

U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Brushy Creek Mine Tailings Release - Removal Polrep
Initial and Final Removal Polrep



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region VII

Subject: **POLREP #1**
First and Final Pollution Report
Brushy Creek Mine Tailings Release
BUNKER, MO
Latitude: 37.5383260 Longitude: -91.1290100

To:
From: Heath Smith, OSC
Date: 6/29/2011
Reporting Period: March 16, 2011 through June 16, 2011

1. Introduction

1.1 Background

Site Number:		Contract Number:	
D.O. Number:	N/A	Action Memo Date:	
Response Authority:	CERCLA	Response Type:	PRP Oversight
Response Lead:	PRP	Incident Category:	Removal Action
NPL Status:	Non NPL	Operable Unit:	
Mobilization Date:	3/15/2011	Start Date:	3/15/2011
Demob Date:	3/31/2011	Completion Date:	3/31/2011
CERCLIS ID:	MOT300010691	RCRIS ID:	
ERNS No.:		State Notification:	MDNR
FPN#:		Reimbursable Account #:	

1.1.1 Incident Category

CERCLA incident category: Active Production Facility

1.1.2 Site Description

1.1.2.1 Location

The Brushy Creek Mine is located in northwest Reynolds County, Mo., off State Highway KK (coordinates of the underground mine headworks and mill 37.538326 latitude, -091.129010 longitude) and is part of a string of mining facilities in the area known as the "New Lead Belt." The mine headworks, mill and associated mine tailings impoundment encompass approximately 600 acres. Brushy Creek Mine is owned and operated by The Doe Run Company (Doe Run).

The closest population center to the mine, Bunker, Mo., is located approximately seven miles to the southwest. The 2009 population estimate for Bunker was 422.

The facility lies within the Westfork Black River watershed (10 Digit Hydrologic Unit Code). An un-named tributary flows from the toe of the facilities 240-acre tailings impoundment to Bills Creek. Bills Creek empties into the West Fork of the Black River approximately 2.5 miles south of the facility.

The facility mines, mills, concentrates and ships lead sulfide (galena) as well as other sulfide minerals commonly found in association with deposits of galena. A froth flotation process is employed to selectively separate the sulfide minerals from gangue. Waste material is generated during this process called "mine tailings" or simply "tailings." The tailings are slurred to and accumulate in an on-site tailings impoundment. The impoundment, which is situated in a valley, is bound, down gradient, by a large dam made of mine tailings. The purpose of the dam is to hold back mine water, surface runoff, and tailings from flowing off-site. The dam covers an area of approximately 45 acres at the site.

South of the tailings impoundment is another body of water called the Brushy Creek Mine Water Lake. Water generated through the processes employed to keep the mine from flooding (dewatering processes) is pumped into this lake. The lake discharges to Licks Creek.

Missouri State Permit, a National Pollutant Discharge Elimination System (NPDES) permit, number MO-0001848 exists for the facility. The permit describes three outfalls at the facility. Outfall #001 is the mine dewatering / storm water runoff from the mining and milling facility. Outfall #002 is the emergency spill way and storm water runoff. The permit states that water from outfall 002 is "recirculated from the tailings pond

back into the process" Outfall #003 is described as the seep impoundment and storm water runoff outfall. The permit indicates that seep water from the toe drain of the tailings impoundment is recirculated from the tailings pond back into the process.

An event was reported to the National Response Center (NRC) on March 15, 2011. The report, number 970127 (NRC Report), describes a release of approximately one ton of lead tailings from the Brushy Creek tailings dam. The release is the focus of this response action.

1.1.2.2 Description of Threat

The primary contaminant of concern at the site is lead and lead compounds. Lead and lead compounds are hazardous substances as defined by section 101(14) of CERCLA, listed at 40 CFR § 302.4, and exist at the site. In the NRC Report, the reporting party estimated that the lead tailings could contain up to 2,000 milligrams per kilogram (mg/kg) lead. It is generally understood that lead mine tailings generated by the process employed at this facility will have residual lead that remains in the waste; therefore, it exists in the lead mine tailings. Lead is classified by the U.S. Environmental Protection Agency (EPA) as a probable human carcinogen and is a cumulative toxicant. A significant amount of lead that enters the body is stored in the bone for many years and can cause irreversible health effects.

The Oil and Hazardous Materials Technical Assistance Data System states that both fish and animals are capable of concentrating lead, accumulating it in the bones. Lead has the potential to bioaccumulate in the food chain.

