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REFERENCES	EFFECTIVE: Revisions: February 2014

Madison County Voluntary Institutional Controls Manual

Developed by The Grindstaff Partnership, LLC
in partnership with
the Citizens of
Madison County Missouri

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Madison County Voluntary Institutional Controls Manual

Section 1 Administrative Framework

SUBJECT: Living With Lead	PART: Administrative Framework
	SECTION: 1.1
REFERENCES	EFFECTIVE: October 1, 2012
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LIVING WITH LEAD

As residents of Madison County, Missouri, we understand that lead is a part of our lives. We know that because of the unique geological qualities of our land, lead can be found both on the surface and under the ground. We also know that 300 years of mining and processing in and among our communities has impacted our land, our water, and our lives.

Living in Madison County requires living with lead. We have built our communities from the wealth of lead. We have grown generations of our families from the abundance of lead. We have created a part of our culture and history from the existence of lead. To live in Madison County is to live with lead. We see the lead and we see the impact of lead on our lives, both the benefits and the challenges.

However, we see what surrounds the lead as well. In Madison County, we live within the St. Francois Mountains and the streams and rivers flowing out of the mountains. We live with farming of livestock, grain, and produce in our fertile fields and valleys. We live in rural communities that value the individual, the family, the community, our beliefs, our education, and our children. We understand the necessity for cooperation and collaboration as a part of our rural foundation of survival.

We also value as a rural foundation, a hearty sense of independence. Historical records illustrate that from the very beginning of our land's inclusion in this country, our ancestors asserted their independent attitudes regarding issues such as property development and ownership of mineral rights. Just as we recognize the importance of independence in the formation of our nation, we recognize the important role it plays in the day to day life of our county's residents. After all, we realize that what works for our county may not work for others, and what works for other counties, may not work for ours.

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Living in Madison County has afforded us both the benefits and challenges associated with lead. As with generations past, we want to live and work around lead in safe, healthy, efficient, and profitable ways. While we continue to listen to our elder's stories, educate ourselves with legitimately researched information, and gain wisdom from our generations of experience, we find new ways to live around lead. Just as our families who worked the mines of the 20th Century did not use the exact same knowledge, techniques and tools from the one-hundred years before, we, in turn, will not live and work with lead and its by-products using the exact same knowledge, techniques, and tools we had in the 20th Century.

SUBJECT: Our Challenge and Response	PART: Administrative Framework
	SECTION: 1.2
REFERENCES	EFFECTIVE:
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OUR CHALLENGE & RESPONSE

Madison County's geography, geology, history, and culture is unique in some ways to any other county in the nation; thus, we have created a unique way to respond to some of our current concerns and questions regarding our life with lead. Because of the amount of lead on and in our land, our county has been listed on the United States Environmental Protection Agency's (EPAs) National Priorities List of contaminated sites. We have worked with the State of Missouri and the Federal Government to educate ourselves and others about health, safety, and environmental concerns. We have allowed the Department of Natural Resources (DNR) and the EPA on our land to perform soil and water tests and to clean up residential areas containing higher percentages of lead than are considered protective of human health.

Now, as we look toward our historical and economical future independent from the lead companies of the past, we want to live on and work with our land in ways that keep additional lead contamination to a minimum. To this end, we have formed a Madison County Voluntary Institutional Controls Plan (VICP). All communities named on the National Priorities List will create some kind of plan for contamination management, but our VICP is unique as it is the only plan in the nation that allows for partnership and engagement in a voluntary way.

Our VICP allows us to educate ourselves with the latest science and health information and work with one another as the need arises instead of telling one another what we have to do because a law says so. As science evolves and as our needs evolve, we can figure out for ourselves the land management practices that work best over a number of years and modify our methods of management through the VICP. Lastly, our VICP will work through partnership within our community, encouraging the kind of cooperation and collaboration our rural tradition values without discouraging the independent attitude our residents have thrived on from the beginning of our county's history.

