



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

DEC 2, 1998

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

Mr. Steven G. Barringer
Singer Brown & Barringer
520 south fourth Street
Las Vegas, Nevada 89101

Mr. Michael S. Giannotto
Shea & Gardner
1800 Massachusetts Avenue, NW
Washington, D.C. 20036

Dear Mr. Barringer and Mr. Giannotto,

Thank you for your letter of October 27, 1998 requesting that the Agency reconsider its views regarding the Bevill status of stripped carbon, carbon fines, kiln fluid, and carbon water generated at gold mines in Nevada. On October 1, 1998 representatives of Barrick Gold Corporation and Newmont Gold Corporation met with Office of Solid Waste staff to discuss this issue. At that meeting Nevada gold industry representatives described how these waste streams were generated and how gold was recovered from them. You also noted at the meeting that the Agency's April 1998 guidance document entitled "Identification and Description of Mineral Processing Sectors and Waste Streams" states that carbon wastes from regeneration were not uniquely associated.

Based on the information noted below, the Agency now believes that the use of carbon is best viewed as being inherent to the recovery of gold. It also appears that the sole purpose of the carbon in gold recovery is to collect and concentrate gold values out of solution. In addition, the principal source of contaminants found on the carbon are from exposure to the gold ore and cyanide solutions. Based on these facts, the Agency concludes that stripped carbon, carbon fines, kiln fluid, and carbon water are "uniquely associated."

Carbon fines are carbon wastes which result after carbon loaded with gold values is acid washed and stripped. Some gold values are left on this carbon. The stripped carbon is then sent to carbon regeneration where contaminants are removed from the carbon using heat. The regenerated carbon is then sent back into the gold recovery cycle with its introduction into the carbon in pulp (CIP)/carbon in column (CIC) units. The carbon regeneration unit (often a rotary kiln) generates in addition to regenerated carbon a kiln fluid. This kiln fluid is a liquid waste

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containing fine carbon which is generally pumped from the regeneration kiln into a carbon fines recovery unit. This unit is generally a type of tank thickener. The thickened carbon is removed from this unit and sent to offsite gold recovery. Carbon water is a liquid stream composed of water and carbon which originates from several points in the gold recovery system; from surge bins which hold both new and regenerated carbon, from surge bins holding loaded carbon being removed from the CIP/CIC process, fine carbon from stripping, and from surge bins holding stripped carbon awaiting regeneration. Carbon is therefore collected throughout the gold recovery system and directed to the water/carbon fines recovery thickener. Carbon is moved throughout facilities usually in a water slurry. Some amount of carbon fines is pumped into the tailings pond because it is too small to be retained within the carbon recovery system.

The May 26, 1998 mineral processing rulemaking (63 FR 28591) describes the Agency's uniquely associated principle:

Based on consideration of all the public comments, the Agency believes that it is appropriate to evaluate whether a particular waste is uniquely associated with mining and mineral processing as follows. First, any wastes from ancillary operations are not "uniquely associated" because they are not properly viewed as being "from" mining or mineral processing.

[Second] In evaluating wastes from non-ancillary operations, one must consider the extent to which the waste originates or derives from processes that serve to remove mineral values from the ground, concentrate or otherwise enhance their characteristics or remove impurities, and the extent to which the mineral recovery process imparts its chemical characteristics to the waste. Under this test, the greater the extent to which the waste results from the mineral recovery process itself, and the more the process imparts to the waste its chemical characteristics, the more likely the waste is "uniquely associated."

The Agency has re-evaluated information presented to the Agency by the gold industry related to carbon wastes and has applied the uniquely associated principles to these wastes. The Agency concludes that stripped carbon, carbon fines, kiln fluid, and carbon water are "uniquely associated." The Agency will amend its April 1998 guidance document entitled "Identification and Description of Mineral Processing Sectors and Waste Streams" to reflect the conclusions noted in this letter.

