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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20469

March 8, 1995

Mr. Christian M. Richter
Washington Representative
American Foundrymen's Society
900 2nd St. N.E. Suite 109
Washington D.C. 20002

Dear Mr. Richter:

I am writing in response to your letter to me of October 31, 1994, and as a follow-up to the November 1994 and February 28, 1995 meetings between representatives for the American Foundrymen's Society (AFS) and the U.S. Environmental Protection Agency (EPA) on the regulatory status of spent foundry sand under the Resource Conservation and Recovery Act (RCRA). Thank you for reviewing with us the use and role of sands in the foundry process and reiterating the industry's concerns.

The two RCRA regulatory concerns at issue which you have raised are: 1) whether spent foundry sands are solid and hazardous wastes within the sand loop and at what point do they become wastes, and 2) what is the regulatory status under RCRA of the type of thermal reclamation units discussed at our meeting, which are used to remove clay and resin binders from spent sands prior to reuse in mold making. The opinions expressed below are based on your general factual description and thus necessarily represent our initial conclusions, not final agency action. In addition, nothing in this letter should be considered to compromise, or to address the merits of any enforcement actions.

With regard to the first issue, for reasons stated below, EPA believes that spent foundry sands are solid wastes at the point at which the mold is broken and the sand is separated from the casting at the shakeout table. These solid wastes are also hazardous wastes if they exhibit the characteristic of toxicity for lead or other hazardous constituents specified at 40 CFR 261.24. Moreover, the process of separating bits and pieces of metal, fines, core sand butts and other clumps of mold sand at the

shakeout table and screen to create return sand (for reuse in the moldmaking process) is a reclamation process. As we stressed at our last meeting, because the recycling process is generally exempt from RCRA regulation, the Agency believes that there is little or no regulatory impact under RCRA from this view for those foundry sands within the sand loop which are reclaimed through non-thermal processes. In particular, the Agency believes that the use of non-thermal reclamation processes for foundry sands will not subject foundries to any substantive requirements. Regarding the regulatory status of the type of thermal reclamation units discussed at our November meeting, EPA believes that these units are incinerators, which are subject to RCRA Subpart O standards under 40 CFR Parts 264 and 265.

The balance of this letter: 1) describes the foundry process and foundry sand management, 2) presents the basis for our regulatory analysis, 3) states EPA's belief with regard to foundry sand waste management, and 4) describes the next steps to be taken to assure proper compliance in the foundry industry with RCRA regulations and to reach a common understanding between EPA and AFS members.

1. Description of Foundry Processes/ Overview of Spent Foundry Sands Management

- A. Description of Foundry Processes

Based on prior correspondence from representatives of AFS member companies and materials submitted to EPA by AFS during our November 16th meeting, our understanding of the typical foundry process is as follows. Foundries are facilities where ferrous and non-ferrous metal castings are produced. The metal castings are produced from sand molds and cores which have been formed in a separate moldmaking process. The sand molds and cores are formed by molding sand together with clay or resin binders. Organic solvents may be added to the resins to reduce their viscosity. After the metal castings are poured into the molds and cooled, the molds are broken to remove the castings at a table referred to as a "shakeout table".

In the process of breaking the molds, several things occur simultaneously. First, the casting is separated from the broken mold and core and sent off for cleaning. Second, sand fines become airborne and are typically collected under negative pressure in a

vacuum aspiration tube located proximately to the shakeout table. These fines may be wetted and deposited into a tank where iron is added in an attempt to fix lead in the fines prior to disposing of them in municipal landfills or on-site industrial landfills. Third, the broken molds are placed into a reclamation process consisting of a vibratory drum with perforations and a series of conveyors and screens.

Sand (hereafter referred to as return sand) which passes through the drum and screens is returned to the moldmaking process to be used to make new molds. The entire process of making sand molds and reclaiming return sand for producing new molds is referred to as the sand loop.

