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Tri-State Mining District – Chat Mining Waste

Introduction

On June 5, 2007, the Environmental Protection Agency (EPA) established mandatory criteria for the environmentally protective use of chat in transportation projects carried out, in whole or in part, with Federal funds. To supplement this rule, EPA Regions 6 and 7 are jointly issuing this guidance on the uses of chat that would be consistent with that rule. In addition, EPA is offering further recommendations on uses of chat in other contexts. The rule establishes criteria for chat that is from the Tri-State Mining District of Ottawa County, Oklahoma, Cherokee County, Kansas, and Jasper, Newton, Lawrence and Barry Counties in Missouri. This fact sheet supersedes fact sheets issued by EPA Regions 6 and Region 7 in June 2002 and February 2003, respectively.

This fact sheet serves as guidance for chat washers, vendors who use chat (chat use), and for anyone selling chat. This guidance provides recommendations on the use of chat that EPA believes will generally be protective. If used properly, the environment and human health can be protected. However, improper use of chat may increase the threat to human health and the environment. Therefore, EPA recommends that chat be treated in accordance with the national rule and generally, with this fact sheet. To ensure that human health and the environment will be protected, EPA believes that the ultimate use of the material generally should not allow people, and in particular young children, to come into direct contact with any raw chat. In addition, EPA generally recommends that prior to use of all other mining wastes, regardless of its lead concentration, that assessments of risk (i.e. site specific risk assessments or the use of SPLP), similar to those in the national rule for chat, be conducted.

Background

Historic lead and zinc mining in the Midwest was centered in two major areas: the Tri-State area covering more than 2,500 square miles in southwestern Missouri, southeastern Kansas, and northeastern Oklahoma and the Old Lead Belt covering about 110 square miles in southeastern Missouri. The first recorded mining occurred in the Old Lead Belt in about 1742. The production increased significantly in both

the Tri-state area and the Old Lead Belt during the mid-1800s and lasted up to 1970. Currently production still occurs in a third area, the Viburnum Trend, in southeastern Missouri. Mining and milling of ore produced more than 500 million tons of wastes in the Tri-State area and about 250 million tons of wastes in the Old Lead Belt. More than 75 percent of this waste has been removed, with some portion of it used over the years. Today, approximately 100 million tons of chat remain in the Tri-State area. The EPA, the states of Oklahoma, Kansas and Missouri, local communities, and private companies continue to work together in implementing and monitoring response actions that reduce or remove potential adverse impacts posed by remaining mine wastes contaminated with lead, zinc, cadmium, and other metals.

Chat and Tailings

Ore production consisted of crushing and grinding the rock to standard sizes and separating the ore. Ore processing was accomplished in either a dry gravity separation or through a wet washing or flotation separation. Dry processes produced a fine gravel waste commonly called "chat." The wet processes resulted in the creation of tailings ponds used to dispose of waste material after ore separation. The wastes from wet separation are typically sand and silt size and are called "tailings." Milling produces large chat waste piles and flat areas with tailings deposited in impoundments. Tailings generally contain higher concentrations of heavy metals and therefore present a higher risk to human health and the environment through direct contact. Chat typically ranges in diameter from 1/4 to 5/8 inch. Intermingled material such as sands measure 0.033-0.008 inches in diameter and fine tailings are less than 0.008 inches in diameter.

Another lesser occurring type of mine waste is called development rock. Development rock is the waste rock generated in drilling shafts to the deep mines and therefore did not come from the major ore producing rocks. Typically, development rock consists of large boulders and is locally known as "bullrock." Smelters also operated historically in Kansas, Missouri, and Oklahoma; however, this fact sheet does not address smelter related wastes.

Health Risk from Lead

When playing in lead-contaminated chat or in a home that has chat dust tracked in from the outside, children may ingest lead when they put their hands or other dirt-covered objects in their mouths. Children are more sensitive to the health effects of lead than adults. Fetuses exposed to lead in the womb, because their mothers have a lot of lead in their bodies, may be born prematurely and have lower weights at birth. Exposure in the womb, in infancy, or in early childhood also may slow mental development and cause lower intelligence later in childhood.

