



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7**

11201 Renner Boulevard
Lenexa, Kansas 66219

MAR 16 2020

ENGINEERING EVALUATION/COST ANALYSIS APPROVAL MEMORANDUM

SUBJECT: Viburnum Trend Lead Haul Roads, Operable Unit (OU) 2 – St. Joe Minerals Corp, City of Viburnum Site – Approval Memorandum to Perform an Engineering Evaluation/Cost Analysis for a Non-Time-Critical Removal

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TO: Mary P. Peterson, Director
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Site ID#: A7J5

I. SUBJECT

Investigations have determined that there has been a release of hazardous substances to the environment at the Viburnum Trend Lead Haul Roads, OU 2 – St. Joe Minerals Corp, City of Viburnum Site (Site) located in and near the city of Viburnum, Missouri. The Site has been under investigation since 2002. A potentially responsible party (PRP), The Doe Run Resources Corporation (Respondent), has been identified for the Site.

This memorandum documents the need to move forward with an Engineering Evaluation/Cost Analysis (EE/CA) for a non-time-critical removal action. The U.S. Environmental Protection Agency gave oral authorization to the PRP to conduct an EE/CA without an Administrative Order on Consent (AOC) during a face-to-face meeting on March 27, 2019. The EE/CA will evaluate removal alternatives to mitigate lead contamination identified at the Site.

The decision to proceed with this EE/CA is consistent with the EPA's guidance and is required under section 300.415(b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for all non-time-critical removal actions. The EE/CA will also provide for public involvement and evaluate and recommend the appropriate response.



II. BACKGROUND

A. Site Description

The Site is mainly located in Iron County with smaller portions existing within Crawford and Washington Counties in the southeastern region of Missouri. It is part of what is commonly known as the New Lead Belt – or Viburnum Trend – which began producing lead around 1960 and continues production to this day. Figure 1 in Appendix A depicts the Site's location.

The Doe Run Resources Corporation – Viburnum Division (formerly St. Joe Minerals Corp – Viburnum) is located in and near the city of Viburnum, Missouri, at the northern end of the Viburnum Trend Lead Mining District. The Viburnum Division includes four mines where ore was brought to the surface: Viburnum Mine 27 in Crawford County, Viburnum Mine 29 in Washington County, Viburnum Mine 28 in Iron County, and Casteel Mine in Iron County. The mined ore was previously transported over haul roads to the Viburnum Central Mill located at Viburnum Mine 28 in Iron County; it is currently inactive. From the Viburnum Central Mill, the processed lead (called lead concentrate) was hauled to various smelters or shipped overseas. Currently only Viburnum Mine 29 and the Casteel Mine are operating. Viburnum Mine 27 was closed in 1983; Viburnum Mine 28 was closed in 2004. Ore from the Viburnum Mine 29 is currently brought to the Viburnum Central Mill Complex where it is crushed and then hauled over public roadways, primarily to the Buick Mill, for concentrating. The lead ore from the Casteel Mine is also hauled over public roadways to other mine ore concentrators within the Viburnum Trend Mining District for further processing. In addition to the mines and mills, there are two large tailings piles that were created from processing of ore at the Viburnum Central Mill Complex.

During construction development and early operation of these mines, it was not uncommon for lead-contaminated materials such as tailings and/or poor rock to be used for construction materials in the building of the city of Viburnum, which was built by the St. Joe Minerals Corporation to support mining operations. "Poor rock" is a term used to describe low grade ore that is removed during mine development but not purposely mined or concentrated. Poor rock commonly contains higher than one percent lead (10,000 parts per million [ppm]). In addition to the mine waste scenario, the Central Mill in Viburnum was a likely source of air pollution and lead fallout from hauling, crushing, and processing of ore and/or concentrate, particularly prior to requirements to reduce air emissions.

The Site is defined in section 7(p) of the AOC for a time-critical removal action (CERCLA-07-2007-0013) as "any residence or child high use area (CHUA) (1) within the city of Viburnum, Missouri, adjacent to the city of Viburnum or within the cross hatched area on the map attached as Appendix A to this Order; (2) adjacent to and within 200 feet of either edge of the haul roads from the city of Viburnum to the Viburnum 27, 29, and Casteel mines; (3) within 1,000 feet of the head frames of Viburnum 27, 29, and Casteel mines; and (4) within the area within 1,000 feet from the edge of all Doe Run and St. Joe Minerals-Viburnum mine waste disposal areas (e.g., tailings piles)." An updated map, according to the AOC, is provided in Appendix A as Figure 2.

