COMMENTS ON THE BIG RIVER MINE TAILINGS SITE OPERABLE UNIT NO. 1

JULY, 2011 PROPOSED PLAN

The Doe Run Resources Corporation offers the following comments in response to the Proposed Plan issued in July 2011 by the U.S. Environmental Protection Agency Region 7 ("EPA") for Operable Unit No. 1 at the Big River Mine Tailings Site ("Site") in St. Francois County, Missouri. EPA issued the Proposed Plan for a 30-day public comment period on July 22, 2011, and extended the comment period an additional 30 days until September 21, 2011. In its Plan, EPA proposes to address potential risk to human health posed by lead mining wastes in residential yards. Specifically, EPA proposes a remedy that includes excavating soil in residential properties with surface soil lead detected at levels greater than or equal to 400 parts per million ("ppm") to a depth of 12 inches, greater than or equal to 1200 ppm lead to a depth of 24 inches, and installing a visual barrier at 24 inches where lead greater than or equal to 1200 ppm is detected at that depth. EPA estimates the proposed remedy will address approximately 4,000 residential properties at an estimated present worth cost of $107.62 million.[1]

The Doe Run Resources Corporation conducts metals mining and processing activities in Missouri, where it employs approximately 3,000 people. As an active employer and member of the Missouri Lead Belt community, Doe Run has worked closely and cooperatively with EPA since the early 1990s to investigate and remediate residual contamination from historic mining activities in the Region in order to ensure that any risks are appropriately addressed. Since 1994, Doe Run has spent approximately $62 million on response actions in St. Francois County. It has devoted significant

[1] For cost estimating purposes, the Feasibility Study assumed 4,540 yards would be addressed. The FS estimated a present worth cost of the proposed Alternative 3 at $108.68 million.

resources and expertise to identifying and defining potential risks to human health and the environment that may exist as result of historic mining activities in the County, and has conducted extensive removal actions to cooperation with EPA, the State and St. Francois County.

EPA has identified eight sources of mine waste in the former mining area of St. Francois County.[2] Since 1994, Doe Run has investigated and stabilized six of these large tailings Piles and a portion of the small Hayden Creek pile to minimize any further releases from those Piles. We understand EPA plans to address the Doe Run Pile, not associated with The Doe Run Resources Corporation, as part of another operable unit. Beginning in 2000, Doe Run began sampling and, where appropriate, remediating residential properties and child high-use areas ("CHUAs"). In 2004 Doe Run began remediating all residential properties and CHUAs with yard soil concentrations greater than 400 ppm located within 500 feet from each of the six major mill piles, 1,000 feet from the four identified smelters and 100 feet from mine shafts identified in the Remedial Investigation. Additionally, Doe Run sampled and remediated yards where elevated blood-lead levels in children ("EBLs") were detected, regardless of their distance from the Piles. As of January 2011, Doe Run has sampled a total of 2,057 residential properties and child high-use areas, and conducted total or partial removals at 586 of those properties.[3] Finally, Doe Run conducted the Focused Remedial Investigation efforts and the prepared the Feasibility Study as directed by EPA. Doe Run proactively did this work in response to EPA's requests regardless of the lead source.

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[2] The Proposed Plan identifies eight areas, collectively referred to herein as the "Piles:" Desloge Pile, National Pile, Leadwood Pile, Elvins/Rivermines Pile, Bonne Terre Pile, Federal Pile (St. Joe State Park), Doe Run Pile and Hayden Creek.

[3] These numbers are from the Feasibility Study. The numbers contained in the Proposed Plan are incorrect.

Concurrent with these efforts, the State and County Departments of Health launched extensive educational programs both in the area and statewide directed to risks associated with lead and how to reduce exposure, particularly of young children, to lead from all sources, including in particular lead-based paint ("LBP"). As shown in Figure 5, infra, the occurrence of EBLs in St. Francois County has fallen substantially since 1997. In fact, the Missouri Department of Health and Senior Services ("MDHSS") reports that occurrence of EBLs in St. Francois County have been less than 5% since 2006. In 2010, the rate of occurrence was reported to be 1%[4] In other words, the rate of occurrence in St. Francois County has already been reduced to a level consistent with EPA's Remedial Action Objective, and to a level less than the national average of EBL.

This Operable Unit presents highly complex issues with regard to the nature and extent of the contamination and the potential risks resulting from it. These issues relate to the lack of correlation between EBLs and identified mine waste source areas; the large volume of mine chat and tailings and their varied uses; the widespread, yet unaccounted-for occurrence of LBP in residences in the area; and the abundance of naturally occurring lead in the area. These complex issues warrant very careful scrutiny in determining the appropriate use of CERCLA statutory authorities and resources.

Doe Run maintains that in a rush to complete the Feasibility Study EPA has failed to consider pertinent analysis of the data provided by Doe Run. In issuing its Proposed Plan with undue haste, EPA made unfounded and arbitrary assumptions regarding the source of contamination, disregarded serious questions regarding the associated potential risk, and disregarded the limits of EPA's CERCLA authorities to respond to conditions at the Site. As a result, EPA now proposes a remedy that 1) is beyond the scope of its

[4] See Exhibit 1. MDHSS 2010 Calendar year Blood Lead Testing Data.

CERCLA response action authorities to the extent it addresses naturally-occurring contamination, lead from building materials, including LBP, consumer products in consumer use, and normal fertilizer use; 2) has not been demonstrated to be necessary to protect human health and the environment; and 3) is otherwise inconsistent with Section 121 of CERCLA and the National Contingency Plan ("NCP"). Accordingly, Doe Run urges EPA to take additional time as needed to carefully evaluate the source of the contamination, evaluate the extent to which unrelated sources, including sources over which EPA does not have CERCLA response action authority, are the true cause of EBLs, and more carefully evaluate the true nature of any remaining risk to human health resulting from mining activities. Only then can EPA develop a remedy that responds more directly to any remaining risk, presents a better balance of trade-offs and is consistent with CERCLA and the NCP.

I. EPA ERRONEOUSLY ASSUMED THE PILES/MINING WASTE ARE ONLY SOURCE AND PRINCIPAL THREAT.

The NCP requires that EPA properly scope the project to ensure the RI/FS is properly designed. 40 C.F.R. § 300.430(a)(2). "The investigative and analytical studies should be tailored to site circumstances so that the scope and detail of the analysis is appropriate to the complexity of site problems being addressed. 40 CFR § 300.430(b). EPA is required to develop a conceptual understanding of the site, or a conceptual site model. 40 CFR § 300.430(b)(2). Section 104(a)(3)(A) and (B) of CERCLA and 40 CFR § 300.400(b)(1) and (2) specifically prohibit EPA from responding to a release of a naturally occurring substance or products that are part of the structure or result in exposure to residential buildings or business or community structures. Additionally,

Section 101(9) and (22) of CERCLA exclude consumer products in consumer use and the normal use of fertilizer from EPA's response action authorities.

In its conceptual site model, EPA identified historic mining wastes as the only source of contamination at the Site.[5] In violation of its obligation under the NCP, the Agency erroneously failed to consider alternative sources for contamination in yards, including LBP, other consumer products, the normal use of fertilizer and naturally-occurring lead. While EPA's conceptual site model does recognize human movement of chat from the piles, much of that use, including but not limited to the use of chat as agricultural lime, represents consumer use of a consumer product and/or normal fertilizer use over which EPA has no authority to conduct a response action.

In its Proposed Plan, EPA ignores these sources, stating that Operable Unit 1 includes "lead-contaminated surface soils present at residential properties across the site that have been contaminated as a result of migration of metal-bearing materials from past mining practices via natural erosional processes, windblown mine waste and human activity." The Proposed Plan "addresses the risk to human health and the environmental resulting from exposure to residential soils contaminated with lead mine waste." It further states, "(t)he eight mine waste areas are the source deposits and constitute the principal threat to human health and the environment," and that "(t)he sources of most of the lead contamination in the site are the large mine waste piles...." In fact, EPA's conceptual site model overestimates the extent of air dispersion from the Piles. This, coupled with EPA's arbitrary disregard of other sources for lead, result in a remedy that reaches outside the scope of EPA's response action authorities and without regard to the true cause of the risk the remedial action is intended to address.

[5] *See* 2009 EPA Human Health Risk Assessment.

A. The RI Data Demonstrates that Air Dispersion Releases from the Piles are Limited to 200 Feet, and any Risk Associated with These Releases already have been Protectively Addressed.

EPA's first technical error is its assumption that wind dispersion from the Piles resulted in widespread contamination. The Proposed Plan states, "The mine waste ha(s) contaminated soil, sediment, surface water and groundwater. Mine waste also has been transported by wind and water erosion and manually relocated to other areas throughout St. Francois County. It has also been reported that mine waste has been used on residential properties for fill material and private driveways, used as aggregate for road construction."

1. RI data demonstrates that air dispersion releases from the piles are limited to a 200-foot area surrounding piles.

No studies conducted to date show a correlation between the residential properties yard soil lead concentrations and the processes of wind and erosion from the piles. As part of the Focused RI (NewFields 2006), the impact of particulate deposition from the mill waste piles was investigated. Shallow soil samples were collected along upwind transects and downwind transects at five large piles. Lead concentrations in near-pile soils in the downwind transects were found to be higher than background concentrations in a narrow "affected" zone about 200 feet wide around the piles, and then averaged beyond the 200 feet 180 mg/kg lead.

In concert with the RI near-pile sampling, EPA requested Idaho National Engineering and Environmental Laboratory (INEEL) to perform air dispersion and deposition modeling of airborne lead associated with mill waste piles, *Air Dispersion Modeling of Mine Waste in the Southeast Missouri Lead Belt* (Abbott 1999). The air dispersion model was used to predict maximum lead concentrations in air and downwind

soil lead concentrations, and to place the downwind transects. The model and soil sample results were matched and used to predict geometric mean lead concentrations assuming 80 years of deposition accumulating in a 2-inch soil column already containing 65 mg/kg lead. Predicted lead concentrations range from 300 – 500 mg/kg within 200 meters of the mill waste piles, and from 125 – 175 mg/kg out to 1 kilometer. The model-predicted soil lead concentrations apply only to the upper two inches of soil and to "generally undisturbed surface soils which have not been subjected to significant tillage, excavation, landscaping or flooding." (Abbott 1999). The model-predicted soil concentrations are generally consistent with the near-Pile soil sampling results. (Abbott 1999, NewFields 2006).

It is also important to note that lead ambient air emissions in the Site area have been monitored for many years by Doe Run and other government agencies, beginning before the Piles were stabilized. Doe Run operated the "Big River Network" in the Site area from 1996 until 2005. The monitored lead ambient air concentrations for all monitors were well below the then applicable 1.5 ug/m3 lead NAAQS standard and in most all respects were also below the now much more stringent 0.15 ug/m3 lead NAAQS standard. More recent air monitoring conducted by Doe Run and MDNR within the Site area show consistent compliance with the 0.15 ug/m3 standard.[6]

These predicted soil lead concentrations do not explain the observed lead concentrations in yard soils. In fact, lead concentrations averaged above 700 mg/kg in the residential yard sampling programs conducted. Therefore, the Focused RI concluded

[6] See Exhibit 2. Various Information Regarding Ambient Lead Monitoring Stations and Lead Monitoring Results in and Around the Response Area.

that particulate deposition of lead from the mill waste piles was not the major contributor to lead in yard soils.