Some chunks of sand from the broken molds and cores cannot be broken down and are too large to fit through the drum/screening process. This sand together with bits and chunks of metal (referred to as tramp metal), is removed from the screening process and sent to a ball mill where the mixture is milled and remaining metal is removed for reinsertion into the casting process or sold for recycling. Iron may be added to the clumps of sand prior to or during the milling process in an attempt to fix lead in the sand. The milled sand is then sent to a municipal or on-site industrial landfill.

B. Overview of Spent Foundry Sand Management

As you mention in your incoming letter to EPA, AFS estimates that 100 million tons of sand used to make molds in the ferrous and non-ferrous foundry industry and that approximately 94 percent of these sands are reused within the industry. In an April 26, 1993 article of American Metals Market, AFS is quoted as estimating that only about 4 percent, or 240,000 tons of the estimated 6 million tons of discarded foundry sand are hazardous waste. The article indicates that this is particularly a problem with manufacturers of leaded brass. However, Dan Twarog, AFS Director of Research, indicated in this article that contamination of foundry sands "is not a huge problem".

Based on data submitted to EPA by brass foundries, most spent foundry sands which are hazardous wastes are classified as such because they exhibit the characteristic of toxicity for lead, D008. In addition, one brass foundry exporting its sands for use in Canada reported that the sand exhibited the characteristic of

toxicity for cadmium, D006.

2. RCRA Subtitle C Regulatory Status of Spent Foundry Sands and Thermal Reclamation Unit

As stated above, AFS has raised two particular issues for EPA's consideration: 1) is spent foundry sand a solid waste and when is it generated, and 2) what is the regulatory status of thermal reclamation units for spent foundry sand. Each of these issues is discussed in turn.

A. Regulatory Status Under RCRA of Spent Foundry Sands and the Sand Reclamation Loop

Regarding the first issue, based on prior regulatory determinations, as well as the information you presented about typical foundry practices, it appears that spent foundry sands are "spent materials" being "reclaimed," and are therefore solid wastes. This determination is made based on the properties of the sand and the nature of typical foundry sand reclamation activities.

Used foundry sands are generated as solid wastes after being separated from the castings at the shakeout table. At this point, the used sand contains contaminants, such as chunks of brass, fines, and hard lumps of sand, that must be removed from the sand prior to its reuse in the making of molds. Thus, the used sand is a "spent material" because it is no longer fit for its original use without further processing. 40 CFR §261.1(c)(1).

The subsequent process of separating and screening return sand (sand which is fit to be reused in mold making), core butts (clumps of sand from the core molds which are bonded with resin binders and are unfit for mold making without further processing), lumps of clay-coated mold sand, fines, and metal pieces appears to be a "reclamation process." 40 CFR §261.1(c)(4).

When the spent sands enter the shakeout process, they are reclaimed through regeneration, which involves the removal of contaminants including core sand butts, fines; tramp metal and other clumps of sand too large to fit through the screens. As a spent material being reclaimed, the spent foundry sand constitutes a solid waste. Indeed, the Agency has so held on very similar facts. In the Matter of Lee Brass Company, RCRA Appeal No. 87-12

(August 1, 1989). EPA also determined on January 6, 1986 that spent foundry sands being reclaimed are solid and hazardous wastes, in correspondence to Mr. John Robbins, a project chemist for Kohler Co., about one year after the final rule amending the definition of solid waste was promulgated (see enclosure).

Once the return sands are completely reclaimed, removed from the reclamation process, and are being returned to the moldmaking process, they cease to be wastes and are no longer under RCRA jurisdiction. 40 CFR §261.3(c)(2)(i). The portion of spent sand which is not returned to the mold making process remains a solid and (if hazardous) hazardous waste.

Because this mechanical process of screening and separating hazardous spent foundry sand is a reclamation process, it is generally exempt from regulation under RCRA. 40 CFR §261.6(c)(1) (exempting actual recycling processes from regulation unless otherwise specified).