B. Nature and Extent of Contamination

As a result of mining-related activities that have occurred in and around the city of Viburnum, Missouri, lead and lead compounds have been released into the environment in quantities sufficient to present an imminent and substantial danger to public health and welfare. Lead and lead compounds are hazardous substances, as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and are listed as hazardous substances in 40 C.F.R. § 302.4.

In September 2005, the EPA issued an AOC to the Respondent (corporate successor to St. Joe Minerals Corporation) to conduct a removal Preliminary Assessment/Site Inspection (PA/SI). The primary objective of the PA/SI was to identify lead-contaminated properties in and around the city of Viburnum, Missouri.

In July 2006, the Respondent submitted the PA/SI report to the EPA that detailed the results of the sampling investigation. Out of an estimated 315 homes, the Respondent sampled 304 residential or CHUA properties. Lead levels in the soil exceeded the EPA's residential screening level (RSL) of 400 ppm at 222 properties (73 percent). Concentrations identified above the RSL ranged from 400 ppm to 38,000 ppm. At least 64 of the properties with soils that exceeded the RSL also exceeded 1,200 ppm, thus necessitating a time-critical removal action.

In May 2007, the EPA issued an AOC (CERCLA-07-2007-0013) to the Respondent to conduct a time-critical removal action at the residential and CHUA properties with lead concentrations that exceeded 1,200 ppm. The objectives of the time-critical removal action to be performed by the Respondent, as described in the AOC scope of work (SOW), were:

1. To conduct certain sampling activities at any previously unsampled residential property or CHUA within the Site as defined by the AOC and identified in Appendix A to the AOC.
2. To provide a surface soil replacement program for any residential property or CHUA located within the Site and contaminated as a result of mining-related activities. The PRP will also provide a surface soil replacement program for properties or areas sampled pursuant to Objective #1 and where lead concentrations in soil exceed 1,200 ppm and such lead concentrations are the result of mining-related activities. The properties or areas to be remediated are those with lead concentrations in soil exceeding 1,200 ppm or those properties greater than 400 ppm where a child with an elevated blood lead level (EBL) resides, as identified during the PA/SI conducted by the PRP or identified pursuant to Objective #1 of the SOW.
3. To provide High Efficiency Particulate Air household vacuums to each home at the Site where the soils in any portion of the yard exceeded 1,200 ppm and removal activities are required under the AOC to address the soil contamination.

4. When allowed by the landowner, to conduct indoor cleaning of home interiors at each home at the Site where the soils in any portion of the yard exceeded 1,200 ppm and removal activities are required under the AOC to address the soil contamination.

The EPA also required the Respondent to address some yards where lead concentrations were less than 1,200 ppm but greater than 400 ppm with a child younger than 72 months of age in residence. Prioritization levels for these yards were provided in the AOC SOW and were as follows:

1. Residence where EBLs were identified in a child under 72 months of age and soil area exceeds 400 ppm.
2. Residence where child under 72 months of age resides and a yard quadrant soil area exceeds 1,200 ppm lead.
3. All other residences or CHUAs with a soil area exceeding 1,200 ppm lead.
4. Residence where a child under 72 months of age resides and no yard quadrant area exceeds 1,200 ppm lead (but soil concentrations exceed 400 ppm lead).

In total, 119 properties qualified for time-critical removal action work, with actions occurring at 111 of those properties. Work for this time-critical removal action was primarily completed in 2007 and 2008, with two additional yards being addressed in 2018. A total of 68 residences and CHUAs identified during PA/SI sampling with lead concentrations in soil below 1,200 ppm but greater 400 ppm are unremediated and will be addressed by this non-time-critical removal action.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

When the lead agency makes the determination, based on factors listed in 40 C.F.R. § 300.415(b)(2), that there is a threat to public health, welfare or the environment, the lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate or eliminate the release or threat of release. The factors in 40 C.F.R. § 300.415(b)(2) that apply to the Site are:

300.415(b)(2)(i) – Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

Previous environmental assessments have determined that lead is present at concentrations that exceed regulatory standards in surface soils at the Site.

300.415(b)(2)(iv) – High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.

Lead is present in surface soils across the Site at concentrations that exceed EPA-established standards for residential soils.