If you have any questions regarding this letter, please feel free to contact
Stephen Hoffman at 703-308-8413.

Sincerely,

A handwritten signature in cursive script, appearing to read "Elizabeth A. Cotsworth".

Elizabeth A. Cotsworth, Acting Director
Office of Solid Waste

October 27, 1998

VIA HAND DELIVERY

Ms. Elizabeth Cotsworth
Acting Director
Office of Solid Waste
U.S. Environmental Protection Agency
2800 Crystal Drive, 9th Floor
Arlington, Virginia

Re: Bevill Status of Carbon Fines, Stripped Carbon, and
Other Carbon-Bearing Streams Generated During Precious
Metals Beneficiation Operations

Dear Ms. Cotsworth:

We are writing jointly on behalf of Newmont Gold Company ("Newmont Gold") and the Precious Metals Producers ("PMP"), to follow up on our recent meetings with your staff and seek a determination concerning the status, under the RCRA Subtitle C Bevill Amendment, of gold- and silver-bearing carbon streams generated during the carbon adsorption, elution, and carbon regeneration stages of mineral beneficiation operations in the precious metals sector. The carbon streams in question include stripped carbon generated during the elution process; carbon fines and carbon water generated during carbon adsorption, elution, and carbon regeneration activities; and kiln fluid generated in connection with the carbon regeneration process. For the reasons discussed below, all of these streams are uniquely associated with mineral beneficiation in the precious metals sector and therefore are exempt from RCRA Subtitle C regulation pursuant to 40 C.F.R. § 261.4(b)(7).

Newmont Gold is the largest gold producer in North America. The PMP, which comprises Barrick Goldstrike Mines, Inc., Independence Mining Company Inc., Echo Bay Mines, Coeur D'Alene Mines, and Battle Mountain Gold Company, was formed in 1986 to participate in EPA's development of mine waste requirements under RCRA. Combined, these six precious metals companies account for roughly three-fifths of the gold mined annually in the United States.

As we have discussed in prior comments submitted to the Agency, the use, regeneration, and reuse of carbon is essential to the economic viability of gold beneficiation operations. The process by which carbon is used to preferentially adsorb gold from ore-bearing solutions, stripped of gold during elution, and then regenerated and reused in a closed loop process is described in detail in the Agency's recent background document on Mineral

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Processing Sectors and Waste Streams.^{1/} Various carbon-bearing streams (including stripped carbon, kiln fluid, carbon-bearing water and carbon fines) are generated during these activities. These streams are never discarded; rather, they are exceedingly valuable materials that, even after stripping, contain very high and recoverable levels of gold (from 5 to 20 ounces per ton or even more). Indeed, the gold content of these materials can range from two to three orders of magnitude greater than the gold content of virgin ores processed in the mills or leach facilities.

The high levels of gold contained in stripped carbon and carbon fines (including carbon fines in kiln fluid and carbon water) cannot be recovered efficiently from the leaching, stripping and electrowinning or filtering activities on-site. As such, the carbon fines are conveyed to containers and sent off-site for further precious metal recovery. Similarly, at the end of its mill life the remaining stripped carbon is sent off-site in containers and processed for its precious metals values. At our recent meeting with your staff, Newmont Gold presented a flow diagram (a copy of which is attached) showing the process at its largest facility by which these carbon streams are generated and further processed and used, as well as the gold content of these streams.

As the scientific authorities attest, the use of large quantities of carbon is essential for gold beneficiation, and all precious metals producers must reactivate and reuse carbon from elution operations scores of times to remain economically viable.^{2/} Indeed, without use of reactivated carbon, the

^{1/} See U.S. Environmental Protection Agency, Identification and Description of Mineral Processing Sectors and Waste Streams (April 1998) (hereafter "EPA Background Document") at pages 339-41.

