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The Aluminum Association

Position Paper

Saltcake Generation and Management

Overview

Saltcake is the slag generated during the recovery of aluminum in Rotary Furnaces. To maximize metal recovery, a salt flux is often added to aluminum scrap and dross in the recovery process, and the residue resulting from that aluminum recovery process is referred to as saltcake or saltslag. Saltcake typically contains 3-10% metallic aluminum, 20-60% aluminum oxide, and 20-80% salt.

If disposed without further processing, saltcake or salt slag can be safely transported and disposed in non-hazardous landfills, when proper care is taken and material handling guidelines are met. However, uncertainties regarding what saltcake is and its proper handling have led to an uneven approach to management practices as well as differing regulatory responses nationwide.

Therefore, the Aluminum Association seeks to clarify the definition, regulatory status, and handling practices of saltcake in order to ensure that both the aluminum industry and the waste industry manage saltcake responsibly.

Background

Aluminum is an infinitely recyclable material whose light weight and versatility in a variety of transportation, packaging, and construction applications make it a valuable societal commodity.

- Nearly 75% of all aluminum ever produced is still in use today because of its durability and infinite recyclability.
- Recycled aluminum requires only 5% of the energy and emits only 5% of the greenhouse gases associated with primary (new) aluminum production.
- Recycling in the beverage sector approaches 70% and in the automotive and building/construction sectors is well above 90%.

Because of the valuable benefits of aluminum noted above, there are strong environmental and economic incentives to pursue aluminum recycling. However, aluminum production generates various types of slag – of which saltcake is one specific type.

Saltcake Regulatory Status

US EPA

In the U.S., solid wastes are characterized as hazardous wastes if they exhibit any hazardous characteristics or match any listings found in the hazardous waste regulations. Although each waste generator is responsible for their own waste characterization, saltcake does not exhibit hazardous characteristics or match any listings such that it would be considered a hazardous waste. Specifically, saltcake is not a hazardous waste as it neither falls into a F, K, U or P category on the hazardous waste list, nor does it meet any of the D characteristic criteria. EPA has four specific D characteristic criteria: ignitability, corrosivity, reactivity, and toxicity. Saltcake does not meet the characteristic of ignitability. US EPA's ignitability definition states that, "A solid waste exhibits the characteristics of ignitability if[…]it is not a liquid and is capable under standard temperature and pressure, of causing fire through[...]absorption of moisture[...]and, when ignited, burns so vigorously and persistently that it creates a hazard." Definitionally, saltcake does not meet either of these criteria. Note that although they sound similar, the US EPA ignitability criteria is different than the US DOT 4.3 Dangerous When Wet criteria for flammable gas evolution (See US DOT section below).

Saltcake does not meet the characteristic criteria for corrosivity as it is not aqueous in nature nor even a liquid. There is no US EPA specified test method for reactivity determination, and saltcake has been determined to not meet the narrative standard for reactivity. In the May 19, 1980 Federal Register on page 33109 in regard to the reactivity definition, US EPA stated, "This definition was intended to identify wastes which, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process." In view of this definition, a regulatory applicability determination conducted by Robert S. Nakamoto of the Tennessee Department of Environmental Conservation (TDEC) on March 3, 2011 noted that,

"We see that EPA intended this definition to cover waste with "extreme instability" that could "react violently" or "explode". It follows that it was not intended, as a rule, to cover waste that only had moderate or minor instability that when they reacted, did not react violently or explode. Thus, some things that do react would be reactive, while other things that react, because of a slower and lesser rate of reaction, would not meet the reactive hazardous waste definition. For

aluminum salt cake, when it is exposed to water, gases can be emitted and heat can be generated. EPA clarified that in order to meet the legal definition of being a reactive waste, the gases must be emitted in "a quantity sufficient to present a danger to human health or the environment." Again, while aluminum salt cake can emit gases, the rate and quantity does not appear to remotely approach the threshold for being classified as "extremely unstable" or "reacting violently". Like sharps, metal waste, etc. aluminum salt cake does possess its own hazards, but of a quantity insufficient to warrant legal classification as a reactive hazardous waste." [1]

The fourth characteristic assessed in making a hazardous waste determination is toxicity. Extensive testing of saltcake across multiple facilities and years of testing has shown that saltcake does not trigger the toxicity characteristic.

Several notable investigations into the determinations discussed above include that in 1980, the Kentucky Department of Environment Protection (KDEP) submitted a letter to the US EPA requesting an evaluation of saltcake fines in reference to 40 CFR 261.23 (a)(4), hazardous waste characteristics of reactivity. At that time, US EPA concluded that the saltcake fines should be regulated as a hazardous waste based on the information supplied by KDEP inspection reports. In 1981, Barmet Aluminum Corporation filed a civil action in the U.S. District Court against US EPA and KDEP, contesting the intent to regulate saltcake fines as a hazardous waste. The U.S. District Court, Western District of Kentucky handed down a decision on August 5, 1981, declaring that saltcake fines are not a hazardous waste within the meaning of the Solid Waste Disposal Act, 42 U.S.C.S. 6901, et seq. and KRS Chapter 224. Further to that decision, US EPA has not made any subsequent declarations that saltcake is a hazardous waste.