2. *Interim Action and Halo Removals Reached Beyond Potential Risk Posed by Air Dispersion from Waste Piles.*

Based on its long-held assumption that wind dispersion from the Piles were the principal source of contamination, EPA determined that sampling and soil removal of yards near the Piles was necessary to protect human health. In response, Doe Run agreed in 2000 to conduct soil sampling, blood lead sampling and soil removals from residential yards in the near vicinity of the Piles.[7] This work was done under the 2000 "Interim Action" administrative order on consent, and was continued in 2004 under the "Halo" administrative order on consent. These removal actions included work that was consistent with Alternative 2 in the Feasibility Study.[8]

Under the 2000 Interim Action, extensive surface soil sampling was performed at residential yards surrounding the Piles, and was designed to identify residences where soil removal or other actions might be required. At that time, yards and areas within yards with soil lead concentrations greater than 2,000 ppm were removed. The Halo Removal Action, which began in 2004, was conducted within the areas jointly called the "Halo" around the six major Piles located in St. Francois County. The Halo Removal Action included sampling of yards within the Halo that had not previously been sampled during the Interim Action and sampling of any identified yard outside of the Halo but within the Response Area at which an EBL child resided.

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[7] These activities also were conducted in areas located within 1000 feet of the smelters and 100 feet from identified shafts.

[8] The Proposed Plan misrepresents Alternative 2 in the Feasibility Study to the extent it describes the alternative as placing the visual barrier only if the subgrade soils are greater than or equal to 1,200 ppm rather that greater than or equal to 400 pm, as was proposed in the FS's Alternative 2, and as has been conducted for 10 years as part of the Interim Action and Halo Removals.

In the Interim Action and Halo Removals, if a portion of the yard qualified for yard soil removal, the soil was removed to a depth of one foot. The subgrade soils were screened with an XRF; and if subgrade soil lead concentrations were above 400 ppm, then a visual barrier was placed across the subgrade. The excavation was backfilled with clean soil (less than 240 ppm lead). Remedial Alternative No. 2 in the Feasibility Study is consistent with the removal methodology used in the Interim Action and Halo Removals.

To date, 387 yards have been completely remediated (all surface yard soil greater than 400 ppm have been removed). 55 homeowners within the Halo have refused yard removal, and 71 homeowners within the Halo have refused yard sampling. Of these 387 remediated yards, a visual barrier has been placed in at least some portion of 369 yards or almost 95%. The purpose of the visual barrier is to provide notice and reminder to property owners of the potential presence of lead at depth, so ensure that exposure to soil can be properly managed. An additional 188 residential yards have had some partial yard soil removal and almost 95% of those yards also have a visual barrier. Therefore, 543 yards within the Response Area or Site have existing visual barriers.

As of January 31, 2011, 2,057 residential yards and 12 Child High-Use Areas ("CHUAs") had been sampled. 532 property owners had refused yard soil sampling, resulting in a final residential yard sampling refusal rate of 21 percent. Some portion of the yard soils (yard quadrant, drive way, garden, play area, or drip zone) was above 400 ppm lead in 87 percent of all yards sampled (up through January 2011), or 84 percent when elevated drip zones only yards are excluded.

3. *Interim Action and Halo Removal Data Shows No Correlation Between Lead Levels and Proximity to Piles.*

Figure 1 presents the average yard soil lead concentrations relative to distance to the closest Pile. This figure demonstrates that there is no correlation of yard soil lead concentrations to the Piles. Furthermore, Figure 2, drip zone soil lead concentrations relative to distance from the closest Pile, also shows no correlation or trend indicating that the drip zone lead concentrations likely are not derived from an airborne source.

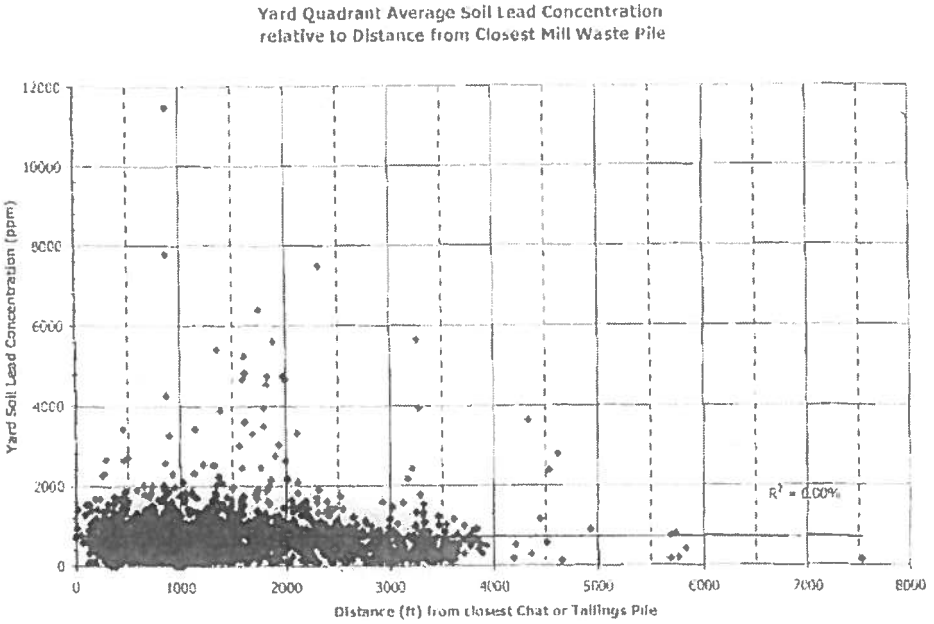


Figure 1 Average Yard Soil Lead Concentrations in the yard quadrants relative to Distance from the Closest Mill Waste Piles

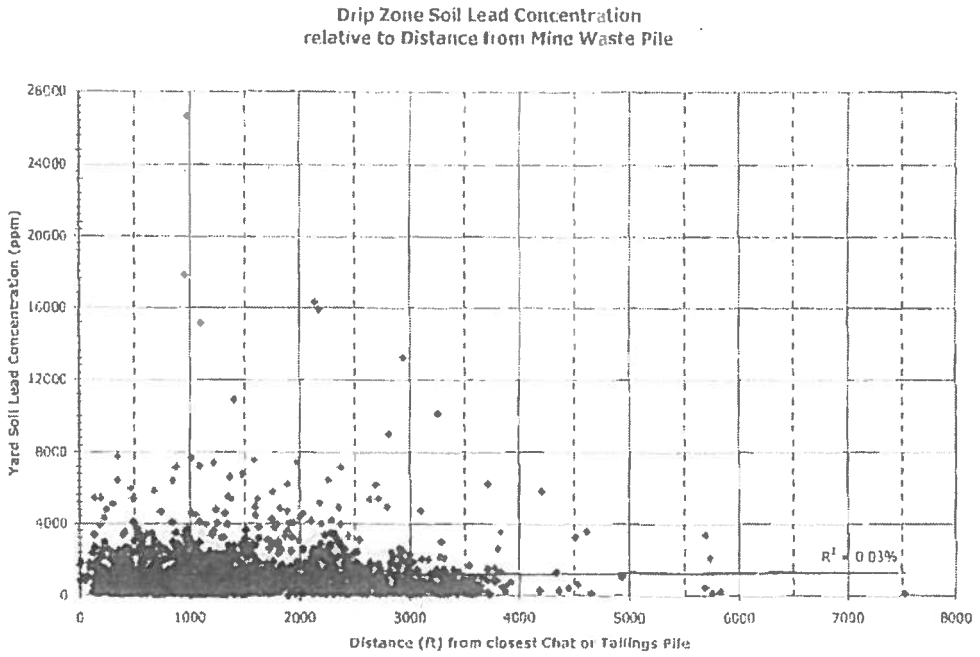


Figure 2 Drip Zone Soil Lead Concentrations relative to Distance from the Closest Mill Waste Piles

Sampling of the drip zone soil and screening for outdoor lead-based paint (LBP) conducted during the Interim Action was reported in the *Removal Action Report for Interim Action.*[9] The report stated that drip zone soils would be greater than 400 ppm lead in 93% of the homes with measureable outdoor LBP. 33% of those homes' drip zone soils would be greater than 2,000 ppm (NewFields 2004).

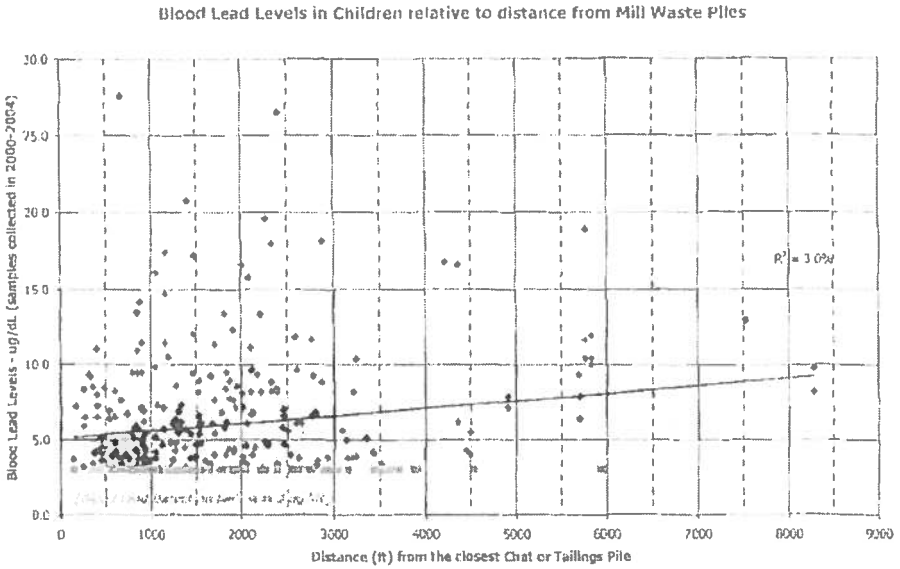
4. Even within the "Halo," the data show no correlation between the Blood Lead Levels and proximity to piles.

More than 300 children's blood lead levels ("BLLs") were sampled during the Interim Action's blood lead sampling program. Approximately 29% of the qualifying children (less than 84 months of age) identified within the Response Area were sampled. The average BLL in the Interim Action Response Area was 5.8 µg/dL. Of the children sampled, 11% had elevated EBLs greater than 10 µg/dL. These statistics are probably

[9] See Exhibit 3. *Removal Action Report Interim Action Removal* (Newfields 2004).

biased by the high rate of sample refusal (71%). Many of the program's blood lead sampling refusals were due to previous testing (most would not retest if a previous testing was found to be low) or parents deciding to have the child's doctor or health department tested the child (non-elevated results were unlikely to be, and were not reported to the study program as yard soil would not need to be addressed).

Of the children tested during the Interim Action, 32 resided in homes within the Halo (within 500 feet of the Piles). (See Figure 3). Of these, only one child was found to have an EBL. Notably, this child's corresponding yard soil lead concentrations were below 400 ppm in all parts of the yard (NewFields 2004). All other EBL children identified in the Interim Action, as well as any EBL children identified post-Interim Action, resided in homes with yards outside the Halo.



No child is represented more than once on the data set - blood lead concentration is either the initial blood draw or if a child had more than one year that was sampled previously was resampled (a minimum of a year later) and the no action had occurred in the yard, the second sample result was included. Multiple children residing at one location, if sampled, are included in the data set. (NewFields and Gradient March 9, 2010)

Figure 3 Blood Lead Levels in Children (less than 84 months of age) relative to Distance from the Closest Mill Waste Piles

The lack of EBL yards within the Halo further supports the Interim Action's findings that BLL could not be correlated or appeared to have a direct relationship to yard soil lead concentrations. Figure 4 presents the soil lead data grouped into two data sets, elevated and non-elevated BLL. There is essentially no difference between the two groups except that the average lead concentration in drip zone soils is slightly higher in the elevated BLL subset.