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Overview of Madison County Lead History and VICP	SECTION: 1.3
REFERENCES	EFFECTIVE: October 1, 2012
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OVERVIEW OF MADISON COUNTY LEAD HISTORY & VICP

Lead History Leading to Superfund Site

Much of the land known as Madison County was part of southeastern Missouri called "The Old Lead Belt". One of the oldest lead mines west of the Mississippi, Mine LaMotte, sat on the northern end of the county. During the 20th Century, "The Lead Belt" was the site of the largest lead mining operations in the world. The processing and smelting of lead in Madison County left 13 identified major areas of mine waste (chat and slime). The mine waste contains elevated levels of lead and other heavy metals which we now know pose a threat to human health and the environment. The mine waste contaminated soil, sediment, surface water, and groundwater, both on the waste property and elsewhere, as it was transported by both natural and human modes.

Remediation Efforts and Management of Remediation

The superfund law (CERCLA) was enacted in 1980. This law gave the U.S. Environmental Protection Agency (EPA) the authority to find contaminated areas around the United States and clean them up, using funds from whatever parties were designated as the potentially responsible parties (PRP's).

In 1995, EPA performed an Expanded Site Inspection on the Little St. Francis River watershed. The results of this inspection indicated elevated concentrations of a number of heavy metals in samples of mine waste, groundwater, sediment, and soil. Studies were also being conducted by the Missouri Department of Health and Senior Services and the Madison County Health Department. These studies concluded that some children in Madison County had elevated levels of lead in their blood.

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Because of the previous investigations, the presence of mine waste piles, the elevated blood lead levels in children, and a request for a site-specific assessment from the Madison County Health Department, EPA began conducting a number of assessments to see if contaminated soil removal was needed. These assessments led to specific removal actions in Harmony Lake, Fredericktown, sensitive population areas (daycare centers, public parks, other public recreational facilities), and homes with potentially lead-impacted children. As a part of the assessments, EPA collected and analyzed samples of water and soil with the results indicating high concentrations of a variety of heavy metals. Surface water samples showed iron, lead, nickel, aluminum, copper, and silver concentrations which exceeded the Missouri Department of Natural Resources aquatic life standards.

In 2003, because of the elevated levels of heavy metals present, Madison County was put on the National Priorities List (NPL). This is how Madison County received the designation, "Superfund". Since the "Superfund" designation, even more properties have been assessed, and more removal actions have occurred.

Management of Remediation (Voluntary Institutional Controls Plan)

Once a Superfund site has been remediated, a management plan (usually called institutional controls) needs to be put in place so that the land does not get re-contaminated. Management plans have similar components as they are created based on the federal, state, and local laws in existence, but each site's management plan reflects the unique needs and requirements of its individual location. Madison County's management plan, or set of institutional controls, focus on digging, hauling and disposal of soil.

Specific methods of digging, depending on the condition of the soil relative to lead content, have been developed for residents and professionals to use when digging in Madison County soil. These methods are referred to as "Best Practices". Similarly, hauling and disposal best practices have also been developed for Madison County based on state and federal hauling and disposal regulations.

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What does "voluntary" mean to you?

Some institutional controls plans involve the creation of local ordinances and development of permits to insure that residents and businesses use the best practices. Madison County has chosen not to create local ordinances or develop permits. Instead, the Madison County Health Department will be the point of contact for guidance regarding the voluntary management plan. The word, "voluntary" simply means there are no local ordinances overseeing the digging, hauling, and disposal of soil. However, there are state and federal oversight regulations that may apply.

Madison County has created a management and education plan through the health department. Although they have no means of regulatory oversight, the health department will have the capacity to assist property owners and professionals both in understanding soil conditions and understanding how to use the best practices. Through the EPA Sampled and/or Remediated Properties Database for Madison County, the health department will also have the capacity to assist property owners and businesses record digging actions as they are performed on property within the county.

The State of Missouri does have regulatory oversight over hauling and disposal practices. If hauling and disposal best practices are not used properly, businesses may be held accountable for those actions by the Missouri Department of Natural Resources.

