 to 2-16.

[55] *Id.* at 3-1.

[56] *See id.* at 3-6 to 3-8.

[57] *Id.* at 2-10.

[58] *Id.* at 2-16, 3-7.

[59] 40 C.F.R. § 261.2 (1990). *See generally* S. COOKE, THE LAW OF HAZARDOUS WASTE: MANAGEMENT, CLEANUP, LIABILITY, AND LITIGATION § 2.03[2][b] (1990).

[60] EPA Report, *supra* note 2, at 3-4, 3-10 to 3-13.

[61] *Id.* at 3-3 to 3-4, 3-10.

fect, these tailings constitute a secondary material functioning as a substitute for raw materials. Tailings used as ingredients in this manner would be exempt from solid waste regulation under 40 C.F.R. § 261.2(e)(i), which excludes materials used or reused as ingredients in an industrial process. However, it is questionable whether tailings reprocessed to recover additional metals will qualify for an exemption. The answer to this questions lies in the definition of "solid waste" and the interpretation of the word "discarded."[62]

C. *Identification of Secondary or In-Process Mining Wastes*

The determinative question underlying the issue of whether mining wastes intended for reprocessing or recycling will be regulated as solid wastes is whether the wastes are "discarded." Two recent appellate court decisions have considered the scope of this term in the context of secondary waste materials.

In *American Mining Congress v. U.S. E.P.A. (AMC I)*[63], the court was faced with the question of whether materials reprocessed in order to remove as much pure ore from the material as possible should be classified as a solid waste.[64] The court recognized that not all valuable metals can be extracted during the initial processing and that reprocessing is often necessary to maximize metal recovery.[65] The court determined that Congress did not intend to regulate materials that, although no longer useful in their original capacity, are destined for immediate reuse in another phase of the industry's ongoing production process.[66] The court held that the EPA could not regulate in-process secondary materials such as the reprocessed material in question because the material was destined for beneficial reuse in a continuous process.[67] This holding seems to extend the solid waste exemption to cover tailings reprocessed to recover additional metals.

However, this apparent exemption for reprocessed tailings was limited in a 1990 decision by the same court.[68] In *AMC II*,

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[62] RCRA's definition of "solid waste" names specific materials and then adds "and other discarded material." 42 U.S.C. § 6903(27) (1988). *See supra* note 42.

[63] 824 F.2d 1177 (D.C. Cir. 1987) [hereinafter *AMC I*].

[64] *Id.* at 1178.

[65] *Id.* at 1181.

[66] *Id.* at 1185-86.

[67] *Id.* at 1193.

[68] American Mining Congress v. United States E.P.A., 907 F.2d 1179 (D.C. Cir. 1990) [hereinafter *AMC II*].

the petitioners argued that sludges, stored in surface impoundments but subject to further processing operations at some future time, were not discarded and therefore were not solid wastes.[69] Alternatively, the EPA argued that these materials were discarded and threatened harm to human health and the environment.[70] The D.C. Circuit explained that the exclusion from solid waste classification identified in *AMC I* applied only to materials destined for *immediate reuse* in another phase of the industry's ongoing process.[71]

As a consequence of this holding in *AMC II*, tailings and other materials stored in surface impoundments or piles are now defined as solid waste, unless the materials are reused or reprocessed immediately. However, a strict solid waste classification scheme based on whether or not a material is immediately reused represents an impediment to mine operators who are involved in the recycling or reprocessing of stockpiled tailings.

Mining companies may intentionally accumulate tailings and mine waste in order to reprocess the material to recover additional metals when market conditions make operations economically feasible. Further, mining companies may be unable to reprocess such waste immediately due to mechanical or operational constraints. The EPA has stated that materials accumulated speculatively or stored before recycling are classified as solid wastes.[72] The immediate reuse standard and the rule against speculative accumulation before recycling conflict with Congress' stated intent in RCRA to encourage the reuse and recycling of waste materials.[73]

Strict application of these rules would severely limit a mine operator's ability to maximize operational efficiency in reacting to market conditions. Rather than merely being stored for future use, the tailings must be handled as a solid and possible hazardous waste. In addition, because more than fifty percent of tailings are initially placed in piles or ponds,[74] more waste will now qualify as solid waste under the immediate reuse test.