1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results

On March 16, 2011, On-Scene Coordinator (OSC) Heath Smith and Remedial Project Manager (RPM) Greg Bach performed a site inspection at the location of the release. Access to the area was provided by the Doe Run maintenance supervisor and the mill superintendent. The unnamed tributary of Bills Creek, Lick Creek (another tributary of Bills Creek) and Bills Creek were visually inspected.

Heavy rains during the days preceding March 15, 2011, caused an excessive amount of storm water to accumulate and flow off-site. Storm water flowed down the face of the tailings impoundment dam carrying with it lead mine tailings. The storm water bypassed the seep ponds and entered the unnamed tributary, an intermittent stream that feeds into Bills Creek. Some of the tailings were deposited along the unnamed tributary. An unknown amount of tailings were transported into Bills Creek, a perennial stream.

During the inspection, the EPA collected three surface water samples and three sediment samples at three different locations including (results can be found at the following web address: <http://www.epaosc.org/sites/7018/files/Results%20Worksheet.pdf>, 5319-1 Sediment Sample 1 (SD-1) and 5319-4 Surface Water Sample 1 (SW-1): 37.525109 Latitude, -091.141000 Longitude. Samples were collected east of the low water crossing at Lick Creek and County Road 908. A sign labeled BC001 was present at the location indicating NPDES Outfall #001. Lick Creek, an intermittent stream, was flowing across the low water bridge on County Road 908. A column of water approximately 15 feet wide and, at its maximum, 3 inches deep, was flowing over the concrete low water crossing at County Road 908.

5319-2 Sediment Sample 2 (SD-2) and 5319-5 Surface Water Sample 2 (SW-2): 37.523918 Latitude, -091.142469 Longitude. Samples were collected near the east bank of Bills Creek, immediately upstream of the confluence with Lick Creek. Bills Creek was flowing at the time samples were collected.

5319-3 Sediment Sample 3 (SD-3) and 5319-6 Surface Water Sample 3 (SW-3): 37.532210 Latitude, -091.146268 Longitude. Samples were collected from the unnamed tributary that flows from the toe of the Tailings Dam to Bills Creek. Samples were collected upstream of the disturbance caused by the removal effort and downstream from the seep ponds. Water was flowing in the tributary at the time. Water volumes were low. The stream bed was miniscule and ranged from 6 to 12 inches wide and 1/8 to 1/2 inch deep.

The samples were processed by the EPA Region 7 Laboratory in Kansas City, Kan. Results of analysis were provided on April 1, 2011.

During the site inspection, the EPA observed crews managed by Doe Run excavating sediment and mine waste from the unnamed tributary of Bills Creek, on the west side of County Road 908. Material was excavated by a mid-sized excavator and loaded into a large off road dump truck. The reclaimed material was hauled to the top of the Tailings Dam where it was deposited back onto the facility. Doe Run was awaiting permission from a private landowner to complete excavation on the west side of County Road 908 at the time of the inspection. Crews had several hundred feet of the unnamed tributary to excavate on the east side of County Road 908 to excavate before they were complete.

Lead was found to exceed the EPA Ambient Water Quality Criteria in all three surface water samples (SW-1, SW-2 & SW-3). Lead was found to exceed the U.S. Geological Survey (USGS) Probable Effects Concentration (PEC) in sediment samples taken at all three locations (SD-1, SD-2 & SD-3).

The table referenced above provides comparisons of results to applicable standards including NPDES permitted values, USGS PEC values, the EPA Water Quality Criteria, and Missouri Water Quality Standards. Lead and zinc were found to exceed the surface water standards in one or more samples. Cadmium, lead, copper, nickel and zinc were found to exceed the sediment standards in one or more samples.

At SW-1, taken at NPDES permitted Outfall #001, Lead and zinc were found to exceed the NPDES permitted values for the monthly average permissible discharge concentration, but were less than the daily maximum allowable concentration. The measuring frequency described in the permit is one grab sample per month.

2. Current Activities

2.1 Operations Section

2.1.1 Narrative

On March 15, 2011, Doe Run reported a release of approximately one-ton of lead contaminated mine waste into an unnamed tributary of Bills Creek in rural Reynolds County, Mo.