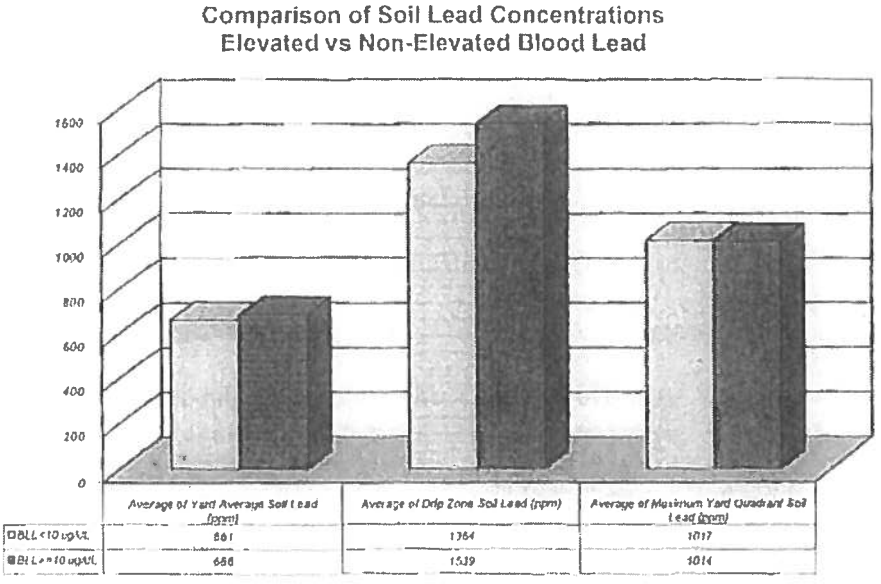


Figure 4 Comparison of Yard Soil Lead Concentrations and BLLs measured during the Interim Action

Correlation analyses were conducted using paired data sets to evaluate the relationship between BLL and play area maximum soil lead, yard average soil lead, drip zone soil lead, driveway soil lead and outdoor LBP. The correlation coefficients (R^2) for each sample population are listed below in order of increasing magnitude.

Blood Lead Correlations

BLL vs. Play Area Maximum Soil Lead	R^2=0.00
BLL vs. Yard Average Soil Lead	R^2=0.01
BLL vs. Drip Zone Soil Lead	R^2=0.01

BLL vs. Driveway Soil Lead	R^2=0.11
BLL vs. Outdoor Lead-Based Paint	R^2=0.145

The correlation coefficients are low for all the sample populations tested. For the regression BLL vs. Outdoor LBP, assays of lead that were greater than or equal 1 mg/cm^2 were taken as an indicator of LBP. These correlations were presented in the *Removal Action Report for the Interim Action.*[10]

Average blood lead concentrations from the Interim Action compare well to the previous blood lead study conducted in St. Francois County. The Lead Exposure Study in St. Francois County (MDOH 1998) found the average BLL to be 6.52 µg/dL with 17 percent of the population with elevated BLL. The Interim Action, conducted 3 to 5 years later in the same general area, found a decrease in BLLs with 5.8 µg/dL average BLL with 11% of the sample group with elevated BLL. The participation rate during the two studies was approximately 30%.

5. *Blood Lead Levels in St. Francois County Have Already Been Reduced to Levels Below EPA's Remedial Action Objective.*

The Missouri Department of Health and Senior Services ("MDHSS"), formerly Missouri Department of Health ("MDOH"), has maintained a data set of children, less than six years of age, who have been tested for BLLs since 1997. Note the percent of the population with elevated BLL identified in the Lead Exposure Study and the Interim Action cannot be compared directly to the MDHSS yearly statistics as these studies' statistics range over multiple years and are limited only to the study participants and therefore probably do not completely represent the area's unbiased population. The MDHSS data set is reported by county and may include the same child in multiple years

[10] See also Exhibit 4. Blood Lead Levels Measured during the Interim Action (2000-2004) by City and Distance to the Closest Pile, Railroad, and Highway.

due to possible yearly or biyearly testing. Figure 5 presents the percent of EBL children compared to the cumulative number of complete[1] yard soil removals conducted in the Response Area. As seen in this figure, the decline in St. Francois County's child EBL percentage dropped dramatically prior to majority of the yard soil removals.

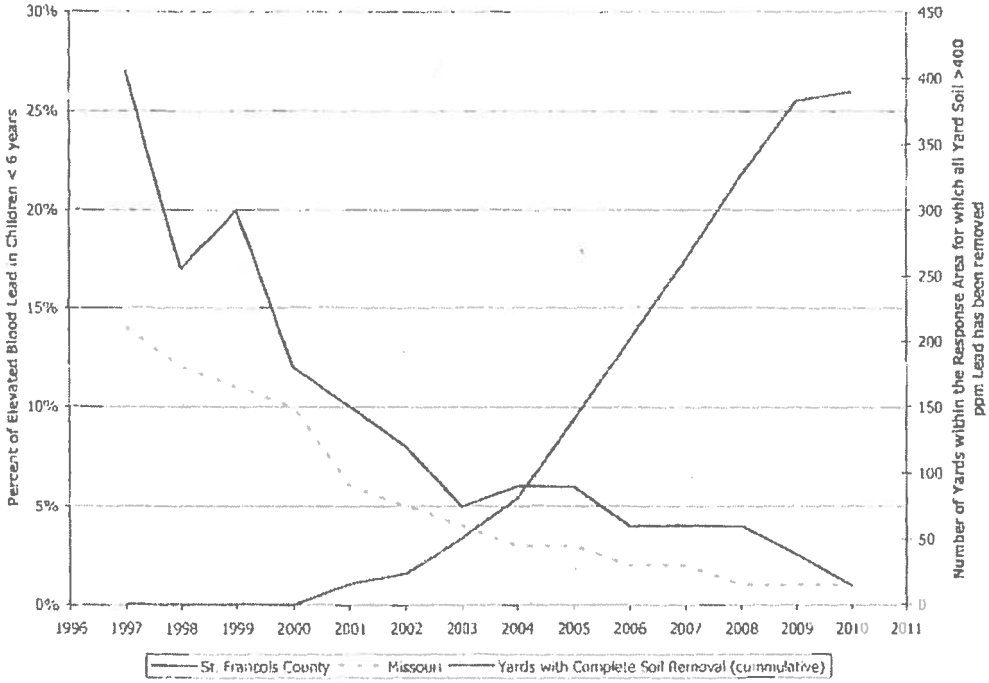


Figure 5 St. Francois County and Missouri yearly elevated blood lead percentages and cumulative complete yard soil removals

Blood lead levels among US children age 1 to 5, the population at the highest risk for lead exposure and effects, have been monitored and reported by the CDC and EPA and have declined steadily since surveillance began in 1976. Early (1976-1980) study reported a geometric mean BLL of 14.9 µg/dL just over 88% of this high-risk population had EBLs. Data collected from 1991 to 1994 showed that the geometric mean BLL for children was 2.7 µg/dL, with 4.4% of the children having EBL. Children age 1 to 5

[1] "Complete" yard soil removal is defined as all surface soil with lead concentrations greater than 400 ppm have been removed. "Partial" yard soil removal indicates that all surface soil with lead concentrations greater than 2,000 ppm have been removed.

whose blood was sampled as part of the 2007-2008 survey had a geometric mean BLL of 1.5 µg/dL, with 0.9% of the children having EBLs. The data for St. Francois County presented in Figure 5 are consistent with national averages and the decline in the child BLLs with time. The discontinued use of LBP and leaded gasoline, as well as the decrease of lead in food and toys, are the primary contributing factors to these drops in BLLs. Performance of yard soil removals within the County does not appear to affect the natural downward decrease in the County's BLL for children, which further indicates the EBLs had been caused by sources other than mining waste.

B. EPA failed to Identify, Characterize or Otherwise Consider Building Materials, Including LBP, as a Source of Lead Contamination or EBLs.

Section 104(a)(3)(B) expressly prohibits EPA from using its CERCLA response authorities to address releases from LBP. EPA's own directive states "Lead-based paint can be a significant source of lead exposure and needs to be considered when determining the most appropriate response action. Interior paint can contribute to elevated indoor dust lead levels. In addition, exterior paint can be a significant source of recontamination of soil."[12] Yet EPA has refused to acknowledge LBP's role as a source of contamination, much less evaluate the extent to which it is a source for contamination. EPA's refusal to do so is particularly arbitrary given the data at the Site that indicates LBP is a major source of contamination and a major cause of EBLs.

The Lead Exposure Study (MDOH 1998) identified both outdoor and indoor LBP at the Site and reported 64% of the homes had detectable outdoor LBP, 55% of the homes had detectable indoor LBP, and more than 51% of the homes in the study were older than

[12] Revised Interim Soil Lead Guidance for CERCLA sites and RCRA Corrective Action Facilities, OSWER Directives No. 9355, 4-12, August 1994.

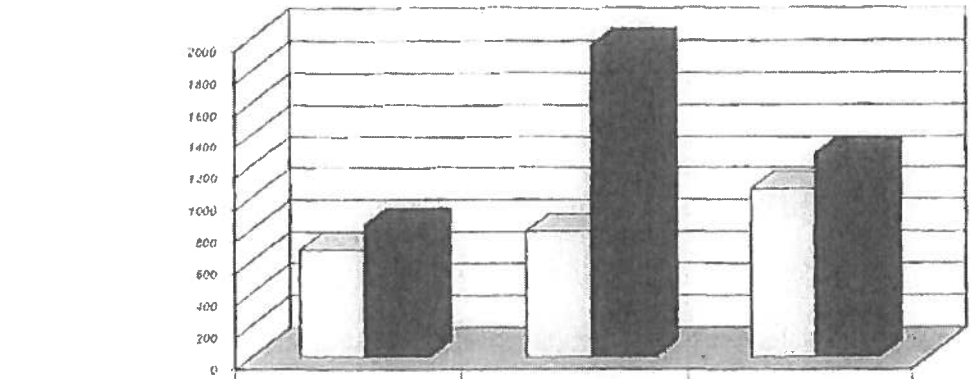
1970. The study noted that the strongest correlation of BLLs in the study area was to lead in dust on the floor, followed by indoor paint lead levels, and then lead on the window sills. Further correlations indicate that both indoor and outdoor LBP contributes to dust lead concentrations.

1. Significant amount of LBP was detected during the Interim Action

As reported in the Removal Action Report for Interim Action (NewFields 2004) and the Focused RI (NewFields 2006), many of the highest soil lead concentrations measured in the Interim Action sampling were in the drip zone.[13] Specifically, more than 42% of the drip zone samples had higher lead concentrations than the corresponding yard soil lead concentrations. Drip zone soil samples were commonly (39%) over 1.5 times the average yard lead concentration, indicating the lead source to the drip zone was potentially different or closer to the drip zone source.

Figure 6 presents a comparison of average lead soil concentrations in residential yards with ($\geq$1 mg/cm^2) and without (<1 mg/cm^2) lead-based paint made in the Interim Action (NewFields 2004). The comparison shows that drip zone soil lead concentrations are influenced by the presence of LBP. Paint chips were observed in some drip zone samples. Many homes in the area have had exterior painted surfaces covered with vinyl siding, and therefore, may be incorrectly identified in the "houses without lead paint" category and thus the concentrations for this category have a higher uncertainty than the "houses with lead paint."

[13] Drip zone is defined as the area within 2.5 feet of the house .



	Average of Yard Average Soil Lead	Average of Drip Zone Soil Lead	Average of Maximum Yard Quadrant Soil Lead
Houses w/o Lead Paint	870	787	1048
Houses w/ Lead Paint (>1mg/cm2)	828	1955	1276

Figure 6 Comparison of Yard Soil Lead Concentrations with measurable LBP (data set from the Interim Action)

Regardless of the uncertainty in the houses without outdoor LBP, the correlation between outdoor LBP and the drip zone samples indicates that LBP is a source of lead to yard soils. As discussed in Section 2.1, without an air-deposition source, the elevated lead concentrations in the drip zone soil would not be associated with airborne materials washing off the roof but rather an in-yard source. This same relationship of elevated drip zone soils to outdoor LBP was identified in the Lead Exposure Study (MDOH 1998).