In addition, as discussed above, a more recent review of saltcake's regulatory status was performed by Robert S. Nakamoto of the State of Tennessee's Regulatory Compliance Section wherein he stated on March 3, 2011 in a Review of Waste Determinations finding saltcake to be non-hazardous waste that,

[1] State of Tennessee, Department of Environment and Conservation, Division of Solid Waste Management, Date: March 3, 2011, Subject: Review of Waste Determinations – Tennessee Aluminum Processors (TAP) and Smelter Services Corporation (SSC).

"*I could not identify any information that justified contesting the facility's hazardous waste determinations or that warranted requesting any additional data or testing related to their hazardous waste determinations*". [2]

It is also important to note that if saltcake were for some reason to meet any of the US EPA's hazardous waste criteria, it would be managed as hazardous waste, however the likely circumstance for its disposal would continue to be into landfills, albeit ones meeting a different regulatory classification.

US DOT

Aluminum remelting by-products (of which saltcake is one type) can exhibit US DOT Division 4.3 Dangerous When Wet characteristics (i.e., when in contact with water can emit flammable or toxic gas at a rate of greater than 1 liter per kg per hour). If an aluminum remelting by-product exhibits 4.3 characteristics it is classified as UN 3170 for transportation purposes. Saltcake has a wide range of constituencies and no generalizations can easily be made regarding its exhibiting 4.3 characteristics or not. Rather, site-specific material testing is recommended.

As background, DOT published a final rule in December 1994 that classified aluminum remelting by-products (of which saltcake is one type) as a potentially hazardous material for transport. Soon after, the Aluminum Association's recycling division demonstrated to DOT that even when aluminum remelting by-products are hazardous materials, there are a variety of safe transportation options available for them to comply with the hazardous material transportation provisions. In 1997, the DOT published a revision to their 1994 rule that included special provision B115 for the shipping of aluminum remelting by-products.[3] The special provision essentially eliminated the need for a DOT exemption (ie DOT-E 11602) for shipments of UN 3170 materials only, while it remained in effect for others. Special provision B115 permits the use of non-specification bulk containers that are sift-proof, prevent water from reaching the material, and are adequately ventilated. As additional background, subsequently DOT-E 11602 was converted into special permit DOT-SP 11602 which was a name change exercise for all

[2] State of Tennessee, Department of Environment and Conservation, Division of Solid Waste Management, Date: March 3, 2011, Subject: Review of Waste Determinations – Tennessee Aluminum Processors (TAP) and Smelter Services Corporation (SSC).
[3] Federal Register, Vol. 62, No. 87, Tuesday, May 6, 1997 (pages 24690-24743 – see page 24694)

DOT exemptions that started with the issuance of a December 9, 2005 final rule. Later the special permit became fully incorporated into the regulations with a final rule issued on January 21, 2016.

Current Management Practices

When not recycled, saltcake is disposed in landfills. The current landfill design for disposing of saltcake in the U.S. is the Subtitle D municipal and industrial non-hazardous waste design. This design includes a compacted clay liner overlain by a plastic liner system to contain the waste along with an accompanying leachate collection system. The liner system is designed to provide isolation of the wastes so as to successfully limit the waste, landfill leachate, and any generated gases from impacting groundwater and the surrounding environment. In most cases, saltcake is disposed in a monofill (with only saltcake and related wastes disposed in the landfill) or a monocell (with only saltcake and related wastes disposed in a dedicated cell within a larger landfill handling other wastes) so as to minimize the co-mingling of saltcake with municipal or other industrial wastes.

State regulatory agencies have continued to permit the receipt of saltcake into landfills, and some have even gone as far as to include specific regulatory language in legislation. As an example, the Ohio EPA worked with the Ohio legislature to approve the following language in 2012:

Excerpt from SB294

> "(O)(1) As used in this division, "aluminum waste" means waste containing aluminum generated from aluminum smelting operations, including dross, salt cake, baghouse dust, and shredder wastes.
> (2) The owner or operator of a sanitary landfill shall not commingle municipal solid waste with aluminum waste.
> (3) The owner or operator of a sanitary landfill shall not dispose of municipal solid waste that has been commingled with aluminum waste.
> (4) The owner or operator of a sanitary landfill may dispose of aluminum waste, but only in a monocell or monofill that has been permitted for that purpose in accordance with this chapter and rules adopted under it."

Landfills managing saltcake also have specific operating practices in place to minimize off-gas generation from saltcake management, including only receiving the material during non-inclement weather conditions, placing a cover layer over the waste on a daily basis, and not recirculating leachate back into the body of the landfill.

Landfill Alternatives

The secondary aluminum industry is aware of reclamation technology that can recover constituents from saltcake. However, there are currently only very limited options in the U.S. to further reclaim all of the saltcake components.

Summary

Aluminum Association member companies are dedicated to the responsible handling of any by-product material and continually work toward increasing processing efficiencies and alternatives for by-products and wastes within secondary aluminum recycling operations. Further, for the saltcake that continues to be generated there is a commitment to its responsible management in landfills that are designed, constructed, operated, monitored, and maintained consistent with applicable regulatory requirements and landfill industry best practices.

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