After coordinating with Doe Run, EPA OSC Heath Smith performed a follow up site visit on June 16, 2011. Doe Run had excavated the bed of the unnamed tributary from Bills Creek back to the Tailings Dam. Two berms had been constructed from "shot rock," unsorted rock of various sizes, downstream of the tailings dam. Shot rock had been used to construct a terrace at the edge of the tailings dam to carry storm water that fell inside the terrace into the seep ponds in order that it might be pumped back into the tailings impoundment. A mound of material was observed on the north side of the top of the Tailings Dam. This mound was described as the reclaimed material from the creek. Doe Run was not able to provide an accurate estimate of the volume of material reclaimed during the removal. Based on visual observation and professional judgment, the OSC estimates the volume to be approximately 150 cubic yards. During the original site inspection on March 16, 2011, the EPA observed the reclaimed material being used to construct the terrace. It had since been replaced by shot rock and moved to its current resting place.

An interview of the facilities maintenance foreman was conducted. Abney Construction of Viburnum, Mo., conducted the removal. Per the interview, it took approximately two days to remove the material from the unnamed tributary, including the privately owned portion of the drainage. The current terrace was intended to catch any storm water within its drainage area and divert it to the seep ponds. Removal of the mine waste from the unnamed tributary as well as construction of the terrace took approximately two weeks.

2.1.2 Response Actions to Date

Crews managed by the potentially responsible party (PRP) conducted a removal action at the site. The entire unnamed tributary was excavated (approximately 650 feet).

The EPA did not collect additional samples during the June 16, 2011 site visit. A visual inspection revealed there was not an ongoing release of the magnitude reported on March 16, 2011. Material released to the unnamed tributary had been excavated and transported back onto the facility.

2.1.3 Enforcement Activities, Identity of PRPs

The Doe Run Company manages the facility where the material released originated. Doe Run took responsibility and conducted the necessary removal action without an enforcement instrument.

2.1.4 Progress Metrics

<i>Waste Stream</i>	<i>Medium</i>	<i>Quantity</i>	<i>Manifest #</i>	<i>Treatment</i>	<i>Disposal</i>
Lead-Contaminated Soil	Solid	150 cubic yards	N/A	None	Reclaimed

2.2 Planning Section

2.2.1 Anticipated Activities

2.2.1.1 Planned Response Activities

No further actions are planned by the PRP in response to this release. The PRP indicated that it may conduct more grading within its facility; however, no indication of further removal of offsite waste.

2.2.1.2 Next Steps

No further offsite actions are planned in response to this release.

2.2.2 Issues

Heavy rains caused a release at the facility. Storm water runoff traveled down the face of the tailings dam carrying with it the estimated one-ton of mine waste which was deposited downstream in the unnamed tributary and Bills Creek. Although this particular event prompted action by the PRP, it appears that nothing was in place to divert tailings from flowing into the unnamed tributary during prior events. Visual evidence of tailings existed downstream of the seep ponds and upstream of County Road #908 that appeared to pre-exist the March 15 reported release.

In response to the event, Doe Run constructed a terrace. The terrace was constructed of unsorted blast rock "shot rock" and was put in place to catch storm water and divert it into the seep ponds per Doe Run. The terrace appears sturdy; however, it has high permeability due to the type of construction material used which could affect the effectiveness of its intended use.

A berm was constructed across the unnamed tributary below the seep ponds and above County Road #908.

The berm was placed bank to bank. Filter fabric was installed on the upstream side of the berm. A second berm was constructed upstream of the first in a similar fashion.

Doe Run provided verbal direction on the construction of the terrace. Visual inspection of the site revealed issues with the grade of the drainage area and the terrace. At the middle step of the Tailings Dam on the north side, the terrace appeared low. Evidence of water leaking through the terrace was present. At the top of the Tailings Dam storm water had cut a small gulley in the ground. The gulley led to an area outside of the terrace. Mine tailings was present at this location outside the terrace. Doe Run indicated it would conduct additional work in the area using a backhoe temporarily stored on-site.

Although the structures constructed in response to this event appear to be sturdy, the longevity and effectiveness of the solution is questionable. It is the recommendation of the EPA that Doe Run evaluate the current system as it exists to ensure it is the most effective solution.

At the initial site inspection on March 16, 2011, the EPA noted Lick Creek to be milky in color. Samples were collected near NPDES Outfall #001 (SD-1 and SW-1). Results indicated lead and zinc levels exceeded the NPDES permitted values for the monthly average permissible discharge concentration. Results indicated lead, cadmium, nickel and zinc were exceeding the USGS PEC at SD-1. Lead and zinc were found to be above the EPA Ambient Water Quality Criteria as well as the Missouri Water Quality Standards at SW-1.