IV. ADDITIONAL FACTORS DEMONSTRATING APPROPRIATENESS OF REMOVAL ACTION

A. Time Sensitivity of the Response

Lead is classified by the EPA as a probable human carcinogen and is a cumulative toxicant. The early effects of lead poisoning are nonspecific and difficult to distinguish from the symptoms of minor seasonal illnesses. Lead poisoning causes decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, digestive symptoms, abdominal cramping, nausea, vomiting, and decreased appetite. With increased exposure, symptoms include anemia, pallor, a "lead line" on the gums, and decreased handgrip strength. Alcohol and physical exertion may precipitate these symptoms. The radial nerve is affected most severely causing weakness in the hands and wrists. Central nervous system effects include severe headaches, convulsions, coma, delirium, and possibly death. The kidneys can also be damaged after long periods of exposure to lead, with loss of kidney function and progressive azotemia. Reproductive effects in women include decreased fertility, increased rates of miscarriage and stillbirth, decreased birth weight, and/or pre-term delivery. Reproductive effects in men include erectile dysfunction, decreased sperm count, abnormal sperm shape and size, and reduced semen volume. Lead exposure is associated with increases in blood pressure and left ventricular hypertrophy. A significant amount of lead that enters the body is stored in the bone for many years and can be considered an irreversible health effect.

Children are more vulnerable to lead poisoning than adults. For children, lead can damage the central nervous system, kidneys and reproductive system. At higher levels, it can cause coma, convulsions and death. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased stature and growth, and impaired hearing acuity.

Soils exceeding time-critical action levels have been addressed pursuant to the established time-critical action priorities. However, soils that exceed the non-time-critical action level of 400 ppm remain at residences and CHUAs at the Site.

B. Comprehensiveness of the Proposed Action

The EE/CA and subsequent treatment and/or removal options must address the lead contamination in residential soils and soils in CHUAs. The EE/CA will also evaluate whether the removal action alternatives will supplant the need for remedial action.

C. Likely Cost of the Action

Because the Respondent requested to voluntarily perform an EE/CA, which is currently being developed, the EPA's involvement in performing the EE/CA should be limited to oversight. As a result, the EPA's costs related to the EE/CA should be minimal and those costs will be recoverable from the Respondent. The EPA will select the appropriate remedy, after public comment, through an Action Memorandum.

V. ENDANGERMENT DETERMINATION

Actual or threatened releases of a hazardous substance at the Site may present an imminent and substantial endangerment to public health, or welfare, or the environment. A non-time-critical removal action is therefore necessary and appropriate to abate, prevent, minimize, stabilize, mitigate, or eliminate such threats.

VI. SCOPE OF THE EE/CA

The purpose of the EE/CA will be to evaluate the alternatives available for reducing or eliminating the threats posed by residential and CHUA soils contaminated with lead.

Pursuant to the EPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA/540-R-93-057), which details the outline of an EE/CA, alternatives will be evaluated based upon effectiveness, implementability, cost and compliance with applicable or relevant and appropriate requirements (ARARs). In reviewing the Respondent's development of the range of alternatives to be evaluated in the EE/CA, the EPA will consider Section 300.415(e) of the NCP as well as all other relevant guidance. The following are various removal actions, among others, which may be appropriate and will be evaluated singularly or in combination in the EE/CA for this Site:

- The "no action" alternative
- Institutional controls
- Public health actions
- Containment
- Soil removal

VII. ENFORCEMENT STRATEGY

In May 2007, the Respondent signed an AOC with the EPA whereby the Respondent, among other things, performed a time-critical removal action to address high priority lead-contaminated soils in residential yards and CHUAs. During a quarterly meeting on March 27, 2019, the EPA authorized the Respondent to voluntarily conduct an EE/CA for a non-time critical removal action at the Site. Upon completion of the EE/CA and 30-day availability for public comment, the EPA will select the most appropriate removal alternative through an Action Memorandum. The EPA will be the lead agency for overseeing the EE/CA as it progresses.

Although the EPA has authorized Respondent to voluntarily conduct an EE/CA, it is anticipated that negotiations for an AOC to compel the Respondent to complete the non-time-critical removal action for the Site will follow the approval of the EE/CA and selection of a removal alternative(s).

VIII. ESTIMATED COSTS

Because the EE/CA will be developed by the Respondent voluntarily, the EPA's involvement in performing the EE/CA should be limited to oversight. As a result, the EPA's costs related to the EE/CA should be minimal and those costs will be recoverable from the Respondent.

IX. OTHER CONSIDERATIONS

The proposed non-time-critical removal action is expected to be consistent with and may possibly supplant any remedial action at this Site.

The Missouri Department of Natural Resources actively participates in overseeing cleanup activities throughout the state of Missouri and supports the action at this Site.

X. RECOMMENDATION

Site investigations have determined that there has been a release of hazardous substances to the environment at the Site. Consistent with Section 104(b) of CERCLA, further investigation by way of an EE/CA is necessary to plan and direct future response actions that are not inconsistent with the NCP.