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[69] *Id.* at 1182.
[70] *Id.* at 1183-84.
[71] *Id.* at 1186.
[72] 40 C.F.R. § 261.2(c) (1990).
[73] *See* 42 U.S.C. §§ 6901(c), 6902(a)(9) (1988).
[74] EPA Report, *supra* note 2, at 2-15 to 2-16.

III. MINING WASTES AS HAZARDOUS WASTES

Upon determining that the mining waste is a solid waste, the next step is to determine whether the waste is hazardous and therefore subject to regulation under Subtitle C or D of RCRA. Congress has defined hazardous waste in very broad terms,[75] while directing the EPA to develop and promulgate criteria for identifying the characteristics of hazardous waste and for listing certain specific wastes as hazardous.[76]

Based upon the statutory definition of hazardous waste and Congress' directive to the EPA, a mining waste qualifies as a hazardous waste if it falls within any one of the following four categories.

(1) the material is a characteristic hazardous waste;[77]
(2) the material is a listed hazardous waste;[78]
(3) the material is a mixture of a listed or characteristic hazardous waste and any other material;[79] or

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[75] RCRA defines "hazardous waste" as follows:

> a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may -
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> (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
>
> (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

42 U.S.C. § 6903(5) (1988).

[76] 42 U.S.C. § 6921(a), (b)(1) (1988).

[77] "RCRA § 3001 authorizes the EPA to identify hazardous wastes by establishing certain characteristics which, if possessed by a solid waste, will render [the waste] hazardous." K. WOODS, IDENTIFICATION OF RCRA - REGULATED SUBSTANCES 13-14 (1989). The EPA has to date established four hazardous waste characteristics: 1) ignitability 2) corrosivity 3) reactivity 4) EP toxicity. *Id.* at 14; 40 C.F.R. §§ 261.20-24 (1990). The EPA has authority to establish other characteristics which will render a waste hazardous, and some states have included additional characteristics in their own programs. *See* 40 C.F.R. § 261.10 (1990) (The regulations set out the criteria for identifying characteristic hazardous wastes in § 261.10; §§ 261.20-261.24 discuss the four hazardous waste characteristics.).

[78] "The EPA may list a waste, usually from a specific production process, as hazardous based principally upon the presence of specific hazardous *constituents* in the waste *or* because the waste consistently exhibits one or more characteristics" identified in note 77. R. Fortuna & D. Lennett, *supra* note 26, at 27. *See also* 40 C.F.R. §§ 261.11, 261.30-261.33 (1990) (The regulations set out the criteria for identifying listed hazardous wastes in § 261.11; §§ 261.30-261.33 include the lists of wastes EPA has identified as hazardous.).

[79] The so-called "mixture rule" is meant to prevent waste handlers from diluting hazardous waste with other materials in order to avoid regulation under RCRA. "Mixtures

(4) the material is derived from a hazardous waste.[80]

Determining whether a waste falls within any of these four categories is of primary importance. Wastes included within any category are subject to the cradle-to-grave hazardous waste management requirements of Subtitle C, unless exempted from such regulation.[81]

A. Exemption from Hazardous Waste Status

In regulations published in 1978 to implement RCRA, the EPA recognized that certain wastes did not warrant full scale regulation as hazardous wastes.[82] These so-called "special wastes,"[83] which included mineral extraction and processing waste, were seen as being generally high in volume, but low in toxicity.[84] The EPA noted that since little information existed regarding the characteristics and dangers of these special wastes, EPA considered itself unable to develop standards for managing such waste.[85]