However, with respect to the portion of foundry sands that is removed from the reclamation process and is not beneficially reused, foundries remain subject to all applicable RCRA standards for managing these materials under 40 CFR Part 262. These standards include manifesting and standards for storage in tanks, containers, drip pads and containment buildings, as set out in Section 262.34. In addition transporters of these hazardous wastes are subject to 40 CFR Part 263. Furthermore, foundries that treat these hazardous wastes in conformance with these less-than-90 day storage provisions would not be subject to RCRA permitting requirements. Our expectation is that operating foundries should be able to operate in ways such that they do not trigger requirements for RCRA permits pursuant to the Federal regulations.

EPA's views about the point of generation for jurisdiction purposes do not imply that we believe that the non-thermal reclamation process of screening and separating sand following the separation of the casting requires a RCRA Subtitle C permit. When this screening and separation of sand is part of a reclamation process, it is exempt from RCRA Subtitle C regulation. 40 CFR 261.6(c)(1). Nor does this opinion imply any belief on the part of the Agency that state regulation under Subtitle D of RCRA is warranted for nonhazardous foundry sands undergoing reclamation. The scope of our regulatory concern is limited to foundry sands which are considered characteristically hazardous under Subtitle C

of RCRA.

Notwithstanding these points, EPA cannot agree that the point of generation occurs after the sand mold is separated from the casting. The AFS interpretation, that foundry sands are generated after processing at the shakeout table, would have two adverse effects that are potentially damaging to human health and the environment.

First, some foundries would be able to add iron to spent foundry sands which are destined for land disposal (including both clumps of sand molds and sand cores as well as sand fines that are collected from emissions from the shakeout table) and argue that the spent sands were solid wastes, but never hazardous waste. This argument would be based on the assumption that they were "generated" after the addition of iron, possibly masking the toxicity characteristic for lead. It would follow that these foundries would not be subject to standards required for hazardous waste generators treating characteristic wastes in tanks, notwithstanding that they are engaged in a classic treatment activity. Moreover, these iron-treated sands would not be subject to Land Disposal Restriction treatment standards, thus possibly avoiding effective immobilization of the hazardous constituents in the sand fines. As we noted in our February meeting, for more discussion of the relationship between land disposal restriction standards and the process of adding iron filings to spent foundry sands, please see 60 FR 11702, 11731 (March 2, 1995).

The second effect of arguing that foundry sands are generated as wastes after their processing at the shakeout table would be to allow some foundries to incinerate hazardous sands "prior" to the generation of hazardous waste so that they may claim that the hazardous waste treatment activity is not regulated. Regardless of any attempt to conduct unregulated treatment, however, the fact remains that foundry sands are spent materials being reclaimed from the moment that they are separated from the castings.

AFS has argued that EPA is without jurisdiction to regulate spent foundry sands being reclaimed because the sand is "part of the industrial manufacturing process." However, courts have held that secondary materials which either: 1) are not returned to an ongoing production process or 2) have become part of the waste disposal problem are discarded and therefore can be solid wastes

under RCRA. Also, the courts have consistently held that whenever a material stream is characterized by an element of discard, as when a brass foundry removes and disposes of spent sands from the sand loop, the material is part of the waste disposal problem and is subject to EPA's jurisdiction. See *American Petroleum Institute v. EPA*, 906 F.2d 729 (D.C. Cir. 1990); *American Mining Congress v. EPA*, 907 F.2d 1179 (D.C. Cir: 1990)(AMC II).

B. Regulatory Status Under RCRA of Thermal Sand Reclamation Units

For the reasons discussed below, the type of thermal sand reclamation unit discussed during our November meeting and presented in correspondence from AFS member companies appears to meet the Agency's definition of an incinerator and so is subject to regulation under 40 CFR Parts 264 and 265, Subpart O.

We understand that this type of thermal treatment unit consists of a combustion chamber that holds the spent sand and a firebox chamber immediately below, in which hot gases are generated by the combustion of natural gas. The two chambers are separated by a refractory membrane through which hollow ceramic tubes and "T" nozzles allow the hot combustion gases to move from the firebox to the combustion chambers. The flow of hot gases through the spent sand causes the combustion chamber to operate as a fluidized bed. Controlled flame combustion of the organic resins occurs in the fluidized bed. As a result, the organic resins, binders and solvents are destroyed.