Large chat piles contaminated with lead also pose a risk to adolescents who climb or recreate on them. Female adolescents may absorb lead from this exposure which can be transferred to their fetuses during pregnancies later in their lives. Lead exposure can also cause other problems in adults, such as increases in blood pressure, anemia, and impaired nervous system or kidney function.

By eliminating the unrestricted use of loose chat (i.e., chat that has not been bound in concrete, asphalt, or a safe product), we can effectively reduce human exposure to lead.

Legal Considerations

If waste material is used in a way that creates a threat to human health or the environment, the owner of the property and the party responsible for creating the hazardous situation could be liable for a cleanup under the CERCLA law. Because these mine wastes often contain lead, cadmium, zinc or other metal contaminants at levels that present a risk to both human health and the environment, using them in situations that would allow people or ecological receptors (animals, plants, fish, etc.) to regularly come into contact with the material could cause sufficient risks that warrant remediation action under CERCLA. To avoid potential CERCLA liability, EPA generally recommends that property owners, haulers, operators, and individuals or businesses that sell, buy, or use mine waste materials which contain hazardous constituents, use the materials in a manner that prevents exposure to humans and other receptors, and is otherwise not detrimental to the environment.

Chat Usage Regulations and Guidelines

The following is a list of typical uses of chat that EPA regulations and RODs have determined to be acceptable and unacceptable.

Acceptable Uses of Chat in Transportation Construction Projects

EPA has determined the following uses of chat in transportation construction projects funded, in whole or in part, with Federal funds are not likely to present a threat to human health and the environment:

- (1) Chat used as an aggregate in: hot mix, warm mix and cold mix asphalt road surfaces, asphalt road base, asphalt slurry seals/microsurfacing, and epoxy bridge anti-skid surfacing.
- (2) Chat used as an aggregate in: Portland cement concrete (PCC), granular road base, stabilized road base, chip seals, and flowable fill if:
 - (a) the product is tested using the Synthetic Precipitation Leaching Procedure (SPLP, EPA SW 846 Test Method 1312) and the resulting metals in the leachate do not exceed the National Primary Drinking Water Standards Maximum Contaminant Level (MCL) for lead of 0.015 mg/l and cadmium of 0.005 mg/l and the leachate also does not exceed the National Recommended Water Quality Criteria chronic standard for zinc of 120 ug/l: or

¹Title VI of Section 6018 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2005 (HR 3 or “the Act”), amended Subtitle F of the Solid Waste Disposal Act (42 U.S.C. 6961 et seq) by adding Sec. 6006 which requires EPA to develop rules governing the use of chat in transportation construction projects funded, in whole or in part, with Federal funds. In June 2007 U.S. Environmental Protection Agency (EPA) issued regulations governing these uses (see XX FR XXXX).

(b) EPA (or a State environmental Agency, if it chooses to do so) has determined, based on a site-specific risk assessment and after notice and opportunity for public comment, that leachate will not cause an exceedance of the National Primary Drinking Water Standards Maximum Contaminant Level (MCL) for lead of 0.015 mg/l and cadmium of 0.005 mg/l in potential drinking water sources, and the fresh water National Recommended Water Quality Criteria for zinc of 120 ug/l in surface waters, or

(3) The use of chat has been authorized pursuant to a state or federal response action. State or Federal response actions are undertaken pursuant to applicable Federal or State environmental laws and with consideration of site-specific risk assessments.

Acceptable Non-Transportation Uses of Chat in Cement and Concrete

The Agency recommends that the non-transportation uses of chat in cement and concrete be limited to **non-residential construction projects** that, on a case-by-case basis, either:

(1) Synthetic Precipitation Leaching Procedure (SPLP, EPA SW-846 Method 1312) tests conducted on the proposed material show that concentrations in the leachate do not exceed the National Primary Drinking Water Standards for lead of 0.015 mg/l and cadmium of 0.005 mg/l and the fresh water chronic National Recommended Water Quality Criterion for zinc of 120 ug/l; or

(2) EPA (or a State environmental Agency, if it chooses to do so) has determined, based on a site-specific risk assessment and after notice and opportunity for public comment, that leachate will not cause an exceedance of the National Primary Drinking Water Standards Maximum Contaminant Level (MCL) for lead of 0.015 mg/l and cadmium of 0.005 mg/l in drinking water sources, and the National Recommended Water Quality Criteria for zinc of 120 ug/l in surface waters.