In 1980, Congress passed an amendment to RCRA[86] which consolidated the special wastes into four categories and established statutory provisions commonly called the "special waste exemptions."[87] These statutory exemptions are collectively known

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of hazardous and solid wastes may or may not be regulated under RCRA" because mixtures involving listed hazardous wastes are treated differently from those involving characteristic hazardous wastes. Mixtures of characteristic wastes and solid wastes will only be considered hazardous if the mixture continues to exhibit one of the four hazardous characteristics. Mixtures containing listed wastes are treated as hazardous unless they qualify for certain exemptions in 40 C.F.R. § 261.3(a)(2)(iii), (iv) (1990). K. Woods, *supra* note 77, at 20-21.

[80] The "derived-from rule" states that "any solid waste generated from the treatment, storage, or disposal of a hazardous waste" is itself a hazardous waste subject to certain exclusions. *See* 40 C.F.R. § 261.3(c), (d) (1990).

[81] *See* 40 C.F.R. § 261.1(b)(1) (1990); 45 Fed. Reg. 33,066 (1980).

[82] 43 Fed. Reg. 58,948, 58,991-92 (1978).

[83] These special wastes included: (1) cement kiln dust waste (2) utility waste including bottom ash waste and fly ash waste (3) phosphate rock mining, beneficiation, and processing waste (4) uranium mining waste (5) other mining waste (6) gas and oil drilling muds and oil production brines. 43 Fed. Reg. 58,946-48, 59,015-16 (1978).

[84] 45 Fed. Reg. 33,065, 33,173-74 (1980).

[85] 43 Fed. Reg. 58,946, 58,991-92 (1978).

[86] Solid Waste Disposal Act Amendments of 1980, Pub. L. No. 96-482, 94 Stat. 2334 (1980).

[87] *Id.*

The four categories include (1) drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of

as the Bevill Amendment, and the wastes affected are known as Bevill wastes.[88] The third of the special waste exemptions temporarily suspends EPA regulation of solid wastes that result from the extraction, beneficiation, and processing of minerals as hazardous wastes until EPA completes studies of these wastes to determine whether regulation as hazardous waste is warranted.[89] Specifically, key provisions of the Bevill Amendment require the EPA to conduct a comprehensive study of the adverse environmental and health effects, if any, of "the disposal and utilization of solid waste from the extraction, beneficiation, and processing of ores and minerals."[90]

Congress was aware that large volumes of waste were produced by mining operations.[91] The legislative intent behind the Bevill Amendment suggests that Congress intended to single out high-volume low-hazard wastes for exclusion from regulation as a hazardous waste until it could be shown that such regulation was necessary.[92] The EPA has therefore provided additional relief from hazardous waste status for certain materials.[93] In

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crude oil or natural gas or geothermal energy (2) fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels (3) solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ore (4) cement kiln dust waste.

42 U.S.C. § 6921(b)(2)(A), (3)(A) (1988).

[88] The Bevill Amendment is named for its sponsor Rep. Tom Bevill (D-Ala.). The Bevill Amendment added two key provisions to RCRA which have specific implications for mining waste: (1) the Amendment directed the EPA to "conduct a detailed and comprehensive study on the adverse effects on human health and the environment, if any, of the disposal and utilization" of mining industry wastes. 42 U.S.C. § 6982(p) (1988); (2) the Amendment suspended from regulation under Subtitle C of RCRA "solid waste from the extraction, beneficiation, and processing of ores and minerals" until at least six months after the EPA completed the study required by 42 U.S.C. § 6982(p). 42 U.S.C. § 6921(b)(3)(A) (1988).

[89] 42 U.S.C. § 6982(p)(3) (1988); *See* 42 U.S.C. § 6903(5) (1988).

[90] SWDA § 8002(p) (codified at 42 U.S.C. § 6982(p) (1988)).

[91] *See* EPA Report, *supra* note 2, at 2-10 to 2-14.