Under the Agency's regulatory regime, thermal treatment devices are classified as either boilers, industrial furnaces, incinerators, other interim status thermal treatment units, or miscellaneous permitted treatment units. Definitions of a boiler, industrial furnace, and incinerator are provided in 40 CFR §260.10. If a thermal treatment device does not meet the definition of boiler or industrial furnace, it is classified as an incinerator if it uses controlled flame combustion; if it does not, it is either an interim status thermal treatment unit (Part 265 Subpart P) or a miscellaneous permitted treatment unit (Part 264 Subpart X).

The thermal sand reconditioning device you presented to us is not a boiler because it does not recover and export energy. It does not meet the definition of an industrial furnace because it

is not one of the enumerated devices listed as an industrial furnace in Section 260.10. Thus, our analysis focuses on whether the device should be regarded as either an incinerator or a miscellaneous/other treatment unit.

Given that the device uses controlled flame combustion to burn natural gas and that the combustion gases are exhausted into the combustion chamber containing the spent sand, the device should be classified as an incinerator. Among other considerations, although not dispositive in themselves, are: (1) the temperature in the combustion chamber would be carefully controlled to what is claimed to be the optimum combustion temperature of the resin contaminants; and (2) the temperature would be controlled by modulating the natural gas burner in the firebox, or, in some designs, burners in the combustion chamber itself.

AFS has maintained that because, in its opinion, sand which is part of the sand loop is not discarded and therefore not a solid waste, that spent foundry sand which is destined for a thermal reconditioning unit is also not a solid waste. For this reason, AFS maintains that thermal recondition units of the type described in our November 16 meeting are not incinerators, but rather part of a manufacturing process used to recondition sand for reuse within the mold making process.

For the reasons stated above, the AFS argument that spent foundry sand is not a solid waste does not appear to be sound. To reiterate, the sand from the broken mold is not fit for its original use as a mold without substantial reprocessing. If the sand is reprocessed through thermal reconditioning rather than or in addition to the physical screening and separation process, it is all the more part of the waste management problem because of the fact that incinerators are a type of treatment technology which clearly engages in waste management. In this regard, the placement of hazardous foundry sand into a thermal combustion unit is analogous to the placement of secondary materials into surface impoundments. Both activities may result in the release of hazardous waste to the environment if improperly managed. AFS' argument that this type of thermal reconditioning unit is simply reconditioning sand for reuse in the moldmaking process ignores the fact that the organic resins, binders and solvents used to construct the molds are destroyed in the incineration process. The potential release of products of incomplete combustion, such as

dioxin and furans, as well as volatile metals such as lead and cadmium, makes clear that management activities using these units can be viewed as part of the waste disposal problem. In addition, the build up of metallic lead in the resulting sand in a more leachable form likewise supports this conclusion. Thermal waste treatment units such as incinerators, like surface impoundments, are a central focus of the RCRA program. RCRA Section 3004(o)(2). As such, these units are clearly within RCRA jurisdiction and materials placed into them can be viewed as discarded and therefore solid wastes. AMC II, 907 F.2d at 1186.

C. Other RCRA Regulatory Issues Regarding Spent Foundry Sands

The Agency notes that there is one circumstance when spent foundry sands are not solid wastes. Spent foundry sand is not a solid waste under RCRA when legitimately used or reused without reclamation as an effective substitute for a commercial product. 40 CFR §261.2(e)(1)(ii). It is our understanding that some foundry sands are currently being used as a substitute for virgin silica sand as a fluxing agent in primary copper smelting operations in North America. Please be aware, however, that under Section 3006 of RCRA individual States can be authorized to administer and enforce their own hazardous waste programs in lieu of the Federal program. When States are not authorized to administer their own program, the appropriate EPA Regional office administers the program and is the appropriate contact for any case-specific determinations. Please-note as well that under Section 3009 of RCRA, States retain authority to promulgate regulatory requirements that are more stringent than Federal regulatory requirements.