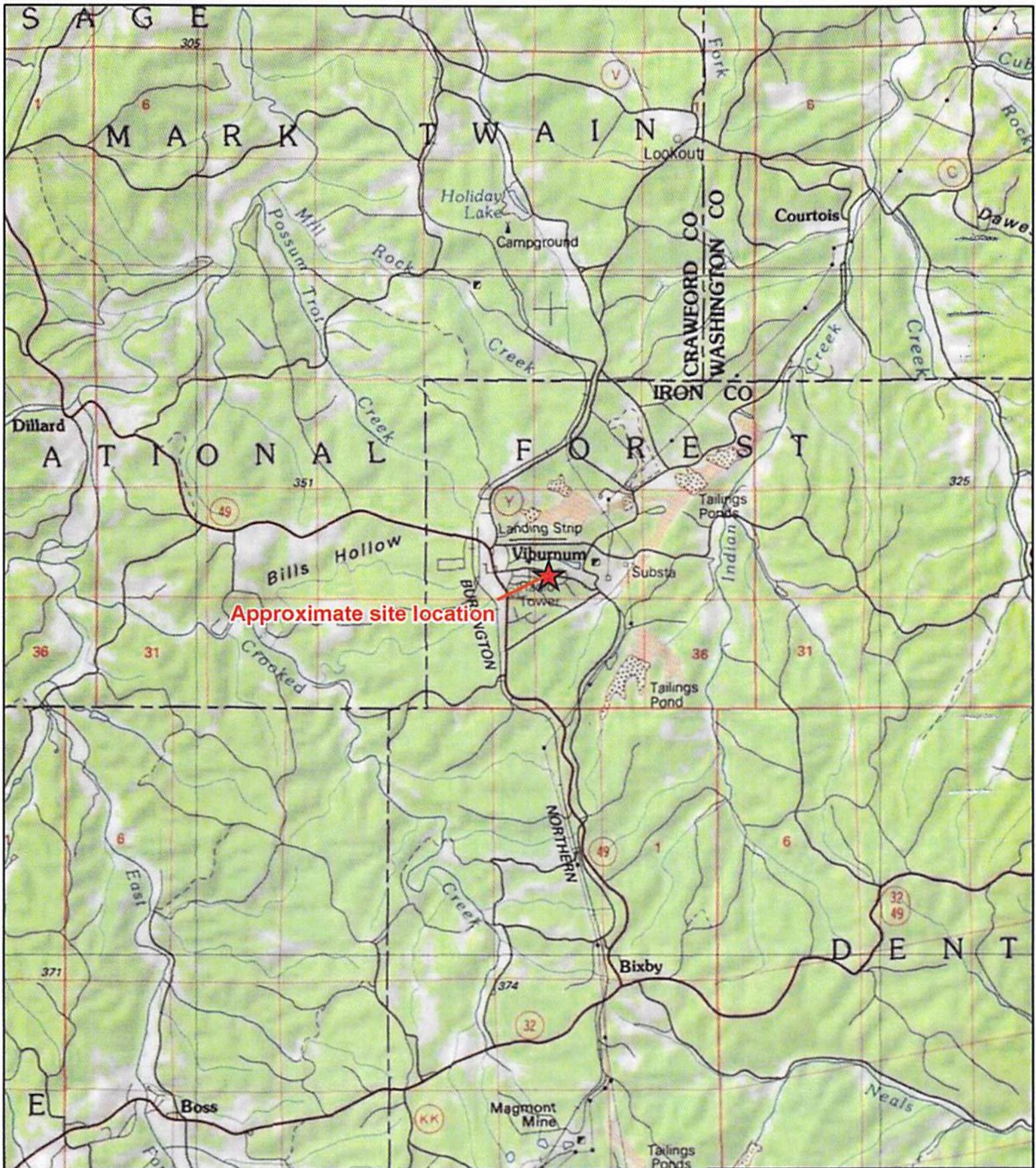
Approved:

Mary P. Peterson
Mary P. Peterson, Director
Superfund and Emergency Management Division

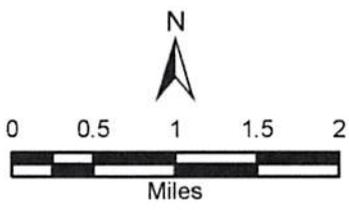
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Date