[92] 126 CONG. REC. 3364 (1980). Rep. Williams of Montanta stated that the Bevill Amendment would direct the EPA to evaluate certain high-volume low-toxicity waste so as to assure a reasoned set of regulations by which to manage these wastes. *Id.*

[93] 40 C.F.R. § 261.4(b) provides that the following solid wastes are not hazardous wastes:

(1) household waste

(2) agricultural and livestock waste

(3) "mining overburden returned to the mine site"

(4) wastes generated from the combustion of coal or other fossil fuels

particular, 40 C.F.R. § 261.4(b)(7) provides an exclusion from hazardous waste status for "solid waste from the extraction, beneficiation, and processing of ores and minerals (including coal)."[94]

B. Regulation of Mineral Extraction and Beneficiation Wastes

The EPA could not regulate mining wastes as hazardous material until it completed the studies mandated by the Bevill Amendment. The mining waste studies, initially due by October 1983,[95] were finally completed on December 31, 1985.[96] The report addressed only mineral extraction and beneficiation wastes. The report did not address mineral processing waste because the EPA had proposed in October 1985 to reinterpret the scope of the Bevill Amendment's mining waste exclusion as it applied to processing wastes.[97]

1. *EPA's 1985 Mineral Extraction and Beneficiation Waste Report*

As a result of the 1985 report on mineral extraction and beneficiation wastes, the EPA determined that none of the wastes should be subject to regulation under Subtitle C of RCRA.[98] The EPA noted that some of these wastes were clearly hazardous but believed that "several aspects of EPA's current hazardous waste management standards are likely to be environmentally unnecessary, technically infeasible, or economically impractical

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(5) drilling fluids and other wastes "associated with the exploration, development, or production of crude oil, natural gas or geothermal energy"

(6) certain wastes which fail the test for the toxicity characteristic

(7) "[s]olid waste from the extraction, beneficiation, and processing of ores and minerals (including coal), including phosphate rock and overburden from the mining of uranium ore"

(8) cement kiln dust waste

(9) certain "solid waste which consists of discarded wood or wood products which fails the test for the toxicity characteristic"

(10) certain petroleum-contaminated media and debris.

40 C.F.R. § 261.4(b) (1990).

[94] 40 C.F.R. § 261.4(b)(7) (1990).

[95] 42 U.S.C. § 6982(f) (1988).

[96] EPA Report, *supra* note 2.

[97] 50 Fed. Reg. 40,292 (1985) (to be codified at 40 C.F.R. pt. 261) (proposed Oct. 2, 1985).

[98] 51 Fed. Reg. 24,496 (1986) (to be codified at 40 C.F.R. pt. 261).

when applied to mining waste" (i.e. extraction and beneficiation wastes).[99] In explaining its decision to exempt mineral extraction and beneficiation wastes from Subtitle C regulation, the EPA observed that (1) mining wastes generally have a lower risk potential than other industrial wastes, (2) mining sites are usually located in remote areas in drier climates—typically isolated from water supplies, and (3) regulation under Subtitle C would be very costly to the mining industry.[100]

In lieu of regulation under Subtitle C, EPA announced in June 1986 an intention to develop a regulatory program for extraction and beneficiation wastes under Subtitle D of RCRA.[101] Recognizing that Subtitle D regulations did not fully address mining waste concerns, EPA stated that it would develop new standards to comprise an effective mining waste program under Subtitle D.[102]

2. *Recent EPA Actions*

At the time of the 1985 EPA report, it appeared that the decision to regulate extraction and beneficiation wastes under Subtitle D of RCRA meant that mine operators would not be subject to pervasive regulation of large volumes of their waste. Under Subtitle D, extraction and beneficiation wastes would be treated as solid wastes and regulated as part of nonhazardous waste management plans developed by individual states. Recent activity by the EPA suggests, however, that the generally less stringent regulation to which extraction and beneficiation wastes are subject under Subtitle D will come to an end in the near future.