Studies of LBP in urban soils with no mining influences indicate paint undergoes a relatively rapid transformation and redistribution with consequent loss of its potentially distinctive individual particle identity (Johnson and Hunt 1995).[14] The lead adsorption to iron and manganese phases in soil makes the degraded LBP resemble the soil matrix

[14] See Exhibit 5. Johnson, D L. and A. Hunt, 1995. "Analysis of Lead in Urban Soils by Computer Assisted SEM/EDX- Method Development and Early Results", *Lead in Paint, Soil and Dust: Health Risks, Exposure Studies, Control Measure, Measurement Methods and Quality Assurance. ASTM STP 1226.* Michael E Beard and SD Allen Iske, Eds., American Society for Testing and Materials, Philadelphia 1995, pp 283-302.

material. Thus only within soils near the LBP source might the lead derived from LBP be easily identified.

In EPA's speciation study of yard soil, the sampling methodology recognized the high potential for LBP within the soils. Yard soil samples were specifically selected such that "(n)o samples were collected from within approximately 10 feet of on-site structures, in order to avoid the potential for soil-lead concentrations being influenced by lead-based paint." (HGL & Drexler 2006). This speciation study went on to conclude that "paint is unlikely to be a major source to the residential yard, as a whole," when the "whole" yard had not been characterized by the sampling methodology. The EPA sponsored study was designed to bias the study's ability to identify LBP within the yard soil. Having intentionally designed its study to avoid detection of LBP, EPA cannot validly conclude that LBP is not a major contributor to soil contamination.

2. *More than 65.5% of homes in St. Francois County were constructed prior to 1978 and thus potentially contain LBP.*

Available age-of-housing data in the incorporated communities within the Response Area (see Table 1 and 2) indicate the housing within the Site is over 65.5% pre-1970's and therefore have a high potential for LBP.[15] The identification of outdoor LBP during the Interim Action and Halo Removals may underestimate its occurrence since many homes have been re-sided with vinyl siding, thus masking, but not eliminating, the presence of outdoor LBP. When EPA surveyed 22 homes for LBP as part of its speciation study, 16 of the 22 homes had vinyl siding (73%).[16] Of the four yards where

[15] The Consumer Product Safety Commission banned the use of lead-based paint in housing effective in 1978.

[16] See Exhibit 6. "Table 3-1 Summary of Screening Results from Locations Where Samples were Collected," Speciation and Bioaccessability of Anomalous Lead Concentrations in Soils, Big River Mine Tailings Site (HGL & Drexler, 2006).

paint was surveyed, three detected outdoor LBP (primarily on the house versus other outdoor structures).

Table 1
Percentage of Age of Housing in the Incorporated Cities and Towns of the Response Area and St. Francois County

Incorporated City:	Bonne Terre	Desloge	Park Hills	Leadington	Leadwood	County Wide
Built 2005 or later	0.8%	1.9%	2.6%	1.1%	0.0%	3.0%
Built 2000 to 2004	7.0%	7.5%	6.5%	14.2%	2.9%	10.3%
Built 1990 to 1999	7.0%	16.6%	10.0%	40.4%	4.2%	17.7%
Built 1980 to 1989	10.3%	14.6%	10.4%	12.0%	5.9%	14.1%
Built 1970 to 1979	9.4%	11.0%	14.6%	5.5%	4.2%	15.4%
Built 1960 to 1969	7.2%	13.2%	7.1%	10.9%	6.6%	8.2%
Built 1950 to 1959	12.9%	9.2%	8.1%	2.2%	7.8%	9.1%
Built 1940 to 1949	11.4%	12.3%	7.8%	1.6%	18.8%	6.6%
Built 1939 or earlier	34.0%	13.7%	32.9%	12.0%	49.6%	15.7%
Pre 1970's	65.5%	48.4%	55.9%	26.7%	82.8%	39.6%

Source: 2005-2009 American Community Survey 5-Year Estimates, http://factfinder.census.gov/servlet/ADPGeoSearchByListServlet?_lang=en&_ts=332956084339

Table 2
Age of Housing and Yard Soil and Outdoor LBP in the Incorporated Cities and Towns of the Response Area and St. Francois County

Census City/Town	Homes Built Pre-1970's	Yards Tested	Yards with Elevated Yard Quadrants	Yards with Elevated Drip Zones	Homes with Measurable Outdoor LBP	EBL Children (Identified During the Interim Action)
Bonne Terre	65.5%	10.2%	92.0%	85.9%	34.4%	18.2%
Desloge	48.4%	20.2%	72.8%	62.5%	15.2%	6.9%
Park Hills[a]	55.9%	23.5%	90.0%	79.0%	34.2%	10.6%
Leadwood	82.8%	51.3%	73.3%	73.8%	42.6%	5.7%
Leadington	26.7%	1.1%	100.0%	0.0%	0.0%	25.0%

With the exceptions of Leadwood and Leadington, the percentage of EBL children correlates better to the percentages of measureable outdoor LBP than to any of the elevated yard soil lead concentrations. It should also be noted that the presence of outdoor LBP is probably an indicator of potential indoor LBP.

3. *Conceptual model assumes indoor dust derives from mining waste. But the Lead Exposure Study indicates LBP is also a significant source of indoor dust.*

Even though the Lead Exposure Study indicated that children's BLLs were more likely influenced and thus impacted by indoor dust and indoor LBP, EPA arbitrarily continues to ignore this source of lead contributing to the EBLs. EPA does not include any other source expect the "Tailings/Chat Piles" in the Conceptual Site Model in the Human Health Risk Assessment for the Site.[17]

MDOH's Lead Exposure Study assessed the source contribution of lead in house dust from mine waste. It was noted that paint contributed at least 23% of the lead in household dust, mine waste contributed 21%, and soil contributed 37% (Sterling, et al., 1998). The authors went on to state their belief that the soil lead was from the mine waste; therefore, the contribution of mining waste to indoor soil was greater than paint. Location of the homes relative to the Piles was not presented in the Lead Exposure Study, but a later speciation study conducted by HGL and John Drexler (2006) on soils within the Site did provide soil sample locations. HGL and Drexler's conclusion that "tailings piles are the most likely source of contamination" was based on samples collected from 4 yards (5 out of the 21 samples examined) which were located within the Halo and 3 of the 4 yards have undergone a complete soil removal (fourth yard refused soil removal). The remaining 16 samples were overwhelmingly dominated by natural soil-forming minerals with no significant relationship to chat. [18] Of the 16 yards from which the 21 speciation samples were collected, all but one yard were located within the Halo.

Despite being obligated under the NCP to do so, EPA has made no effort to study the identified and abundance presence of LBP and all the various exposure pathways within homes that would affect child BLLs. In fact, using the speciation study as an

[17] See Exhibit 7. Figure 3.2 Conceptual Site Exposure Model, EPA Human Health Risk Assessment, 2009.
[18] HGL and Drexler (2006).

example, EPA appears to be going out of its way to exclude any evidence of LBP. EPA's failure in this regard is arbitrary, capricious and inconsistent with 40 CFR § 300.430(b).

C. Chat from Mining was Widely Used by Residents in St. Francois County and Other Areas as Fertilizer.

For a number of reasons, granular mine tailings ("chat"), when used as agricultural lime fertilizer, cannot and should not be addressed in EPA's Proposed Plan. Agricultural lime is not regulated under federal or state law with respect to contaminant remediation levels. More importantly, EPA does not have jurisdiction over this product because it is exempted from CERCLA: (1) because chat used as fertilizer is exempted from the definition of "release" under CERCLA; and (2) because the consumer use of chat as fertilizer exempts the product from the definition of "facility" under CERCLA. Because of these factors, EPA does not have the authority to respond to or conduct a remedial action to address releases from chat used as fertilizer.

The sale of Old Lead Belt ("OLB") chat as agricultural lime ("ag-lime") began in 1925. The volume sold was huge, roughly estimated at 35 million tons, or about one-third by volume of all chat sales. For decades, it was sold both locally and by the train-load for use in farm fields in some 10 different central states. Not until August 1, 2003 were ag-lime sales actually stopped, as part of the clean-up negotiations on the Elvins/Rivermines Chat Pile.[19]

As an initial matter, no federal law specifies contaminant levels for OLB ag-lime. See "Background Report on Fertilizer Use, Contaminants and Regulations," U.S. Environmental Protection Agency, EPA 747-R-98-003, January 1999, pp. i-ii, 60, 62 and

[19] See Exhibit 8. "Engineering Evaluation/Cost Analysis Report, Elvins/Rivermines Tailings Site" ("Elvins/Rivermines EE/CA"), Barr Engineering, June 2003, pp. 1-2.

64. Moreover, all chat and its products, such as ag-lime, are exempt from regulation as hazardous waste. 40 C.F.R. § 261.4(b)(7).[20]

Similar to federal law, Missouri's Agricultural Liming Materials Act, Section 266.500, R.S.Mo. et seq., and its implementing regulations, 6 CSR § 250-1.020, et seq., set no contaminant levels for ag-lime. The section on "Quality Standards of Agricultural Liming Materials" address correction of soil acidity, furnishing calcium or magnesium as plant nutrients, and meeting minimum specifications for calcium carbonate equivalent and fineness of grind. Section 266.525, R.S.Mo.[21] Furthermore, in 1976 the Agricultural Liming Materials Act and its implementing regulations created a certification process for ag-lime. For over 25 years, the OLB ag-lime was listed as being provided by registered producers and as properly meeting all state standards.[22]

In support of this lack of regulation regarding contaminant remedial action levels, during all the years chat was used as ag-lime, no studies called for any cessation in sales. See, e.g., "Further Characterization and Use of Tailings and Chat from Missouri's Old Lead Belt as Agricultural Lime," B.G. Wixson and B. E. Davies, in Trace Substances in Environmental Health XVIII (1984), p. 260; and "A Study on the Possible Use of Chat and Tailings from the Old Lead Belt of Missouri for Agricultural Limestone", B.G. Wixson, N.L. Gale and B.E. Davies, University of Missouri-Rolla, (December 1983), pp. 92-93. In the end, as noted above, EPA shut down the sale of OLB tailing as part of clean-up negotiations, not based upon any scientific studies on its actual use as ag-lime.

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[20] EPA has confirmed that chat from lead mining in the Tri-State Mining District "is a 'Bevill-exempt" waste and is not subject to regulation under RCRA Subtitle C." 72 Fed. Reg. 39325, July 18, 2007, p. 39334.

[21] Similarly, the ASTM Standard Specification for Agricultural Liming Materials requires calcium carbonate equivalent, percentage moisture, percentage calcium and magnesium, and sieve analysis. ASTM C602-07, June 15, 2007.

[22] "Missouri Agricultural Liming Materials Report," Agricultural Experiment Station, University of Missouri-Columbia, 1976-2003.

Regardless of whether the constituents of ag-lime are regulated in terms of contaminant remediation levels, ag-lime used as fertilizer is not subject to jurisdiction under CERCLA, as evidenced by the definition of "release." The CERCLA exemption for "normal application of fertilizer" is found in the definition of "release":

> The term "release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment..., **but excludes...(D) the normal application of fertilizer.**

42 USC § 9601(22) (Emphasis added).

Because "normal application of fertilizer" is not defined in CERCLA, the terms should be construed in accordance with their ordinary meaning. U.S. v. Telluride, Co., 146 F.3d 1241, 1245 (10th Cir. 1998):

> "Normal" - 1. usual; regular; or typical state, degree or form.
>
> ****
>
> "Application" - the act of applying to a particular purpose or use . . . the act of putting something, such as a lotion or paint, into a surface.
>
> ****
>
> "Fertilizer" - any substance, such as manure or a mixture of nitrates, added to soil to increase its productivity.

"Collins English Dictionary." (10th ed.)