^{2/} At Newmont Gold's largest facility, for instance, carbon is regenerated and reused 40 to 60 times before passing out of the circuit as fines. At that facility, Newmont Gold typically uses 42 tons per day of regenerated carbon in its operations, as compared to approximately 1.9 tons per day of "new" carbon. See also Marsden & House, The Chemistry of Gold Extraction (1992) at pages 326-27 ("carbon is typically reused between 100 and 400 adsorption-elution cycles, depending on the carbon quality and the effectiveness of reactivation procedures applied"); *id.* at page 334 ("the effectiveness of carbon adsorption as a commercial process relies on the ability of activated carbon to be reused many times, which depends on . . . the efficiency of any reactivation processes used"); Yannopoulos, The Extractive

(continued...)

modern precious metals industry would not exist in its current form.

Carbon-bearing streams generated in the precious metals sector satisfy EPA's three criteria for determining that a stream is "uniquely associated" with mineral beneficiation. Those criteria focus on: (1) whether the stream is generated in a "non-ancillary" operation; (2) whether the operation in question serves to concentrate metal values and/or remove impurities; and (3) whether the stream obtains some of its salient characteristics (particularly its hazardous characteristics, if any) from the metal recovery process.^{2/}

Carbon-related streams satisfy the first two criteria because they are generated during normal operations integral to gold production. The Agency has long explicitly recognized carbon adsorption and elution as "non-ancillary" beneficiation operations integral to gold production. The Agency has also clarified that carbon regeneration is a beneficiation operation^{4/} and that operations aimed at removing impurities from the carbon (which is what carbon regeneration does) are "non-ancillary" activities that assist in concentrating the gold.^{5/}

Carbon streams satisfy EPA's third uniquely associated criterion because they obtain their chemical characteristics from the ore or beneficiation processes. These streams do not contain any "non-indigenous" toxics. Some of these streams could be RCRA hazardous, if at all, only because of chemical characteristics (e.g., mercury) imparted by the ore.

The considerations above demonstrate that carbon use and regeneration in the gold sector is different from its use in other industrial sectors. In the precious metals sector, carbon,

^{2/} (...continued)

Metallurgy of Gold (1991) at page 530 ("[C]alculations show that only 5% of the carbon make-up to the adsorption circuit each day is fresh carbon, and therefore the activity of the carbon in the circuit is very dependent on the efficiency of the regeneration system [S]hortcomings in the regeneration system cannot be effectively overcome by using more expensive, more active carbon.")

^{2/} See EPA Background Document at pages 44-45; 63 Fed. Reg. 28578-79; 28591 (May 26, 1998).

^{4/} See EPA Background Document at page 342.

^{5/} See 63 Fed. Reg. at 28592 (discussing reasons why acid wash streams are Bevilled).

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is not used for pollution control or waste treatment. Rather, it is a valuable material whose use and regeneration is integral to the actual production process; and any "toxic" constituents it may contain are acquired from ore or reagents used in beneficiation. These same considerations led EPA recently to conclude that acid rinse from the elution process is a Bevilled stream. See 63 Fed. Reg. at 28592-93 (noting that acid wash is Bevilled because it derives from a "non-ancillary" mineral recovery process and because the ore cleaned from the carbon imparts some chemical characteristics to the acid wash stream).

Based upon the above, we request a confirmatory regulatory determination from the Agency that carbon-bearing streams generated during carbon adsorption, elution, and regeneration activities in the precious metals sector are "uniquely associated" with mineral beneficiation and therefore exempt from regulation under Subtitle C of RCRA pursuant to 40 C.F.R. § 261.4(b)(7). We would also respectfully request that, in that regulatory determination, the Agency indicate that any statements to the contrary contained at pages 350-51 of its April 1998 Background Document on Mineral Processing Sectors and Waste Streams are now considered by the Agency to be inaccurate.

Sincerely,

Steven G. Barringer by usg

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cc: Steven Hoffman

NEWMONT GOLD COMPANY CARBON HANDLING (TYPICAL) - 9/98