In May 1990, the EPA released for informal comment and discussion a draft of a proposed regulatory program for Subtitle D wastes. In the draft proposal, or "Strawman II," the EPA established a plan for the treatment, storage, and disposal of mining wastes excluded from regulation under Subtitle C.[103] The EPA previously recognized that Subtitle D regulations did not adequately address mining waste concerns and stated that it

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[99] *Id.*

[100] *Id.* at 24,499-500.

[101] *Id.* at 24,501.

[102] 17 Env't Rep. (BNA) 355-56 (Current Developments July 4, 1986).

[103] John R. Jacus & Thomas E. Root, *RCRA Regulations of Mine Waste: An Overview*, 5 NAT. RESOURCES & ENV'T 26 (Winter 1991).

would develop new Subtitle D standards for mining wastes, noting that several new Subtitle D requirements for such wastes could be imposed.[104] However, it is clear that the EPA's recent draft proposal, "Strawman II," goes well beyond being a mere proposal to regulate mining waste as originally contemplated in 1986.[105]

The Strawman II proposal suggests that additional statutory authority is needed by the EPA to control mining waste and to bring within the EPA's jurisdiction other "mining related materials."[106] In addition to extraction, beneficiation, and processing wastes, regulated materials would include "any other material uniquely associated with mining that the regulatory authority determines has the potential to pose a threat to human health and the environment."[107] This broad description could potentially expand the EPA's regulatory authority to any material, even those only remotely connected to mining, which it happens to think is a threat to humans and the environment.

Under the Strawman II proposal, individual states would have the responsibility of implementing and enforcing programs for managing mining waste. The EPA would maintain an oversight role to ensure compliance with minimum standards it developed. EPA approval of state plans would be required and states would have to make regular reports to the EPA with the agency retaining independent enforcement authority.[108]

In criticizing the broad reach of the EPA's mining waste proposal, the Department of Interior stated that the plan would impose a "cradle-to-grave control of the mineral mining industry."[109] Whether or not this is true, it is clear that given the seemingly similar nature of the Strawman II's provisions to those of Subtitle C, the EPA's proposed mining waste program under Subtitle D will force mine operators to review their waste generation and handling practices. For instance, the EPA's 1985 report on extraction and beneficiation wastes stated that annual costs resulting from Subtitle C regulation of wastes in the copper, lead, zinc, gold, and silver mining segments could range

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[104] 17 Env't Rep. (BNA) 356 (Current Developments July 4, 1986).
[105] Jacus & Root, *supra* note 103, at 63.
[106] *Id.*
[107] *Id.*
[108] *Id.*
[109] 21 Env't Rep. (BNA) 363 (Current Developments June 22, 1990).

from as little as $7 million to more than $800 million per year.[110]

In preparation for the reauthorization of RCRA, Senate subcommittee hearings were held in September 1991 to consider whether mining wastes should continue to be exempt, under the Bevill Amendment, from regulation under Subtitle C. One proposed alternative involved the regulation of mining wastes as industrial solid wastes under Subtitle D. During the hearings, industry speakers expressed concern that Congress was considering more rigorous regulation of mining wastes.[111]

Increasingly, it seems clear that the relatively safe haven once provided by Subtitle D will soon be altered to impose more stringent regulatory requirements on extraction and beneficiation wastes. Whether costs of waste management under Subtitle D will rise to levels expected under Subtitle C is a question the EPA should consider before haphazardly applying such regulations to the mining industry. The specifics of the new program under Subtitle D will not be known until mid- to late 1992 at the earliest. Congress will take up consideration of legislation related to the reauthorization of RCRA in 1992 which will include provisions addressing mining wastes. However, final congressional action is not expected until at least July 1992.[112]

C. Regulation of Mineral Processing Wastes

Mineral processing wastes were not included in the EPA's 1985 study of extraction and beneficiation wastes because the EPA had proposed to reinterpret the Bevill Amendment to narrow the scope of the mining waste exclusion with respect to mineral and ore processing wastes.[113] The EPA recognized that its previous interpretation had excluded from hazardous waste status many low-volume wastes in direct contravention of congressional intent.[114] The EPA, however, withdrew its proposal

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[110] EPA Report, *supra* note 2, at 5-14 to 5-17, Table 5-4.