The Environmental Protection Agency also has regulatory oversight over the entire Superfund site. Every five years, EPA will review the progress of the Voluntary Institutional Controls Plan during its Five-Year Review Process. This review process will include random sample collection at properties remediated. If remediated properties have become re-contaminated, property owners and

businesses that performed digging, hauling, and disposal actions on that property may be held accountable.

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REFERENCES EPA Lead in Your Home Guide EPA Lead Poisoning and Your Children Pamphlet Missouri Department Health and Senior Services Testing Your Drinking Water for Lead Pamphlet Center for Disease Control and Prevention	EFFECTIVE:
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HEALTH EFFECTS OF LEAD

Lead is poisonous and can create ill health effects that can potentially affect almost every organ and system in the body. Lead poses significant challenges as it cannot be seen or smelled. Lead can enter the body though the lungs when you inhale or the mouth when you swallow. The human body stores lead in the same manner as it does calcium, a mineral that strengthens bones. Once ingested, lead, like calcium, will stay in the bloodstream for a few weeks. Some of the lead is naturally excreted while the remaining lead is deposited in the body's soft tissues (liver, kidneys, lungs, brain, spleen, muscles, and heart) or absorbed in the bones. Lead can remain stored in bones for a lifetime.

Lead can have negative health effects on everyone, however, children ages six and younger are highly susceptible to the effects of lead because the bodies of children in this age group develop rapidly and absorb more lead. Young children are also more apt to place lead contaminated objects in their mouths. Pregnant women exposed to lead can pass the lead contaminants from their bodies to their unborn babies.

Children with pica behavior are at high risk for increased blood lead levels and at high risk to experience negative health effects from lead. Pica behavior is the craving to eat nonfood items, such as dirt, paint chips, and clay. Pica behavior is most common in one and two year old children and usually diminishes with age. Pica behavior has also been observed in adults, particularly pregnant women.

Some of the known health effects from of lead exposure in children are:

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- Nervous System Damage
- Kidney Damage
- Learning Disabilities (Attention Deficit Disorder and Decreased Intelligence)
- Speech, Language, and Behavior Problems
- Poor Muscle Coordination
- Decreased Muscle and Bone Growth
- Headaches
- Hearing Damage
- Seizures
- Brain Damage

Some known health effects from high levels of lead exposure in adults are:

- Fertility Problems (men and women)
- Difficulties During Pregnancy
- High Blood Pressure
- Digestive Problems
- Nerve Disorders
- Memory and Concentration Problems
- Muscle and Joint Pain
- Seizures
- Brain Damage

Lead in soil poses health risks to both adults and children in the same manner as any other lead source. Lead in soil is easily susceptible to migration and can

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become airborne by excavations activities or weather elements such as wind. Soil lead can also be spread to water sources or remediated areas by rain or run-off from storm water. Furthermore, soil lead can migrate through the tracking on tires of vehicles or from being hauled in an unenclosed vehicle. The Madison County VICP strives to reduce the lead health risks to both children and adults by providing best practices to effectively manage lead contamination and best practices for prevention of migration of lead contamination.

For further information on the health effects of lead, you can view the Center for Disease Control and Prevention (CDC) website at: http://www.cdc.gov/.

SUBJECT: Purpose	PART: Administrative Framework SECTION: 1.5
REFERENCES	EFFECTIVE: Revisions: January 2014

PURPOSE

THE PRIMARY PURPOSE OF OUR PLAN

A record of decision (ROD) for residential properties by Environmental Protection Agency (EPA) was developed through public meetings and a public comment period. Institutional controls or the Voluntary Institutional Controls Plan (VICP) was determined necessary to protect the remedy at the site. The primary purpose of the VICP is to give residents and workers in Madison County, Missouri the tools to effectively manage lead contamination both on their property and on the land of the county as a whole. Our plan strongly encourages all residents and workers who engage in activities involving excavations, building development, construction, renovation and grading within Madison County to use the management resources and guidelines provided. Specifically, our VICP resources and guidelines encourage the installation and maintenance of contamination barriers and the implementation of other contaminant management standards shown to minimize the migration of, and particularly, human exposure to contaminants within the soil, as necessary to protect the public health and the environment. The Madison County VICP strives to reduce the lead health risks to both children and adults by providing best practices to effectively manage lead contamination and best practices for prevention of migration of lead contamination.