The receiving stream of this event, Bills Creek, was not evaluated for impact by Doe Run. The EPA collected a sample from Bills Creek during the initial site inspection on March 16, 2011 (SD-2 and SW-2). Lead was found to exist above the USGS PEC. Lead was found to exceed the EPA Ambient Water Quality Criteria as well as Missouri Water Quality Standards at SW-2.

No analytical data was provided by the Doe Run regarding this event to indicate the unnamed tributary had been remediated to any standard. No characterization of Bills Creek was conducted.

Current NPDES values are above the current Missouri Water Quality Criteria (Missouri 10 CSR 20-7). Values detected at SW-1, SW-2 and SW-3 are above current Missouri Water Quality Criteria for metals. Specifically at SW-1, lead and zinc were found to exceed the chronic standard. Lead and zinc are also above the acute standard at SW-1. At SW-2, lead was found to exceed the chronic standard. At SW-3, lead was found to exceed the chronic standard while zinc was found to exceed the acute standard.

2.3 Logistics Section

Doe Run handled the logistical issues for the response.

2.4 Finance Section

2.4.1 Narrative

This was a PRP lead removal action.

Estimated Costs *

	Budgeted	Total To Date	Remaining	% Remaining
Extramural Costs				
Intramural Costs				
USEPA - Direct	\$0.00	\$1,500.00	(\$1,500.00)	0.00%
USEPA - InDirect	\$0.00	\$1,000.00	(\$1,000.00)	0.00%
Total Site Costs				
	\$0.00	\$2,500.00	(\$2,500.00)	0.00%

* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

2.5 Other Command Staff

2.5.1 Safety Officer

This was a PRP lead removal action. No safety issues were reported to the EPA. The EPA observed no safety issues during site visits.

2.6 Liaison Officer

A liaison officer was not required during this response.

2.7 Information Officer

2.7.1 Public Information Officer

The removal action does not warrant a Public Information Officer at the site.

2.7.2 Community Involvement Coordinator

The removal action does not warrant a Community Involvement Coordinator to be present at the site.

3. Participating Entities

3.1 Unified Command

The limited scope of the response does not warrant a full Incident Management Team or Unified Command. Operations, safety, logistics, planning, and finance functions were handled by the PRP.

3.2 Cooperating Agencies

N/A

4. Personnel On Site

During the course of the action, Doe Run maintained presence on-site. They employed Abney Construction Company of Viburnum Mo., to excavate the unnamed tributary, relocate the reclaimed mine waste, and construct the terrace and berms.

5. Definition of Terms

AOC	Area of Contamination/Administrative Order on Consent
AOR	Area of Response
ATSDR	Agency for Toxic Substances and Disease Registry
AWQS	Ambient Water Quality Standards
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	U.S. Environmental Protection Agency
ERRS	Emergency & Rapid Response Services Contract
MDHSS	Missouri Department of Health and Senior Services
MDNR	Missouri Department of Natural Resources
mg/L	milligrams per Liter
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
ng/m3	nanograms per cubic meter
NPL	National Priorities List
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PEC	Probable Effects Concentration
Polrep	Pollution Report

PPE	Personal Protective Equipment
PPM	Part Per Million
PRP	Potentially Responsible Party
RCRA	Resource Conservation and Recovery Act
RPM	Remedial Project Manager
Sitrep	Situation Report
START	Superfund Technical Assessment and Response Team
SU	Sample Unit
TCLP	Toxicity Characteristic Leaching Procedure
USGS	United States Geologic Survey
XRF	X-Ray Fluorescent Spectrometer
yd3	Cubic Yard

6. Additional sources of information

6.1 Internet location of additional information/report

For additional information, please refer to <http://www.epaosc.org/brushycreekmine>.

6.2 Reporting Schedule

The Pollution Report (Polrep) serves as the OSC's record of the response actions, notifications and decisions made to support the response action. Polreps will be completed and posted as conditions warrant and at the conclusion of site activities. For this action, this report is planned to be the Initial and Final Polrep.

7. Situational Reference Materials

Please refer to the website <http://www.epaosc.org/brushycreekmine> for maps, data, photos, diagrams, etc.

POLREP #1 Last Updated 8/9/2011