Attachments:
Attachment A – Figures

ATTACHMENT A – FIGURES



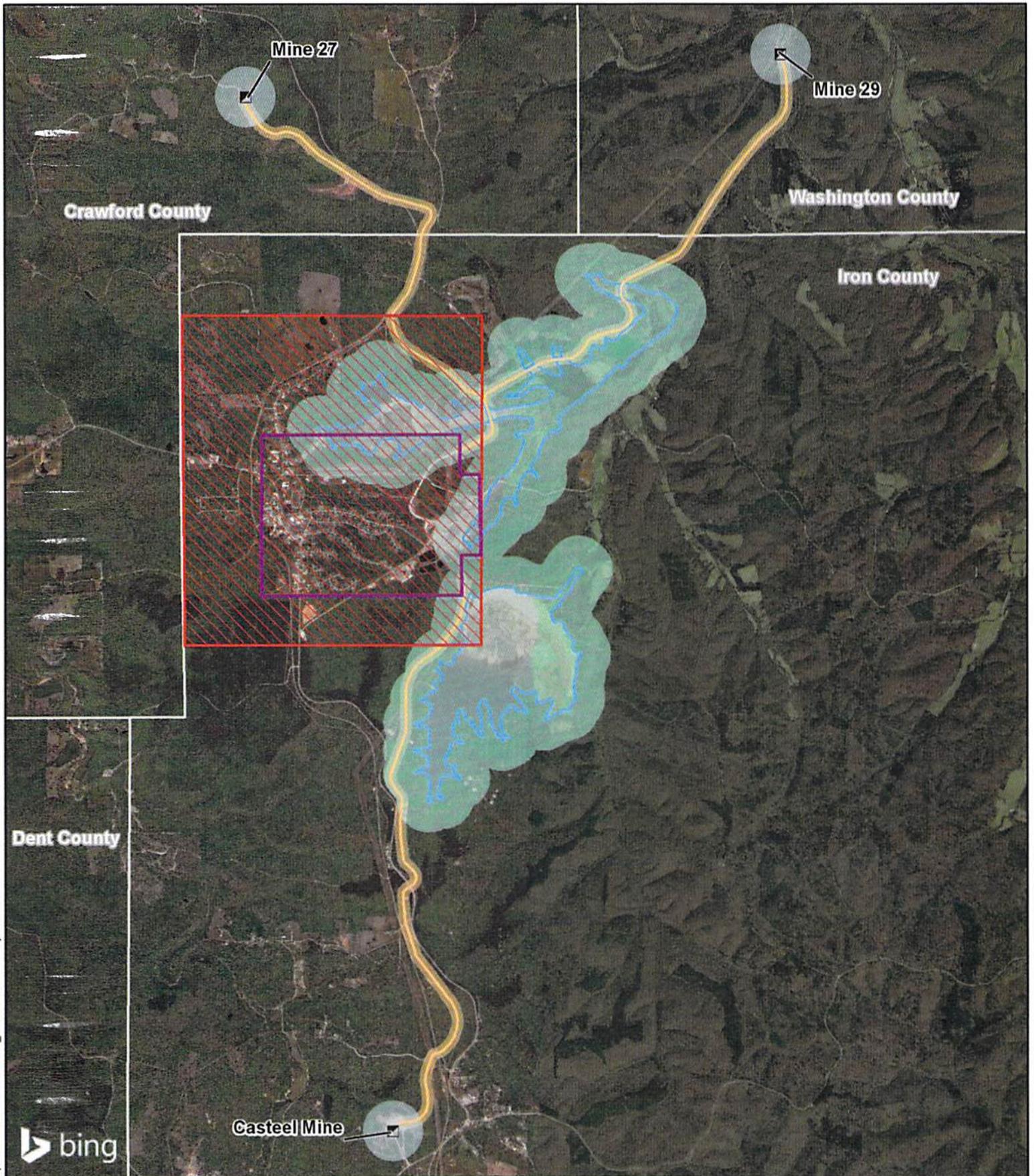
Approximate site location



St. Joe Minerals Corp - Viburnum Site Viburnum, Missouri
Figure 1 Site Location Map

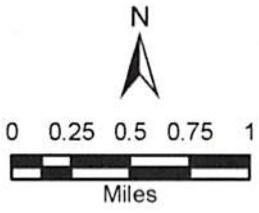

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Source: The source of this map image is ESRI, used by EPA with ESRI's permission.



Legend

-  Mine shaft location
-  Haul road
-  County boundary
-  Proposed residential sampling area
-  Tailings pile
-  Viburnum City Limit
-  200-foot haul road buffer
-  1000-foot shaft buffer
-  1000-foot tailings buffer



St. Joe Minerals Corp - Viburnum Site
Viburnum, Missouri

Figure 2
Site Layout Map



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