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MANAGEMENT OF OUR PLAN

Typical institutional controls plans are not voluntary; rather, they are supervised under the federal authority of the Environmental Protection Agency (EPA), the individual state authority, and the local authority of the county. Our institutional controls plan is different. In the case of our Voluntary Institutional Controls Plan (VICP), Madison County, in partnership with both the State of Missouri and EPA, has enacted a process for creating a cultural attitude shift regarding lead health and safety and for strongly encouraging and supporting both individual resident and community management of lead contamination, without the attempt to enact more laws.

The success of our VICP will not only be measured by property management and certification records on file with the county, it will also be expressed by the broadening of understanding residents have regarding lead health and safety and contamination management on their property. Local management of our VICP provided by Madison County is necessary for success as this type of management provides efficient, economical, and accessible administration by actual residents of the county. Therefore, because of their roles in county leadership and lead health and contamination management up to the present, the Madison County Commissioners, City of Fredericktown authorities, and the Madison County Health Department (MCHD) shall be the local management partners.

The MCHD shall manage the education and resources stated in the plan. As these resources are developed, other local VICP partners who would provide appropriate and efficient management of a specific resource may take on a management role in place of or in partnership with the MCHD. The Madison County Commissioners, City of Fredericktown, and the MCHD in cooperation with other VICP partners, as they develop, have the responsibility of changing the VICP to fit the needs of Madison County residents as science and management practices evolve.

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Management Responsibilities

As the present partner responsible for management of the Voluntary Institutional Control Plan (VICP), the Madison County Health Department (MCHD) will work together with county residents, businesses, schools, and other public and private parties; the local governments; the State of Missouri; and the United States Environmental Protection Agency (EPA) to manage contaminants within Madison County, Missouri. Specific management responsibilities include:

1. Developing, with the assistance of residents, local professionals, city and public utilities representatives, County and State officials, and EPA; educational materials regarding contamination management (including instructions regarding the implementation of barriers and other contaminant management best practices), lead health information, historical impact of lead to the County, and best practices for public health and contamination management;

2. Training contractors, utility personnel, and government entities which may disrupt or install barriers or otherwise disturb contaminants about excavation best practices;

3. Adopting contamination management best practices;

4. Adopting barrier construction and maintenance best practices;

5. Educating county residents and professionals about existing transportation and disposal regulations;

6. Providing educational materials for promotion and dissemination to citizens about the VICP and best practices including businesses, bankers, realtors,

and other land transaction professionals who may be involved in land transfers and land development as VICP partners;

7. Adopting an evaluation procedure for VICP modifications based on the latest science, legal statutes, and management practices.

Additional Provisions

In order to assist those engaging in the Voluntary Institutional Control Plan (VICP), it is the intent of the Madison County Health Department (MCHD) to provide either as a sole agency or in cooperation with other local agencies, as needed:

1. Technical assistance, including Dig Rite program and soil screening;

2. Lead poisoning prevention and intervention activities;

3. A readily available repository for contaminated soil;

4. Clean fill to restore barriers for small projects;

5. Disposal containers to assist in removing contaminated soil from small projects and to assist in the transportation and disposal of such soil;

6. Educational materials for promotion and dissemination to county residents, businesses, and other public and private parties;

7. Education and training in the appropriate implementation of the VICP for professional VICP partners;

8. A database tracking system to assist the public, lenders, and potential purchasers of property within the county;

9. Guidelines for managing contaminants.

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	SECTION: 1.7
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FUNDING OF OUR PLAN

Funding from outside the county, as Madison County does not have the funds to fully support the Voluntary Institutional Control Plan (VICP), is also necessary for our plan to succeed. Funding as contracted between the State of Missouri and the United States Environmental Protection Agency (EPA) will be shared between the two—the EPA funding the Madison County Superfund Site until remediation efforts are complete and the State of Missouri funding the site afterward. As the State of Missouri may not have the budget required to fund the VICP in perpetuity, other outside funding sources are being explored.