[111] 22 Env't Rep. (BNA) 1293-94 (Current Developments September 13, 1991).

[112] 22 Env't Rep. (BNA) 1821-22 (Current Developments November 29, 1991).

[113] 1 J. STENSVAAG, HAZARDOUS WASTE LAW AND PRACTICE S-118 (1989 & Supp. 1990). *See* 50 Fed. Reg. 40,292, 40, 293-94 (1985).

[114] 1 J. STENSVAAG, *supra* note 113, at 6-68. Congress intended the Bevill Amendment exclusions to apply only to high-volume low-hazard wastes. The legislative history of the Bevill Amendment establishes that Congress' intent was to exclude from hazardous wastes status those materials identified by the EPA as special wastes in earlier rulemakings. These special wastes occurred in large volumes while posing a low hazardous threat. 43 Fed. Reg. 58,946 at 58,991-92 (1978) (to be codified at 40 C.F.R. pt. 250) (proposed

to reinterpret the Bevill Amendment in October 1986.[115] The withdrawal of this proposal was struck down by the court in *Environmental Defense Fund v. E.P.A.* as being arbitrary and capricious.[116] The court ruled that the protection offered by the Bevill Amendment could be extended only to those materials satisfying the high-volume low-hazard criteria.[117]

Additionally, the *Environmental Defense Fund* court noted that wastes from the processing of ores and minerals had consistently eluded study by the EPA although such studies were mandated by the Bevill Amendment.[118] The EPA had failed to study processing wastes thereby leaving such wastes protected from regulation as hazardous wastes under Subtitle C.[119]

In response, the court imposed a schedule on the EPA for fulfilling its obligations with respect to processing wastes. The court ordered the EPA to determine which processing wastes were to maintain exempt status under the Bevill Amendment's high-volume low-hazard criteria.[120]

The EPA's response to this directive has not resulted in a report like the one completed for mineral extraction and beneficiation wastes.[121] Rather, in a series of formal proposals and rulemakings since the 1988 *Environmental Defense Fund* decision, the EPA has reduced the number of mineral processing wastes qualifying for an exemption from hazardous waste status under the Bevill Amendment from over one-hundred to only twenty.[122]

After conducting studies of processing wastes, the EPA initially proposed in April 1989 to exempt permanently six cate-

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Dec. 18, 1978). During discussion of the Amendment on the House floor, Rep. Bevill referred to EPA's identification of special wastes in noting the scope of the Amendment. 126 CONG. REC. 3361-62 (1980). Also, Rep. Williams of Montana discussed the high-volume low-hazard characteristic as the key to classifying materials as being within the coverage of the Bevill Amendment. *Id.* at 3364.

[115] 51 Fed. Reg. 36,233 (1986) (to be codified at 40 C.F.R. pt. 261).

[116] 852 F.2d 1316 (D.C. Cir. 1988), *cert. denied*, 489 U.S. 1011 (1989).

[117] *Id.* at 1327-29.

[118] *Id.* at 1330.

[119] J. STENSVAAG, *supra* note 114, at S-120.

[120] *Environmental Defense Fund*, 852 F.2d at 1331.

[121] *See* EPA Report, *supra* note 2.