Other Uses of Chat that EPA Believes Will Not Generally Harm Human Health or the Environment:

– Applications that encapsulate chat as a material for manufacturing a safe product or as part of an industrial process (e.g., glass, glass recycling) where all waste byproducts are properly disposed.

Chat Uses that Have Caused or Have the Potential to Cause Damage to Human Health or the Environment:

– Use as unencapsulated surface material.

– Fill material in yards, playgrounds, parks, and ball fields, schools or daycare centers.

² Title VI of Section 6018 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2005 (HR 3 or “the Act”), amended Subtitle F of the Solid Waste Disposal Act (42 U.S.C. 6961 et seq) by adding Sec. 6006 which requires EPA to develop guidance on the safe use of chat in non-transportation cement and concrete projects.

- Playground sand.
- Vegetable gardening in locations with contaminated chat.
- Sanding of icy roads.
- Sandblasting with sand from tailings ponds or other chat sources.
- Bedding material under a slab in a building that has underfloor air conditioning or heating ducts.
- Development of land for residential use (e.g., for houses or for children's play areas, such as parks or playgrounds) where visible chat is present or where the lead concentration in the soil is equal to or greater than 500 mg/kg unless the direct human contact health threat and environmental risk is eliminated by engineering controls (e.g., removing the contaminated soil or capping the contaminated soil with at least 12 inches of clean soil).
- Use of remilled asphalt roads containing chat on residential properties as fill material or placed on residential property for the homeowner's future use.
- Use as an agricultural amendment.
- Use of chat piles for recreation (e.g., ATVs, bicycling, hiking, climbing, sliding).

To the extent users have questions about any specific uses of chat that are not listed above, users are encouraged to consult with EPA or the States of Oklahoma, Kansas, and Missouri, as appropriate.

Recommended Precautions during Construction Projects

General Construction Practices: Please note that even when chat is put to use as described above as generally acceptable, EPA recommends that care be used to prevent a release. It is especially important to use chat in construction without spreading it beyond the area where it is intended to be used. For example, there could be a situation in which chat was stockpiled prior to being mixed into concrete, but it is inadvertently spread to surrounding areas before it is added to the cement. Chat can be spread by construction traffic, wind or rainfall runoff. Consequently, adequate controls and monitoring are recommended to prevent spreading of contamination during construction to include dust suppression, air monitoring to check air quality, as needed, erosion controls, tracking of trucks spilling contaminated material off the site, and stormwater management.

Remilled Asphalt Roads Containing Chat: EPA generally recommends that remilled asphalt follow the process requirements developed by the National Asphalt Pavement Association and standards established by each state's Department of Transportation. As noted previously, asphaltic material made of remilled roads used on residential or public use properties as fill material or placed on residential property for the homeowner's future use raises potential health and environmental concerns. Accordingly, such use could result in the property owner being held liable for removal and clean up of the property.

Utility Excavations: EPA recommends that particular care be exercised when excavating for utilities in contaminated areas in order to avoid spreading contamination to clean areas. When stockpiling or temporarily staging excavated materials, EPA recommends that adequate controls (e.g., containment of excavated soil, dust suppression, and runoff and erosion controls) are in place to prevent the spread of contaminated soils and leachate to clean areas. Excavated contaminated materials can generally be placed back into the excavations without posing significant human health or environmental risks as long as a minimum clean cover is used. A cover of six inches of clean material is normally adequate in utility right-of-ways. In residential areas, at least 12 inches of clean fill would generally be protective. Alternatively, excavated contaminated material could be disposed of in accordance with applicable laws and regulations. EPA generally recommends against leaving contaminated excavated material exposed at the surface after construction is complete.