SUBJECT: VICP Implementation and Maintenance	PART: Administrative Framework SECTION: 1.8
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VICP IMPLEMENTATION & MAINTENANCE

It is the intent of the Madison County Health Department (MCHD) to procure funding for and then provide the following resources to support lead contaminant management in Madison County. As funding for the items is procured, each resource will be developed with the standards listed below:

1. **Establishment and Management of a Permanent Records Library—**A permanent library for property records, educational materials, and public relations information will be established. This site will house all property records for Madison County. In addition to the basic property information, the records will contain information pertaining to testing and soil cleanup activities in Madison County such as:
    a. Areas of property that were remediated;
    b. Areas of property that were tested but have not been remediated;
    c. Depth of satisfactory soil;
    d. Barriers used to separate satisfactory soil from contaminated soil;
    e. Levels of lead in satisfactory, remediated, and unclean areas;
    f. New areas of property development and management records.

    All records will be computerized for easy access. Educational material and public relations material relating to the Superfund cleanup activities will also be housed at the site.

2. **Establishment and Management of Contaminant Management Addition to "Dig Rite" Program—**The permanent records library will also manage a digging/identification program that connects with the Dig-Rite underground identification program. Specific services of this program will include:
    a. Connection with Dig-Rite /Missouri One Call (underground identification) program;

b. MCHD personnel available to mark areas of property including: barriers, remediated versus unclean areas and potential sampling areas;
c. XRF screening of property at resident request (Specific services this program **WILL NOT** provide include soil sampling and laboratory analysis. Soil sampling and analysis will be conducted by EPA representative or private company and a certified laboratory. It should be noted that XRF soil screening is a preliminary process to determine if lead contamination is present and if additional testing or analysis is needed. Soil sampling and analysis is a detailed testing of soil to determine the extent of lead contamination and depths of the contamination);
d. Education about soil disturbance guidelines and hauling regulations.

3. **Establishment and Management of Permanent Soil Repository Sites--** Permanent repositories for contaminated soil will be established as needed. The site(s) will be the repository for contaminated soil in Madison County. The MCHD will be the contact for those needing location, directions, and best practices information regarding the repository site currently being used. Contaminated soil removed from construction projects; property owner's land usage; and city, county, state, and/or federal projects will be transported using federal and state guidelines to the appropriate repository site. The site(s) will have controls and procedures to encourage appropriate use of site and transportation of soil that may include: Educational guidelines pertaining to the appropriate uses for the site and transportation regulations housed at the Madison County Health Department (MCHD) and distributed to individuals and entities deemed beneficial in encouraging appropriate use of repository and transportation of contaminated soil, controlled site access by some combination of fencing and/or signs warning against soil removal for fill and dumping without the use of appropriate controls around the perimeter, and an area for appropriate decontamination of vehicles, tools, and personnel.

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4. **Purchase and Maintenance of Soil Removal and Transportation Equipment--** Equipment for removal and transportation use for small to medium size individual property owner projects may be purchased and maintained by the MCHD. If purchased, equipment for transportation use and small projects would be housed at the discretion of the MCHD and encouraged for public use when removing and transporting contaminated soil. Types of equipment available could include a truck, a small trailer, shovels, and disposal containers.

5. **Purchase and Maintenance of Clean Fill Soil--**The property or the access and use of property containing clean fill or access to clean fill may be purchased and maintained by the MCHD. If purchased, the clean fill would be for individual property owner's use in small projects that are not professionally contracted. The public would be encouraged to use the fill which would be either free of charge or available at cost. If available, the free hauling equipment may be used to transport the clean fill. Education on the benefits of using clean fill and how to identify potentially contaminated fill may also be distributed and posted at the clean fill site.