[122] 21 Env't Rep. (BNA) 812 (Current Developments August 24, 1990). *See also* Jacus & Root, *supra* note 103, at 27-28 (EPA published a final rule on September 1, 1989, narrowing the Bevill exemption concerning mineral processing wastes. Five processing wastes were given final exemption status, and twenty retained conditional exempt status pending further study.).

gories of waste and exempt conditionally thirty-three other wastes from hazardous waste status.[123] The volume of waste represented by the thirty-nine wastes proposed for exempt status was quite large in relation to the total volume of all reprocessing wastes, meaning that most mineral processing wastes by volume retained their exempt status. However, the actual number of exempt wastes was reduced significantly.[124]

In a rulemaking in January 1990, the EPA published a final mining waste exclusion list specifying only fifteen mineral processing wastes that qualified for exempt status, in addition to the five retained in an earlier ruling.[125] The EPA stated at the time that the twenty wastes in question remained exempt from regulation as hazardous wastes under Subtitle C. However, the EPA announced plans to regulate eighteen of these wastes under Subtitle D, possibly as part of the new Subtitle D program being developed for mining wastes.[126]

Mine operators should understand that any mineral processing wastes not covered by an exemption will be subject to RCRA Subtitle C hazardous waste regulations if the wastes are found to exhibit one of the four hazardous characteristics or are otherwise identified or listed as hazardous.[127] Under Subtitle C, mine operators as generators of hazardous waste are required to document fully that the waste they produce is properly identified and transported to a treatment or disposal facility.[128] Additionally, like mineral extraction and beneficiation wastes, twenty mineral processing wastes will be subject to regulation under Subtitle D of RCRA.

IV. FUTURE REGULATION OF MINERAL EXTRACTION, BENEFICIATION AND PROCESSING WASTES

The EPA is currently developing a mine waste program which will address mineral extraction, beneficiation, and proc-

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[123] *See* 54 Fed. Reg. 15,316-17 (1989) (to be codified at 40 C.F.R. pt. 261) (proposed April 17, 1989).

[124] *Id. See also* 19 Env't Rep. (BNA) 2591 (Current Developments April 14, 1989) (EPA announced April 10, 1989, that most mineral processing wastes "temporarily" exempted would retain that exempt status.).

[125] 55 Fed. Reg. 2322 (1990) (to be codified at 40 C.F.R. pts. 260, 261, 262). *See also* 20 Env't Rep. (BNA) 1620 (Current Developments January 19, 1990) ("Five of the so-called Bevill wastes lost their exclusion from regulation under Federal hazardous waste law, leaving 15 of the mineral- and ore-related wastes under the exclusion. . . .").

[126] 56 Fed. Reg. 27,300 (1991).

[127] 20 Env't Rep. (BNA) 1620-21 (Current Developments January 19, 1990).

[128] RCRA Manual, *supra* note 1, at III-23. *See also* 42 U.S.C. § 6922 (1988).

essing wastes in rulemakings identified by the title "Mining Waste Management Under RCRA Subtitle D."[129] Officials from the Department of Interior have said that the proposed mining waste program under Subtitle D will impose "cradle-to-grave" type waste regulations on the mining industry.[130] However, expanding the scope of Subtitle D of RCRA to encompass a comprehensive mining waste program may increase the cost of regulating such wastes without proportionate reductions in risks to human health and the environment.[131] While basic budgetary constraints may implicate less federal involvement in the Subtitle D state programs, it is clear that the May 1990 Strawman II proposal contemplates that the EPA will be involved in these programs to a significant extent because of the EPA's authority to approve state programs and set minimum standards.

As the EPA worked to finalize the exclusion for mineral processing wastes from Subtitle C regulation, the agency frequently revised its definitions of "processing" and "beneficiation." Currently, the definition of beneficiation is set out in 40 C.F.R. § 261.4(b)(7), and includes the application of physical and chemical processes to raw materials in order to liberate ores and minerals.[132] The definition of processing is more complex but typically involves operations downstream from beneficiation.[133] The distinction is important to the EPA and mine operators because mineral processing wastes not listed as exempt Bevill wastes may be considered by the mine operator to be beneficiation wastes subject to the less stringent requirements of Subtitle D.

In light of recent developments, however, this distinction will likely provide little relief to mine operators in the future. If, as expected, the current EPA rulemakings involving mining wastes strengthen Subtitle D regulation of such wastes, the advantage to mine operators of being subject to regulation under Subtitle D, in lieu of Subtitle C, will be reduced.