EPA itself, in discussing the application of the CERCLA fertilizer exemption to SARA reporting, stated that the exemption would "eliminate reporting of fertilizers...and other chemical substances when applied, administered or otherwise used as part of routine agricultural activities....". 52 Fed. Reg. 38344, 38349 (October 15, 1987) (emphasis added) (considering ag-lime to be a "chemical," because its active ingredients are $CaCO_3$

and $MgCO_3$, which are clearly chemicals). Even EPA's "Background Report on Fertilizer Use, Contaminants and Regulations" specifically combines liming materials with fertilizers and refers to them both as "fertilizers." Supra, at "Executive Summary," p. i.

Even if the use of chat as agriculture lime was not considered "normal use of fertilizer" within the meaning of Section 101(22) of CERCLA, to the extent it is used by property owners for that purpose, it is a consumer product in consumer use, and thus is excluded from the definition of "facility" under Section 101(9) of CERCLA. Similar to the definition of "normal application of fertilizer," the term "consumer product in consumer use" is not defined in CERCLA. Uniroyal Chem. Co., Inc. v. Deltech Corp., 160 F.3d 238, 243 (5th Cir. 1999). Following the ordinary meanings of the terms, courts have found that "[t]he sale of a hazardous substance for a purpose other than its disposal does not expose defendant to CERCLA liability." Dayton Indep. School Dist. v. U.S. Mineral Prod. Co., 906 F.2d 1059, 1065 (5th Cir. 1990) (citing cases) (stating that "Congress did not intend CERCLA to target legitimate manufacturers or sellers of useful products"); See also Kane v. United States, 15 F.3d 87, 89 (8th Cir. 1994) (agreeing with the Fifth Circuit's holding in Dayton, stating that Congress "intended to provide recovery only for releases or threatened releases from inactive or abandoned waste sites, not releases from useful consumer products") (quoting Dayton at 1066). Because consumers used chat in St. Francois County and other areas as a fertilizer product, the product is exempt from the definition of "facility" under CERCLA and is thus not subject to CERCLA jurisdiction.

The effect of the two exclusions discussed above is the same: EPA does not have the statutory authority under CERCLA to take or compel response action with respect to releases that result from these or other consumer uses of chat.[23] Further, federal and state laws excluding ag-lime from specific contaminant-level regulations further indicate that ag-lime should not be managed under CERCLA. EPA's proposal to require remediation of lead contamination resulting from the use of chat as ag-lime, or by consumers for other consumer uses, is prohibited by statute and is arbitrary and capricious.

D. Naturally Occurring Lead is Abundant throughout St. Francois County

Section 104(a)(3)(A) and 40 CFR § 300.400(b)(1) specifically prohibit EPA from using its CERCLA authorities to respond to a release of naturally occurring substances. Yet, EPA has arbitrarily refused to evaluate the extent to which naturally occurring lead is contributing to the detected contamination. As a result, EPA proposed remedy requires response action with respect to all lead detected, regardless of its source. This result is inconsistent with CERCLA and the NCP.

Centuries before the first chat was piled, before St. Joe Lead Company was formed, before any settlers arrived, and before even the first European explorers paddled on the Mississippi, Native Americans in this area were gathering the lead mineral, galena, off the ground. Reportedly, during the Cahokia mound building era, circa 1200-1300 C.E., the shiny galena with its cubic shapes were collected as keepsakes, decoration or to fashion art objects.

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[23] It is well documented that other chat was used in the Site area on a widespread basis for other consumer uses, including foundation fill, asphalt mix, road de-icing and gravel driveways. See for example, Exhibit 9. "Waste Products in Missouri with Potential Highway Applications." Missouri Department of Highway and Transportation. 1982.

Once the local Native Americans observed the value that Europeans placed on lead, they would even crudely smelt the galena. The mineral would be thrown onto a burning pile of wood. When the galena melted, the lead would separate, sink down and run out onto the ground. In Bonne Terre, one of these early Native American furnaces was found, surrounded by tons of slag, from which the lead had been melted.

The name of the town itself, Bonne Terre, is a graphic example of this area's long history with lead. Early French explorers and settlers noted that a certain band of soil, which stretched a half-mile to a mile long and several hundred yards to a half a mile wide, ran through portions of what is now Bonne Terre. This soil was so rich in lead ore that it was called "good earth," or Bonne Terre for the amount of lead to be dug out.

As for how the early digging was done, a pick, a wooden shovel and a bucket were the only tools. Anyone would be a miner, depending on time of year or inclination. The Spanish and French did not generally require the legalities of mining claims, as it was more important to obtain the lead, so that it could then be taxed. Farmers would dig, when crops had been harvested. Hunters would mine, between hunts or when game was scarce. The more well-to-do would send their slaves to mine. Middle-men would drive wagons around the diggings, purchase whatever lead ore had been unearthed by individuals, then haul the lead ore to the nearest smelter or rail line, and sell it for a profit.

Generally, the depth of the digging was determined by where the ore stopped, the depth became too great to throw out dirt, or bedrock was hit, whichever was first. Tools to drill into or explore bedrock did not exist. Deep mines with related mills did not occur prior to the Civil War, so chat piles did not exist. Instead of digging down, the diggings would spread out laterally. For example, at Mine-a-Joe (aka Bogy Mine), first discovered

circa 1735 just west of Desloge, the diggings eventually covered an expanse a mile long and a hundred yards wide.

By the early 1800's, in addition to the diggings at Bonne Terre and Mine-a-Joe, other diggings in the area included;

- Flat River Mines (Park Hills area), with 15 hands and rich ore yields of 65%;
- Gumbo (aka Grunbo) Mines (Gumbo area), at one time thought to be the best mines in the neighborhood;
- Yankee Diggings (Leadwood area) with 28 hands and mineral yield of 60%;
- McKee Mines (Leadwood area); and,
- Butcher Diggings (Park Hills area, in or around Missouri Mines State Historic Site/St. Joe State Park)

In 1864, St. Joe Lead Company bought property in Bonne Terre and subsequently began deep mining, using shafts to haul up ore and mills to process that ore. Only then, did chat come into being, as what was left after the milling process.

This history illustrates the fundamental truth, ignored by EPA, that lead is abundantly naturally occurring throughout the Old Lead Belt. The only basis in the record on which EPA relies is the 2006 Soil Speciation Study (HGL 2006). But that study failed to even mention the possibility of naturally occurring lead, much less evaluate it as a potential source. More specifically, that study was flawed in that

- The study's conclusions only allege that residential soils "have lead forms that are common to the Big River tailings piles". There is NO discussion of how such residential soils might compare to naturally occurring lead.
- The study does not even mention naturally occurring lead as one of the "numerous sources of lead in the site area."
- The study contained numerous other flaws, some of which are discussed, supra, including
    - Only 20 yards were sampled over a 34,200 acre area, in which the agency estimates 4,500 yards are affected.
    - The study asserts that 31 residential samples were speciated for lead. However, the table that is cited for the speciation results only reports on 21 residential samples. Ten (10) samples from 5 houses are missing.
    - A galena-cerussite mineral association is alleged to be representative of the chat piles. However, significant evidence of such an association was only found in 4 yards of the 20 sampled.
    - Speciation from the other 11 reported houses were overwhelmingly dominated by natural soil-forming minerals, with no significant relationship to chat.
    - Of the 20 houses were sampled, the results for five houses are missing. 11 houses had no significant mineral association with chat. Only four yards, 20% of those sampled, had significant evidence of indicating a link to chat.

- Even for these four houses, the alleged galena-cerussite association is actually no proof of chat in these yards. This same galena-cerussite association of minerals also represents the weathering of naturally occurring lead.

In other words, this study provides insufficient support for EPA's far-reaching assumption that mining waste from the Piles is the primary source of lead contamination at the Site.

Although EPA has ignored the issue of naturally occurring lead in St. Francois County, it did not do so when facing a similar residential soil remediation project in adjacent Washington County, Missouri. Specifically, In EPA's July 2, 2010 Proposed Plan for Residential Property Soils in the Washington County Lead District,[24] EPA stated that it "will not intentionally address naturally occurring lead ores in their undisturbed state as part of this action. Although the Site has been heavily mined in the past, it may be possible to encounter naturally occurring lead ores during residential property excavation. Section 104(a)(3)(A) of CERCLA states that removal or remedial actions shall not be provided in response to a release or threat of release 'of a naturally occurring substance in its unaltered form, or altered solely through natural processes or phenomena, from a location where it is naturally found'. . . . When these soil conditions are encountered, they will be documented, excavation will stop, and backfilling will be initiated." Proposed Plan for Residential Property Soils – Operable Unit 1, at the Washington County Lead District Old Mines Superfund Site in Washington County, Missouri, p. 11.

[24] See Exhibit 10. Proposed Plan, Washington County Lead District – Old Mines Superfund Site, July 2, 2010.

Attached as Exhibit 11 is summary of references on the natural occurrence of surficial soils with lead at the Site. This information shows that the area where the upper Bonne Terre formation meets the surface, surface soils have high levels of naturally occurring lead without manmade interference. As a result, true background within the Response Area is higher than it will be outside the Response Area. Also included as Exhibit 12 is a map depicting the existence of naturally occurring lead-bearing minerals in soils in the vicinity of the Site.

The high percentage of samples with greater than 400 ppm lead in areas near where pre-Civil War surface digging occurred shows lead is naturally occurring in the surface soils in those areas.

CERCLA and the NCP require that EPA fully evaluate the occurrence of naturally occurring lead at the Site and develop a remedial alternative that appropriately excludes it from its scope so as not to require response action with respect to such materials. EPA's failure to acknowledge, much less evaluate and characterize the extent to which naturally occurring lead contributes to lead detected in yards, is arbitrary, capricious, inconsistent with the NCP and contrary to CERCLA.

E. The EBL Data Shows no Correlation with the Mine Waste Sources or with Lead Detections in Yards.

1. The arbitrary nature of EPA's assumptions is supported by the Interim Action Report, the RI and the subsurface soil study, all of which show no correlation between BLLs and the piles or yard levels.

From the beginning of its response actions at the Big River Mine Tailings Site, EPA has assumed that all lead detected was related to the mill waste Piles associated with the mining activities of the late 1800 and 1900s. At no point in its investigation and characterization of the Site has EPA given any regard to, or made any effort to

characterize the extent to which other sources of contamination exist. As the Site characterization progressed, it became apparent that a proper analysis of the data must be done to determine whether other sources of lead were contributing to soil contamination and to the occurrence of EBLs in and around the Response Area. It became indisputable that EPA's failure to comply with its obligation under the NCP to evaluate other sources would result in a remedial action that exceeded its statutory and regulatory authority and that was not necessary to protect human health and the environment. Yet, when Doe Run presented its analyses of the data to EPA, first in the 2004 Interim Action Removal Report, and later in the 2010 draft Feasibility Study and the 2011 Draft Subsurface Investigation Reports, EPA ignored the data! In fact, with regard to the draft Feasibility Study and Subsurface Investigation Reports EPA went further and compelled Doe Run to remove any discussion of alternative sources or analysis of data that suggested a lack of correlation between EBLs and mine waste. Remarkably, with regard to the Feasibility Study, EPA stated :

> Much of this section appears to argue that high lead concentrations in subsurface soils and soils away from the tailings piles may be the result of naturally occurring mineralization or processes or sources unrelated to mining. The entire area contained a highly industrialized complex of many mine, mill processing, transportation and other facilities in addition to the waste disposal area, all of which could be sources of soil contamination away from the tailing piles and subsurface soil. Therefore, generalized conclusions about contamination sources should be avoided in the FS."[25]

In addition, Doe Run's 2011 Draft Subsurface Soil Investigation in Residential Areas[26] presented an assessment of potential sources for the elevated lead concentrations in residential soil, using both the thickness of elevated lead concentrations detected in the

[25] See Exhibit 13. Letter to Doe Run from Jason Gunter, EPA, dated July 9, 2010, and enclosed comments and report.
[26] See Exhibit 14. Draft Subsurface Soil Investigation in Residential Areas (NewFields 2011).