3. EPA Concerns About Environmental Effects of Foundry Sand Management

Please understand that the potential environmental concern is not with sand per se. Rather, EPA is concerned that in some foundries, the used sand mixtures contain sufficient hazardous constituents (e.g., lead, cadmium, toxic organic compounds) to pose a threat to human health and the environment if managed improperly. EPA has three major environmental concerns regarding management of spent foundry sand: 1) landfill disposal of spent foundry sand, including treatment with iron prior to land disposal, 2) thermal processing of spent foundry sand, and 3) the storage and actual management practices for spent foundry sands

prior to disposal.

A. Landfill Disposal of Spent Foundry Sands; Treatment of Lead-Contaminated Sand With Iron Filings

As discussed in our meeting and indicated in prior correspondence on behalf of AFS member companies, some portion of spent sand is continuously removed from the sand loop in some foundries and disposed of in landfills. For those foundries whose sand contains hazardous constituents, such as lead, cadmium and organics, the Agency has a strong interest in seeing that these sands are properly managed. Left untreated, lead-contaminated sands may result in releases to groundwater, possibly threatening nearby drinking water wells. Improper disposal of untreated hazardous waste has historically led to many landfills becoming Superfund sites. Thus, when foundry sands exhibiting the hazardous characteristic for lead are land disposed, these materials must be properly treated and disposed of in appropriate facilities in order to prevent the creation of future hazardous waste remediation sites.

Effective treatment for hazardous waste being land disposed must assure the long-term immobilization of hazardous constituents to minimize potential short and long term threats to human health and the environment. RCRA Section 3004(m). We understand that some foundries attempt to treat their hazardous waste foundry sand with iron filings prior to land disposal, in an effort to reduce the leachability of the hazardous constituents (typically lead) so that the waste can be land disposed. EPA is concerned, however, that the addition of iron filings to lead-contaminated foundry sands is ineffective as a long-term treatment method and that it could constitute impermissible dilution under 40 CFR §268.3.

In developing the Land Disposal Restriction program in the Hazardous and Solid Waste Amendments of 1984 (HSWA), Congress stated that only dilution that occurs during the normal manufacturing process may be taken into account in setting section 3004(m) treatment standards. Senate Report No. 284. 98th Cong. 1st Sess. at 17. Since the addition of iron occurs only to stabilize lead in the spent sand prior to disposal, it does not appear to be part of a normal production process.

B. Thermal Reclamation of Spent Foundry Sands

Second, we understand that there is an increasing trend in the industry towards using a type of thermal reclamation unit that involves combustion of the organic constituents in the foundry sand mixture. Combustion of hazardous waste is, of course, a significant Agency concern. See U.S. Environmental Protection Agency Strategy For Hazardous Waste Minimization and Combustion, EPA/530-R-94 04, November 1994. The Agency is concerned about the potential for lead and other metals to be emitted from the units. Toxic organics, including products of incomplete combustion such as dioxins, also may be emitted. In addition, we understand that the thermal treatment of sands may result in increased leachability of lead in sand due to the build up of metallic lead in the sand.

C. Storage Prior to Disposal and Other Management of Spent Foundry Sands

Third, we did not discuss in the meeting in any depth what are the material management practices within the industry. An EPA representative did, however, note that storage of used sands that exhibit a hazardous characteristic because of lead from the metal castings could pose classic waste management types of risks, depending on how the material is stored and handled.

We believe that these three types of environmental concerns address your question of how we could consider the sand being reclaimed for further on-site use to be part of the waste management problem. These concerns underlie the existing regulatory structure which we believe classifies the sands after their use in the casting process as a "spent material," which is being "reclaimed" prior to reuse.

4. Compliance Assurance and Industry Outreach

We understood you to say to us that some members of the industry do not think of the foundry sands being reconditioned and reclaimed for reuse on-site- as a "waste" being managed at the foundry. If that is the case, there may be a need to work with you to change practices within the industry. We hope that the American Foundrymen's Society and other groups would be willing to help us with that task and that we can organize the resources within EPA to work with you on bringing about that change.