Best Management Practices for Chat Processing

Two methods of chat processing are in use in the Tri-State District: they are dry screening or washing. In some instances, a combination of these two methods are used. EPA generally believes that the Best Management Practices (BMPs) for the management and processing of chat described below will effectively reduce the environmental concerns. In general, BMP components include:

- Proper disposal of process water to include injection into underground mine caverns to eliminate surface impoundments and generation of fine tailings.
- Controlling process water to avoid discharge to surface water during and up to a 25-year storm event.
- Constructing berms around mill ponds or surface impoundments capable of retaining water without seepage.
- Developing contingency measures and response plans to address releases from source water, process water, sediment and storm water.
- Containment of stockpiles of chat to prevent spread of contaminated material.
- Controlling storm water runoff within the process areas.
- Dust mitigation to minimize dust generated from the processing of chat and on-site haul roads to include wetting, mist curtains, and foam blankets.
- Air monitoring during chat processing, as needed, to confirm air quality and effectiveness of dust mitigation.
- Controlling releases from trucks hauling raw and/or processed chat off-site to prevent fugitive dust and off-site tracking of contaminated soil to include covering truck loads of chat with tarps and washing trucks prior to leaving the site and entering public roads to prevent tracking.
- Decontamination of personnel and equipment.

- Access controls like fences and gates.
- Developing contingency measures and response plans to address unintended releases from source water, process water, sediment and storm water.

It is further recommended that storage and transportation of the reclaimed asphalt pavement generally follow the BMPs for chat processing.

Owners and operators are encouraged to notify and coordinate with their state agencies to establish and implement the BMPs for their chat processing operations.

Off-site Rule

Because multiple entities are involved with the tracking of where chat is used, the sale of chat, and the disposal of mine waste, it is important for the public and involved parties dealing with chat to know how EPA and other federal agencies handle wastes from CERCLA response actions. During the Federal response action, waste that is disposed off-site, must be sent to a facility that complies with the Off-site Rule. The purpose of the Off-site Rule is to avoid having CERCLA wastes contribute to present or future environmental problems by directing such wastes to management units determined to be environmentally sound. To accomplish this objective, each region has an Off-site Rule Coordinator who determines whether facilities are acceptable for the receipt of CERCLA waste. EPA makes every attempt to ensure the proper treatment and disposal of CERCLA wastes removed from a CERCLA site. As a result, facilities that meet the criteria to receive the designated waste are used.

Certification

With the exception of chat under the jurisdiction of the U.S. Department of Interior, Bureau of Indian Affairs (BIA), which has its own certification criteria, all other parties involved with the sale and use of chat in transportation construction projects funded, in whole or in part, with Federal funds shall:

- (1) Submit a signed, written certification to the environmental regulatory agency in the State where the chat is to be used within 30 days of the date of acquisition. The certification shall contain the following:
 - (i) Location of origin of the chat
 - (ii) Amount of chat acquired; and
 - (iii) Certification Statement: I certify under penalty of law that the chat used in this project will meet EPA criteria found in 40 CFR §278.3.
- (2) Transfer. If the chat is sold or otherwise transferred to another party, the acquirer shall provide a copy of the certification to the new owner of the chat. The new owner shall submit a certification according to 40 CFR §278.4(a) (1). The new certification supersedes all previous certifications.
- (3) Recordkeeping. The acquirer of chat, and any other person that receives the chat, will maintain a copy of the certification for three years following transmittal to the State department(s) of the environment.

For More Information Contact

If you would like additional information about this fact sheet or Superfund mining sites in Kansas or Missouri, please contact EPA Region 7's toll-free number 1-800-223-0425.

If you would like additional information about this fact sheet or Superfund mining sites in Oklahoma, please contact EPA Region 6's toll-free number 1-800-533-3508.

For information about the final rule entitled, Criteria for the Safe and Environmentally Protective Use of Granular Mine Tailings known as "Chat", please contact Stephen Hoffman at 703-308-8413 or hoffman.stephen@epa.gov.