58 yard soil vertical sampling profiles as well as the relationship of lead concentrations to distance from the identified potential sources (the Piles, railroad ballast, highway de-icing). EPA demanded this analysis be removed from the final Report, stating it believed the analysis was "a lot of speculative language which is uncharacteristic of a technical report...and revise...how the data will be used based on the purpose and objectives of the study." [27] EPA failed to consider that one of the objectives of the Sampling and Analysis Plan – Subsurface Soil in Residential Area, St. Francois County Mined Areas included "potentially identifying the source or cause of elevated lead concentrations that are found in the subsurface (especially if lead concentrations are found at higher concentrations at depth compared to the surface)."

The discussion that EPA identified as "speculative" was prepared to address this objective and was highly relevant to development of an accurate conceptual site model. As discussed above, the question of the "source or cause of elevated lead concentrations" is complex due to both naturally-occurring and man-made nature of the sources for and transportation of lead at the Site. This data was presented to further understand the nature of this complexity and the resulting uncertainties. Yet EPA arbitrarily refused even to allow it in the record, much less give it any consideration. By refusing to allow Doe Run to include such information in its reports, or give the analysis any consideration, EPA has failed to identify all potential sources as required by the NCP.

The data presented in the Interim Action Removal Report (NewFields 2004) demonstrate that the BLLs measured in St. Francois County's Mined Areas (Response Area) have no correlation to yard soil lead concentrations or distance from the Piles. As seen in Figure 7, the distribution of the elevated lead concentrations within the surface

[27] See Exhibit 15. Letter to Doe Run from Jason Gunter, EPA, dated June 22, 2011.

soils does not appear primarily attributable to natural transport processes (wind or water) but continues to confirm the Focused RI assessment that elevated lead in residential yards is due primarily to mechanical redistribution by man and LBP and naturally occurring mineralization, and is widely distributed over the residential areas.

Figure 2 of the Subsurface Soil Report 11x17

Figure 7 Average Surface Soil Lead Concentrations in Yard Quadrant Samples

The lack of correlation between soil lead detections and known sources of mining waste, and the lack of correlation between EBLs and known sources, demonstrates that EPA has insufficiently evaluated or addressed the complexities of this Site, particularly with regard to evaluating the extent to which LBP, the use of chat as agriculture lime and naturally occurring lead, have contributed and are continuing to contribute to contamination at the Site, and thus contributing to the potential risks at the Site.

This fundamental failure is reinforced by the fact that for the past five years, BLLs in St Francois County have been below the level sought by EPA in its Remedial Action Objective. As a result, EPA is proposing a remedy that 1) it has not demonstrated to be necessary to protect human health; 2) responds to and would require remediation of contamination over which EPA has no authority under CERCLA; and 3) is inconsistent with the NCP.

The following presents the entire dataset from the Interim Action, Halo and Draft Subsurface Soil Investigation correlation charts showing the relationship of average yard lead concentration and BLLs (as measured during the Interim Action) versus distance from the Piles, from railroads (historic and active), and from major highways (previous Figures 1 and 3 have been repeated for ease of comparison).

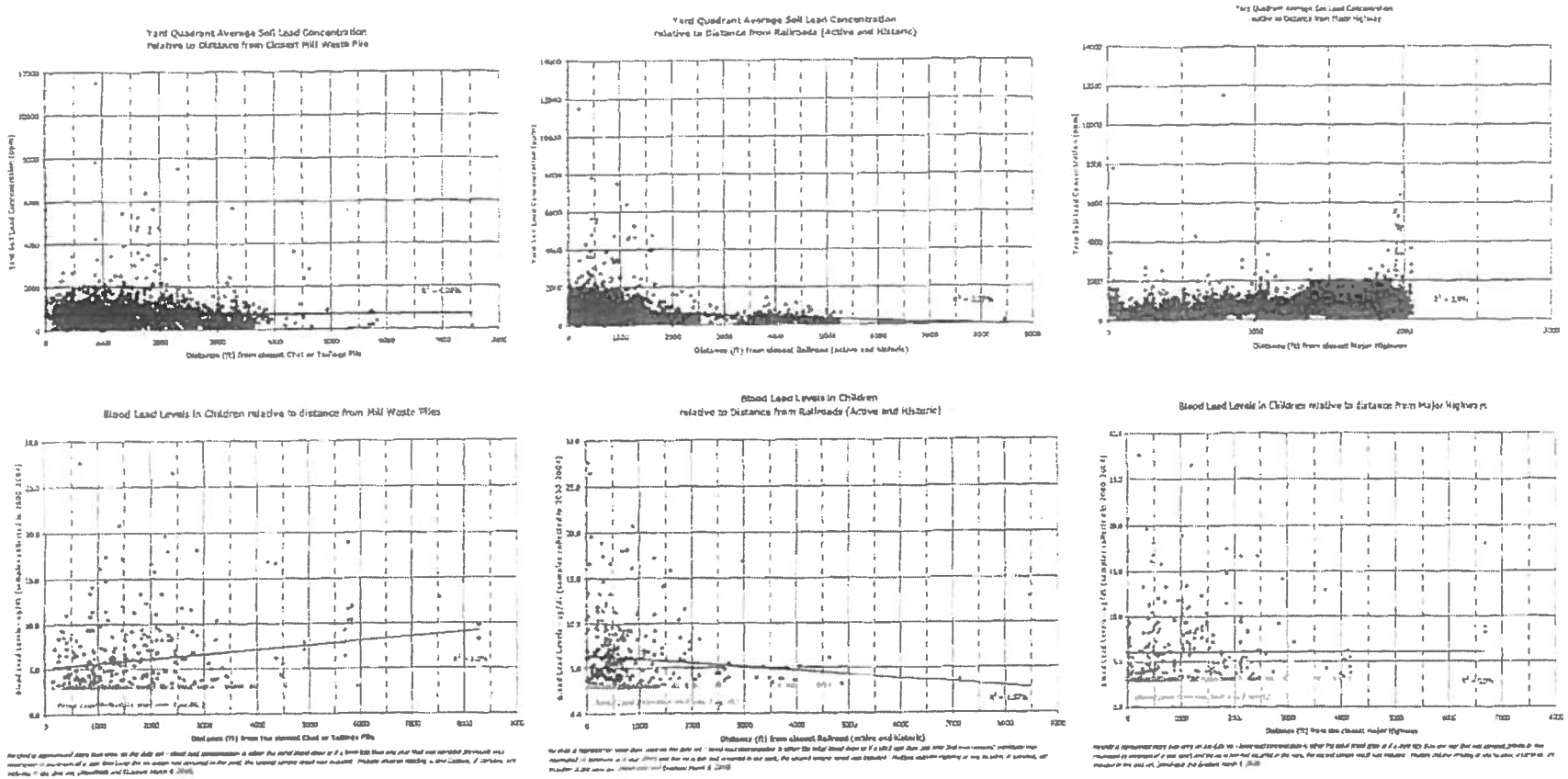


Figure 8 Correlation of Average Yard Soil Lead Concentrations and BLLs to closest Mill Waste Pile, Railroad, and Major Highway

II. EPA'S PROPOSED CLEANUP LEVELS FOR SUBSURFACE SOILS AND THEIR APPLICATION TO NON-RESIDENTIAL PROPERTIES ARE UNSUPPORTED BY THE DATA.

The risks in the HHRA are calculated based on the average soil lead level in a residential yard (consistent with lead risk assessment guidance) (EPA, 2009, see page 4-6). However, the Proposed Plan calls for excavation of any quadrant with a sample above 400 mg/kg even if the yard average (average of all quadrants) is below 400 mg/kg. This remediation strategy is not consistent with how the risk assessment was done, and requires more remediation than needed in order to achieve the Remedial Action Objective (RAO) (stated in the Proposed Plan) to: "Reduce the risk of exposure of young children (children under seven years old) to lead such that an individual child or group of similarly exposed children have no greater than a 5% chance of exceeding a blood lead level of 10 µg/dL".

Note that when a cleanup level represents a target average concentration for a property, the remediation should be conducted such that the post-remediation property average will be at or below the cleanup level. If every yard quadrant that exceeds the cleanup level is remediated, this may over-achieve the cleanup level on average. At the soil cleanup level of 400 mg/kg selected in the Proposed Plan, evaluating the need for remediation on the basis of risk (average concentration) rather than on the exceedance of a single sample would likely reduce the number of properties requiring remediation while still achieving the RAO. It will also serve to relieve homeowners of intrusion of unnecessary yard removals.

III. THE BOUNDARY AREA OF THE PROPOSED REMEDY IS NOT CLEARLY DEFINED AND MAY ARBITRARILY EXTEND BEYOND DEFINED RESPONSE AREA.

A. EPA Must Clarify that the Proposed Remedy Pertains only to the Defined Response Area.

The Interim Action and Halo administrative orders on consent defined the "Response Area" to include generally the distances from the Piles discussed above and the historic mining area of St Francois County. The Response Area, which is depicted in Figure 1 in the Proposed Plan, is the area designated by EPA to be studied for the purpose of planning a remedial action. The Focused RI gathered data from within the Response Area. The cost estimates presented and evaluated in the Feasibility Study are based on the number of residences within the Response Area. The evaluation of remedial alternatives in light of the nine criteria was based on the Response Area representing the boundary of OU 1.

Yet the Proposed Plan is unclear as to the geographic scope of the OU 1 proposed remedy. The Plan states that the "communities of Farmington, Bismarck and Iron Mountain Lake are outside the mining area but will be included in future investigations." It is unclear whether EPA intends that such investigation occur as part of this proposed remedy. Including in this remedy any areas outside the Response Area will invalidate the cost estimates for the alternatives, and thus will render the evaluation of the nine criteria required by CERCLA and the NCP invalid and arbitrary.

B. EPA's Broad Definition of "Residential Properties" is unsupported by the Record.

For the purpose of this proposed remedy, EPA broadly defines "residential property" as "properties that contain single- and multi-family dwellings, apartment complexes, vacant lots in residential areas, schools, daycare centers, playgrounds, parks and green ways." This definition is overly broad for several reasons. First, by including vacant lots and greenways, EPA is including potentially many more parcels than were included in the cost estimates for the remedial alternatives, thus invalidating the evaluation of those alternatives in light of the nine CERCLA criteria, particularly cost-effectiveness. The costs estimates were based on the number of

residences provided by EPA. Additionally, EPA's proposal to apply its cleanup levels to these parcels is unsupported by the record and would be arbitrary and capricious.

The Feasibility Study Report states, "On April 14, 2010, EPA provided an estimate of '7,036 occupied houses total, not counting the houses in Doe Run,' based on the most recent census data for each city in the Response Area.'" 93 yards were added for the town of Doe Run, resulting in a total of 7,129 yards. By adding an unknown number of undefined "vacant lots," and "green ways" to the remedial action will greatly affect the costs and fundamentally alter and invalidate EPA's evaluation of the remedial alternatives, particularly with regard to the cost-effectiveness of the proposed remedy. The Focused RI defined "residential yards" to be the area within 200 feet of the house on each property. The Proposed Plan offers no such definition for vacant lots or green ways, which can and in fact do, encompass many acres throughout the Response Area and St. Francois County.

C. EPA's Proposed Cleanup Levels for Vacant Lots, Parks and Green Ways is Unsupported by the Record and Contrary to Guidance.