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[129] 56 Fed. Reg. 54,012 at 54,059-60 (1991).

[130] 21 Env't Rep. (BNA) 363 (Current Developments June 22, 1990).

[131] *See* 22 Env't Rep. (BNA) 1339-40 (Current Developments September 20, 1991) ("The potential economic impact of a major new federal legislative initiative in RCRA for the huge subtitle D could be extraordinary, and would be unlikely to result in substantial benefits except in a limited number of cases. . . .").

[132] 40 C.F.R. § 261.4(b)(7) (1990).

[133] J. STENSVAAG, *supra* note 114, at S-130 to S-133.

CONCLUSION

The EPA issued a final rule in May 1991 listing those mineral processing wastes that retained their Bevill Amendment exemption from regulation as a hazardous waste under the provisions of Subtitle C of RCRA. The resulting number of exempt wastes of only twenty means a large number of other mineral processing wastes will be eligible for regulation under Subtitle C. Less than four years ago, more than one-hundred of these high-volume low-hazard wastes were protected from the strict regulatory provisions of Subtitle C.[134]

As a general matter, the number of solid wastes available for regulation as hazardous waste under Subtitle C will be increased as a consequence of the decision in *American Mining Congress v. U.S. E.P.A. (AMC II)*.[135] The *AMC II* court held that only those wastes destined for immediate reuse escape classification as solid waste under RCRA.[136] Materials which cannot be reused immediately and those wastes stockpiled for future use will now be classified as solid wastes.

Congress will undertake the reauthorization of RCRA in 1992, which will include provisions for the regulation of mining wastes. Currently, mineral extraction and beneficiation wastes and twenty mineral processing wastes are exempted from regulation as hazardous waste under Subtitle C of RCRA. These wastes are regulated as nonhazardous wastes under Subtitle D, pending the completion of ongoing rulemakings by the EPA aimed at developing a specific mining waste program under Subtitle D.[137] In light of the May 1990 Strawman II proposal, it appears that all mining wastes will soon be subject to more stringent regulations, and it has even been suggested that the exemption from Subtitle C regulation afforded to mineral extraction, beneficiation, and some processing wastes be lifted.[138]

However, congressional action in restraining the EPA's ability to regulate mineral extraction, beneficiation, and processing

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[134] 21 Env't Rep. (BNA) 812 (Current Developments August 24, 1990).

[135] 907 F.2d 1179, 1192 (D.C. Cir. 1990).

[136] *Id.* at 1186-87.

[137] 22 Env't Rep. (BNA) 1297-98 (Current Developments September 13, 1991). *See also* 17 Env't Rep. (BNA) 355-56 (Current Developments July 4, 1986) (A specific mining waste program under Subtitle D can address concerns about actual and potential release of hazardous contaminants.).

[138] *Id.*

wastes under the Bevill Amendment shows an intent to achieve some balance between the industry's cost of complying with regulations and the government's goal of properly regulating hazardous mining waste.[139] Whether this policy will be served by subjecting possibly every mining waste (and other "mining related materials" as proposed in the May 1990 Strawman II proposal) to strict regulatory control under RCRA Subtitles C or D is questionable.

Nevertheless, the strengthening of the mining waste regulations under Subtitle D, along with the reduction in the number of wastes qualifying for exempt status under the Bevill Amendment, means that mine operators must be increasingly diligent in managing their waste streams. Needless to say, the congressional reauthorization of RCRA in 1992 and the expected EPA rulemakings with regard to mining wastes could drastically increase the costs of material handling and disposal for the mining industry.

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[139] *See* 126 CONG. REC. 3361-65 (1980). In discussing the effect of RCRA's hazardous waste provisions on mining wastes and the role of the Bevill Amendment, congressmen expressed concern that the EPA regulations not impede the development of the mining industry or impose increased fuel costs on the utility industry. *Id.*