Conclusion

If you have any questions regarding the status of foundry sands as solid and hazardous wastes under RCRA, please call Michael Petruska of my staff at (202) 260 8551. If you have any questions about the status of thermal reclamation units under RCRA as incinerators, please contact Robert Holloway of my staff at (703) 308-8461. Again, we appreciate your patience in arranging for the meeting and your coming to Washington to discuss the issue with us.

Sincerely,

Michael Shapiro, Director
Office of Solid Waste

Enclosure

Attachment

American Foundrymen's Society Inc.
900 2nd Street, N.E.
Suite 109
Washington, D.C. 20002

October 31, 1994

Michael Shapiro, Director
Office of Solid Waste, M2101
USEPA Waterside Mall
401 M Street S.W.
Washington, D.C. 20410

Dear Mr. Shapiro:

Representatives of the American Foundrymen's Society (AFS) would like to meet with you and David Bussard to discuss several critical policy issues raised by recent Region 6 enforcement actions against foundries. We are concerned that Region 6 has seriously misapplied current USEPA regulatory policy regarding solid waste and recycling under the Resource Conservation and Recovery Act (RCRA).

I. BACKGROUND

EPA Region 6 officials have targeted two brass and bronze foundries for enforcement action under RCRA. Region 6 contends that one of the industry's primary raw materials -- sand -- when reused in an ongoing production process on-site, is a solid waste. It is our understanding that the set of facts in each of these cases is unique.

However, the two cases raise important questions regarding the agency's application of RCRA solid waste and recycling policy to metalcasting production, and potentially other manufacturing processes as well.

A vast majority of the nearly 3200 U.S. foundries cast metals -- such as iron, steel, and various nonferrous alloys -- in sand molds. The industry as a whole reuses in production nearly 94

percent of the 100 million tons of total sand throughput annually, which translates into an impressive recovery rate of 94 percent. The ability to repeatedly reuse sand to make world-class castings saves virgin materials, reduces industry costs, and preserves the nation's diminishing landfill capacity.

II. POLICY RAMIFICATIONS

Sand reuse by foundries -- a conventional industry practice -- is an integral part of the production process. Not only is regulatory control of this extremely low-risk component of production unnecessary, but from a practical standpoint, constraining or regulating sand reuse under RCRA only encourages disposal -- not recovery -- of high volumes of raw material.

The Region 6 approach to sand reuse under the RCRA regulatory framework is a wholly novel interpretation of the law. If allowed to stand, it could have dramatic consequences for foundries nationwide, particularly small facilities (80 percent of the nation's foundries employ fewer than 100 employees).

III. ACTION NEEDED

We do recognize the agency's interest in constraining certain recycling practices and mismanagement of materials. Accordingly, we would like to discuss with you the regulatory status of foundry sand at various points in the metal casting process. The industry has never before encountered Region 6's peculiar interpretation of RCRA during the history of its involvement with the agency's solid and hazardous waste program. In fact, it has never occurred to us, nor EPA staff with whom we have interacted, that sand is a solid waste when reused in ongoing, on-site production of molds to make castings.

The potential consequences for the foundry industry, as well as for the agency's waste program, warrant a thorough airing of this issue at agency headquarters. Ours is truly a perfect illustration of the ambiguity and confusion inherent in current solid waste and recycling policy under RCRA.

Your consideration of these issues is greatly appreciated. We have sent a similar letter to Mr. Bussard, and will be contacting your office to arrange a convenient date and time to meet.

Sincerely,

Christian M. Richter
AFS Washington Representative

cc: David Bussard, EPA Characterization and Assessment Division
Elliot Laws, Asst. Administrator for Solid Waste and Emergency Response
Leon Hampton, EPA Office of Small and Disadvantaged Business
Utilization
Karen Brown, EPA Small Business Ombudsman
Mike Stahl, EPA Office of Enforcement