In addition to the cost uncertainties, EPA relies on its Human Health Risk Assessment in support of its proposed cleanup levels. The Risk Assessment is based on exposure scenarios that do not apply to vacant lots, parks and green ways, resulting in an arbitrary and capricious decision with regard to those properties. There is no information in the administrative record to support EPA's conclusion that applying the proposed cleanup levels to these properties is necessary to protect human health. Children may not be exposed to vacant lots, parks, or greenways every day of the year, or obtain 100% of their daily soil/dust ingestion from an area that is visited for only a portion of the day. Therefore, exposures in these areas are not accurately described by using a residential scenario, and risks should be evaluated using a recreational scenario. There is no data or other basis in the record for determining that these parcels warrant

remediation. Even if there were, separate cleanup levels should be derived for these non-residential areas as a cleanup level of 400 mg/kg is not be appropriate for areas with a lower frequency of contact.

D. EPA's Application of Residential Cleanup Levels to Non-Residential Properties is Contrary to HUD Guidance.

US Department of Housing and Urban Development, which has primary responsibility over abatement of lead in households, has issued guidance on soil-lead hazardous for play areas. Specifically, the HUD Guidance states the "soil-lead hazard for play areas frequented by children under six years of age is bare soil with lead equal to or exceeding 400 parts per million." 24 CFR § 35.1320(b)(2)(ii)(A). However, for the remainder of the yard, no soil lead hazard exists where bare soil does not total more than 9 square feet per property with lead "equal to or exceeding an average of 1,200 parts per million." 24 CFR § 35.1320(b)(2)(ii)(B). In applying its proposed cleanup levels to vacant lots, parks and green ways without regard to existence of bare soil or child impact, EPA has ignored this guidance, and done so without any site-specific justification. The result is an arbitrary and capricious application of cleanup levels without regard to whether they are necessary to protect human health or the environment.

IV. EPA's PROPOSED SELECTION OF ALTERNATIVE 3 DOES NOT PRESENT THE BEST BALANCE OF TRADE-OFFS AND IS INCONSISTENT WITH SECTION 121 AND THE NCP.

Section 121 of CERCLA and 40 CFR § 300.430(e)(9) identify criteria against which EPA must evaluate alternatives for remedy selection. EPA must also identify other pertinent advisories, criteria or guidance in a timely manner. The Agency must do a detailed analysis consisting of an assessment of individual alternatives against each of the nine evaluation criteria and a comparative analysis that focuses upon the relative performance of each alternative against those criteria. The following are the nine criteria EPA is required to evaluate:

1. Overall protection of human health and the environment
2. Compliance with ARARs
3. Long-term effectiveness and permanence
4. Reduction in toxicity, mobility and volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. State Acceptance
9. Community Acceptance

In its Proposed Plan, EPA offered a flawed evaluation of the remedial alternatives in support of its decision to select Alternative 3.

A. EPA misstated Alternative 2 as it was presented in the FS.

In its description of Alternative 2, EPA erroneously states that a visual barrier will only be placed if subgrade soils are greater than 1,200 ppm rather than greater than 400 ppm as stated in the FS. Alternative 2 as set forth in the FS, is consistent with the yard soil removals that have been conducted in St Francois County since 2000 under the Interim Action and Halo Removals. EPA's Plan states that only 7% or 280 yards would require these barriers and the accompanying institutional controls. However, the FS stated that under Alternative 2, up to 94% (approximately 3,760 yards), or potentially as few as 12% (approximately 480 yards) if barrier placement is based on 6-inch vertical subgrade composites rather than subgrade surface samples, would be required under Alternative 2 (NewFields 2011).

B. EPA Ignored Aspects of Alternative 3 that do not compare favorably to Alternative 2.

Under Alternative 3, the excavations would be as deep as 24 inches and visual barriers would be placed where the subsurface soil exceeds the 1,200 ppm lead. The following aspects of this alternative do not compare favorably with Alternative 2:

- Alternative 3 generates an additional estimated 32,700 cubic yards of (untreated) waste soil that would place a burden on the repository sites;
- Alternative 3 requires a matching volume of additional topsoil for fill;
- Transport of the additional volumes requires an estimated 5,460 extra haul trips, increasing the risk of traffic accidents and fatalities and increasing road damage from heavy trucks on county streets and roadways;
- Time to excavate and test at the 12" depth would potentially lengthen yard removals and therefore may lengthen the overall time frame beyond 7 years and may prompt decisions to make further excavation decisions with XRF *in situ* or horizontal composite sampling of the subgrade versus a 6 inch depth profile. This could significantly increase the number of removals at depth than predicted by the final Subsurface Soil Investigation analysis increasing the predicted waste production, clean soil consumption, and truck-haul mileage being used to justify Alternative 3; and
- The use of visual barriers only for soils exceeding 1,200 ppm lead may allow exposure and transport to the surface of subsurface soils that, even when mixed with surface soils, will exceed the 400 ppm lead.

C. EPA Arbitrarily Disregarded ATSDR's recommendation regarding Maintenance of "One-Call" Database for Notification Purposes.

The Agency for Toxic Substances and Disease Registry ("ATSDR") issued a Health Consultation for the Omaha Lead Site (ATSDR 2000) that recommends the location of **all**

remediated yards where surface and subsurface soils greater than 400 ppm remain in place be maintained in a countywide database and be accessible for "one-call" type notification (a form of institutional control) so that if large excavations occur in the yard the homeowner is aware of the possible recontamination.[28] Adherence to ATSDR's recommendation would be a reasonable and implementable form of institutional control, coupled with the visual barriers, that would alert the excavator to these controls.

D. EPA's evaluation against the Nine Criteria was flawed.

With regard to protection of human health and the environment, EPA's analysis of this criterion was fundamentally flawed. First, EPA summarily concluded that the "no action" alternative would not be protective. Based on the information set forth above, particularly the reduction of EBLs in the Response Area, which has occurred despite, not because of the yard removal work, and in fact is more related to reduction in LBP, lead gas, lead in toys, etc., and to the State and County educational efforts, it is unclear that extensive additional yard remedial work will provide the presumed risk reduction. The record does not support EPA's conclusion that "no action" with respect to yards would not be protective. In other words, the data shows that EPA's Remedial Action Objective can be achieved without expenditure of more than $100 million in yard soil remediation.

With regard to protectiveness, the only distinction EPA draws between Alternatives 2 and 3 is that Alternative 3 would be less reliant on institutional controls. First, EPA's conclusion is flawed in that it underestimates the number of yards that will require further action at 12 inches. EPA makes no mention of the uncertainty behind its estimate that only 7 percent of yards would have greater than 1200 ppm at the 12 inch subgrade. The June 13, 2011 Draft Subsurface Soil Investigation in Residential Areas, St. Francois County Mined Areas (Draft Subsurface Soil

[28] Exhibit 16. Health Consultation for Omaha Lead Site. ATSDR 2000.

Report) provided a comparison of subgrade data for the benefit of assessing the uncertainty of this statistic. This statistic, as presented in both versions of the Subsurface Soil Report as well as mentioned in the Proposed Plan, is based on 58 yards out of the estimate of 7,036 yards in the Site or less than 1 percent. The Draft Subsurface Soil Report stated that "one point per yard may predict a highly optimistic view that only 7 percent of yards would actually require further action at a 12-inch subgrade. An assumption of 27 percent based on previously remediated yards with multiple yard quadrants should be considered as a reasonable conservative assumption for the purposes of the Feasibility Study regarding required action at 12 inches." In comments on this draft EPA stated that all conclusions should be stated in terms of the 58 sampling locations and that the discussion was "speculative" and should be removed from the report. While Doe Run disagreed that a discussion was "uncharacteristic of a technical report," it removed the discussion as well as other conclusions to which EPA took exception. Much of the discussion and the resulting conclusions presented the uncertainty behind using statistics exclusively from the 58 sampling locations rather than comparisons to all the subgrade data that had been collected over the last 10 to 11 years of yard soil removals. This was another example of EPA's prejudice to the belief that the mine waste piles within the county are the sole source of the lead and that elevated lead concentrations in residential yards will decrease with relative distance from the waste piles. The Draft Subsurface Soil Report provided both a discussion of the uncertainty of the subgrade statistics as well as a discussion of potential other source relationships to residential yards.

Also with regard to protectiveness, EPA had already made the determination, in conjunction with the Interim Action and Halo Removals, that the removal methodology presented in Alternative 2 was protective. EPA has provided no support in the record for determining it is no longer protective, and that Alternative 3 is warranted instead, or that

Alternative 3 presents enough added protectiveness to justify the estimated minimum of $10 million in added costs associated with that alternative.

Finally, in 2010 EPA determined, in connection with the Washington County Lead District – Old Mines Superfund Site in Washington County, Missouri that a remedial alternative substantially equivalent to Alternative 2 would be protective.[29] EPA offers no explanation for why it would be protective in Washington County, but somehow less so in St. Francois County.

With regard to short-term and long-term effectiveness, Doe Run disagrees with EPA's conclusion that excavating to 24 inches will be more effective. On the contrary, placement of a visual barrier at 12 inches will serve as a constant reminder to property owners of the potential presence of lead below that level. Moreover, if combined with a "one-call" type database, as recommended by ATSDR, this alternative would be more protective in the long-term.

With regard to cost, Alternative 3 comes at a significantly higher cost, but with no corresponding added protection to justify the expenditure of an estimated extra $10 million. In addition, because Alternative 3 involves excavation to a greater depth than was done in the Interim Action and Halo Removals, Alternative 3 appears to require that those yards be revisited. The significant cost that would be associated with that work is not included in the estimate for Alternative 3.

But most significantly with regard to cost-effectiveness, as demonstrated in these comments, EPA has failed to show that the lead from mining wastes, and not other sources, continues to pose an unacceptable risk to human health. Nor has EPA shown that expenditure of $100 million in additional yard removal is the most cost-effective means of addressing whatever residual risk may remain as a result of mining waste.

[29] See-Exhibit 10.

V. THE PROPOSED PLAN HAS NUMEROUS MISSTATEMENTS OF FACTS AND KEY OMISSIONS OF FACT.

The Proposed Plan contains several key errors and/or omission of key facts that warrant correction and clarification for the record. These errors and omissions further demonstrate the arbitrary and capricious nature of EPA's proposed remedy selection.

1. The Proposed Plan's description of the Site's Operable Units ("OUs") is confusing, particularly in terms of how each operable unit relates to the others, and the extent to which they appear to overlap. The Proposed Plan identifies the OUs as follows:

- OU- 00 – Consists of the removal actions at the pile locations (Bonne Terre, Leadwood, Federal, Elvins and National), time-critical residential properties, and high child exposure areas (i.e. playgrounds, daycare facilities).
- OU-1 – consists of the stabilization of the Desloge Pile (stabilized in 2000) and remediation of residential properties and high childe exposure areas exceeding screening levels of 400 ppm in St Francois County. OU-1 also focuses on properties in the towns of Park Hills, Desloge, Bonne Terre, Leadwood, Leadington, and Doe Run. This also includes the rural residential properties surrounding these communities.
- OU-2 - includes the remedial action to address terrestrial ecological risks and impacted watersheds associated with the mine wastes. OU-2 will also include future work on the Doe Run Pile.
- OU-3- consists of the Interim Program and Halo Removal Action to address elevated Blood lead at the site. The final ROD for the other OUs will be issued in the future.

There appears to be significant overlap between these OUs, and it is unclear how each operable unit relates to the others, or to this Proposed Plan, which is identified as addressing only OU 1. For example, as described in the Proposed Plan, OU-00, OU-1 and OU-3 all address residential properties and CHUAs. The record is unclear as to how each Operable Unit is distinguished from the other, the extent to which this proposed remedy addresses risks being addressed in other OUs, and the extent to which EPA anticipates additional records of decision to address residential risks in connection with the other OUs. EPA should clarify its record in this regard.

2. The Proposed Plan states on Page 2 that mine wastes have contaminated soil, sediment, surface water and groundwater. Yet on Page 12, EPA concedes that elevate lead concentrations in groundwater (less than 15 ug/l) occur "sporadically and were limited to four wells and could not be linked to the mining activities at the Site." Any statement about mining waste contaminating groundwater should be removed from the Proposed Plan and any decision document.

3. The Proposed Plan (page 7) discusses the 1998 Lead Exposure Study conducted by the MDOH and the high percentage of children in St. Francois County with elevated blood lead levels (17 percent). However, the plan does not discuss the most recent blood lead levels for the county that were reported in the FS, "Missouri Department of Health and Senior Services (MDHSS) reports that the percent of elevated blood lead in children less than 6 years of age in St. Francois County has dropped from 12 percent reported in the 2000 calendar year to 1 percent in the 2010 calendar year (MDHSS 2003, 2011b)." While we understand EPA's argument that the IEUBK model and the potential for high bioavailability for lead in yard soils predicts the potential for the children in St. Francois County to have elevated blood leads, the statistics for

the county demonstrates that the county's child EBL levels are dropping either without the benefit of soil yard remediation as proposed by EPA and are likely due to an improved education of lead issues.

4. Page 7 of the Plan states, "the Subsurface Soil Report concluded that 93 percent of the elevated lead concentrations were found in the upper 12-inches of soil." This is a misrepresentation of the Subsurface Soil Report which actually concluded that "Seven (7) percent of the yard quadrants after a 1 foot excavation would have confirmation subgrade soil lead concentrations greater than 1,200 ppm." The FS uses this conclusion to assess the potential for an excavation to require further excavation under Alternative 3 (the EPA selected alternative). We find using this statistic as a conclusion regarding percentage of elevated lead concentrations confusing and misleading.

5. The Proposed Plan (page 7) states that the 2004 removal action (Halo) is ongoing and then (on page 10) states that 1,000 properties remain to be addressed under the Halo Removal Action. These are the yards sampled under the Interim Action but were not included in the Halo Removal Action as they were beyond the Halo (typically between 500 to 1000 feet from the piles). These 1000 yards appear to be in the 4000 yards that are covered under the Proposed Plan with the exception of this statement. As we (Doe Run) are implementing the Halo Removal Action and we find these statements confusing, we are unclear as to what EPA is trying to relay to the public by these statements.

6. Page 8 of the Plan states, "(a)t the end of the Interim Action (March 30, 2004), 1,955 residential yards had been sampled and 563 homeowners had refused sampling. Under the Halo Removal Order, 27 additional yards have been sampled; of these yards 22 were sampling refusals during the Interim Action, two were not within the Halo but were sampled due to the

presence of a child with elevated blood-lead levels, and two were childcare facilities." It is unclear where EPA derived the statistics for yards sampled under the Halo Removal Action. The FS states; "At the end of the Interim Action (March 30, 2004), 1,955 yards had been sampled and 563 homeowners had refused sampling, for a 78 percent sampling rate. As of January 31, 2011, 2,057 residential yards and 12 CHUAs had been sampled and 532 property owners had refused yard soil sampling with a final residential yard sampling refusal rate of 21 percent." Using these statistics and noting that 45 yards were sampled as part of the Subsurface Soil Investigation, an additional 69 yards/CHUAs were sampled as part of the Halo Removal Action. Of these 69 yards and CHUAs, 3 were parks, 5 were child care or school playground facilities, 29 were previous residential yard refusals (all but one located within the Halo), 17 were non-Halo residential yards sampled due to the presence of a child with elevated blood-lead levels, and the remaining 15 yards were primarily new construction within the Halo.

7. The Plan makes the statement "The communities of Farmington, Bismarck and Iron Mountain Lake are outside of the mining area but will be included in future investigations." It is unclear what the purpose of this sentence is and its relation to the Site. As stated above, the FS, including cost estimates, were based on the Response Area only. These communities lie outside the Response Area. If EPA contemplates including them or other locations outside the Response Area, it will render the cost estimates inaccurate, as well as EPA's evaluation of the cost-effectiveness of the proposed remedy.

8. This Plan is confusing as to what would make a residence qualify for inclusion in the remedy. The Plan states on pages 14 and 16 that "Residential properties where no quadrant samples exceed 400 ppm lead would not be addressed under this alternative [2-3]". And then later in Alternative 2 on page 14 states, "Excavation of a residential property would be triggered

when the highest recorded soil sample for any defined area of the property contains greater than or equal 400 ppm lead." Alternative 3 does not include this statement. However the cost tables included in the Proposed Plan are from the FS and they show driveway only, garden only, and play area only yards in both alternatives costs.

9. The Plan states "The physical barrier will function as a warning that digging deeper will result in exposure to soils contaminated with lead at a level that EPA has determined to be a human health concern." The concentration for which a visual barrier is placed under the Proposed Plan is 1,200 ppm. However, in the HHRA summary and discussion the plan states on page 12 that "a lead soil concentration of 400 ppm to ensure that a child has less than a 5 percent probability of having a blood-lead level exceeding 10 ug/dL." And the only mention of the 1,200 ppm in the HHRA is in the statement "In past experience at Superfund sites where lead is the contaminant of concern, the EPA generally selects a residential soil cleanup level within the range of 400 ppm to 1,200 ppm for lead..." The RAO section of the Proposed Plan (pages 12-13) makes it clear that exposures above 400 ppm lead under the assumed exposure conditions would create an unacceptable risk for a child. We believe EPA needs to clearly state its rationale for the acceptance of soil lead concentrations between 400 and 1200 ppm lead at depth; as mentioned above we do not necessarily agree with EPA's interpretation of the ATSDR document especially in regard to the lack of institutional controls under these conditions.

VI. CONCLUSIONS

Doe Run has worked cooperatively with EPA since the early 1990s to respond to potential risks to human health and the environment that might have been posed as a result of historic mining activities in the Old Lead Belt. As a member of that community, Doe Run places a high priority on the health and welfare of its residents. Since 1994, Doe Run has spent

approximately $62 million toward stabilization of the Piles, investigation and remediation of residential yards, and BLL sampling in children. Doe Run has been fully responsive to EPA's demands with regard to response actions at the Site.

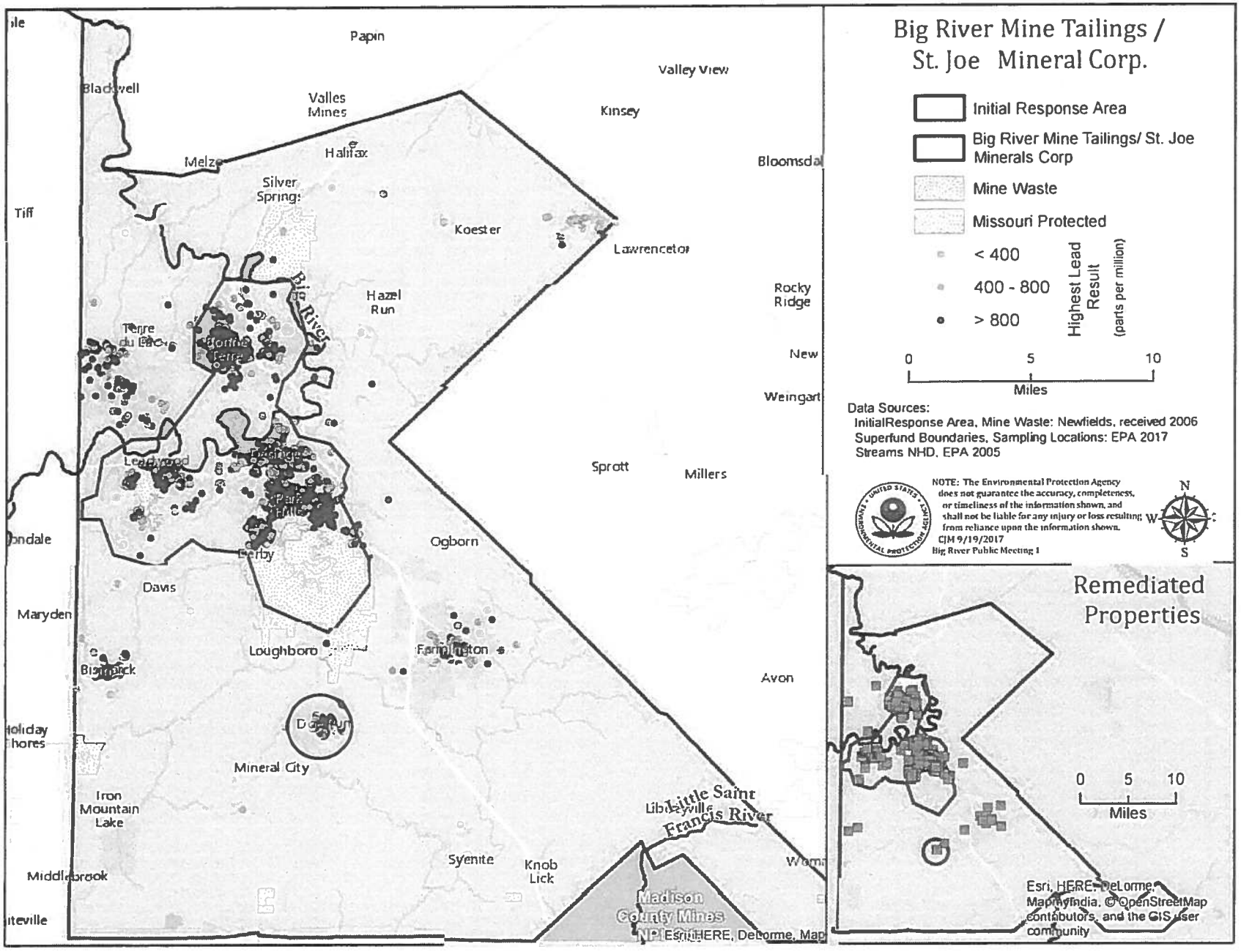
At the same time, EPA has continually refused to consider, much less evaluate the extent to which sources of lead other than mining wastes are contributing to the potential threat to human health and the environment, including, in particular, blood lead levels. Doe Run does not disagree with EPA's desire to reduce BLLs in children. The efforts of EPA, HUD and state and local governments to reduce lead levels in children are important and worthwhile. However, EPA's continuing resistance to consider and evaluate the extent to which sources other than mining wastes are contributing to blood lead levels is a mis-application of its CERCLA authorities.

The significant amount of work already performed at the Site has already substantially abated much, if not all the potential risk from historic mining wastes. State and local programs directed to lead education and lead paint remediation have been dramatically successful both nationwide and locally, as shown by the significant reduction in blood lead levels in the Old Lead Belt area. But it must be noted that these reductions appear unrelated to the yard cleanup work that has been performed to date. This, coupled with the lack of correlation between identified mining waste sources and BLLs, calls into doubt EPA's assumptions that spending another $100 million to conduct removals at more than 4,000 yards will provide substantial additional protection.

Based the foregoing, Doe Run strongly urges EPA to take additional time to more carefully evaluate the available data and more carefully evaluate the extent to which mining waste, and not other sources of lead, contribute to the risk. Only then can EPA select a remedy

that more accurately presents the best balance of trade-offs as required by CERCLA, is protective with regard to the risk actually posed, and is implementable and cost effective.

Appendix C


Big River Mine Tailings / St. Joe Mineral Corp.
Initial Response Area
Big River Mine Tailings/ St. Joe Minerals Corp
Mine Waste
Missouri Protected
< 400
400 - 800
> 800
Highest Lead Result (parts per million)
0 5 10
Miles
Data Sources:
InitialResponse Area, Mine Waste: Newfields, received 2006
Superfund Boundaries, Sampling Locations: EPA 2017
Streams NHD, EPA 2005
NOTE: The Environmental Protection Agency does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any injury or loss resulting from reliance upon the information shown.
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Hazel Run
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Sprott
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