6. **Promotion and Dissemination of Educational Materials--**The MCHD will promote and disseminate educational materials to encourage public engagement in and use of the Voluntary Institutional Control Plan (VICP). Educational materials and programs for the encouragement of lead contamination management may be promoted through local radio, newspapers, signs, leaflets or other means as the MCHD deems appropriate. Educational materials may be disseminated through pamphlets, computer applications, booklets, group instruction or other means as the MCHD deems appropriate.

7. **Establishment of a Soil Screening Program**--The MCHD will screen soil upon request of a property owner or if blood level testing suggests the potential for lead soil contamination. The MCHD will have available to them an XRF machine capable of screening for lead soil contamination. MCHD will employ at least one person certified to use the XRF machine

and screen for lead contaminants in the soil. Screenings will be free to Madison County residents. The screening results will indicate if there is a need for additional soil analysis. Additional soil testing and analysis would be through private companies at the expense of the property owner. All soil screening sampling and testing will be conducted using United States Environmental Protection Agency (EPA) approved methods.

8. **Access to Voluntary Institutional Control Plan (VICP) Information—** All Madison County, Missouri VICP information, including guidelines, educational materials and listing of support resources can be accessed at the Madison County Health Department (MCHD). If available, written materials can be inspected and copied at cost at the MCHD. Inquiries regarding the acquisition of contaminant management education materials and the use of support resources may be made to the MCHD. The MCHD address is 806 West College Avenue, Fredericktown, MO 63645-1308. The phone number is 573-783-2747.

SUBJECT: County Health Department's Role	PART: Administrative Framework
	SECTION: 1.9
REFERENCES	EFFECTIVE:
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COUNTY HEALTH DEPARTMENT'S ROLE IN VICP

At present, the Madison County Health Department manages the oversight of the institutional controls. The health department has created a digging assistance and education plan. The plan calls for county residents to call **1-800-Dig-Rite** before beginning **ANY** digging project, including, but not limited to, the digging of gas lines, telephone cables, electric cables, sewer lines, water lines, fiber optic cables, gardening, landscaping, post holes, mailbox holes, sidewalks, driveways, and foundations. Calling 72 hours (three working days—Monday through Friday) before starting a project ensures that a request will be made for a County Health Department representative to discuss VICP information relative to the property and the digging project.

The representative can also visit the property, screen soil for lead levels, show any remediation and/or previously labeled digging included on the EPA database map, mark site conditions, and discuss the best practices appropriate for use with your project. Furthermore, the representative can also direct you to the current repository site, explain hauling regulations, and discuss clean fill and barrier options. The representative can also answer questions regarding soil conditions and use of best practices.

Lastly, the representative can revisit the property after the project is finished to screen any remaining soil that should be hauled to the county repository and update the digging project area on the EPA database map (and the resident's copy) so property information is accurate.

SUBJECT: Terms and Definitions	PART: Administrative Framework
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TERMS & DEFINITIONS

The list below contains the terms and definitions used throughout our contamination management guidelines as it applies to the VICP. These terms and definitions are intended to assist residents and all those working on soil disturbance and removal activities in understanding the methods which will prevent lead contamination, exposure, and migration in their activities. Any questions concerning a term, definition, or their use in a guideline or educational material may be directed to the Madison County Health Department (MCHD) at 573-783-2747.

1. **Agricultural/Wooded Parcels:** Any parcel of land in Madison County outside of city limits that is not within 100 feet of a dwelling or does not have a commercial business located on it.

2. **Barrier:** Any structure, material, or mechanism which physically separates satisfactory soil from contaminated soil or chat and breaks the pathway of exposure to humans. This includes walls, floors, ceilings, clean soil, asphalt, concrete, fences, or other structures intended to prevent access and exposure to contaminants by humans.

3. **Best Practices:** An activity involving soil disturbance, including excavation, building development, construction, renovation, and grading; contaminant transportation, including soil and chat; and land usage, including agriculture and recreation; which manages contamination migration and/or limits human exposure to contaminants in the air, soil and water.

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4. **Breaching:** A break, rupture, opening, or penetration of soil or protective barriers which may expose contaminants to humans or to the environment.

5. **Building Renovation:** Construction activity to be performed on any structure involving disturbance of soil.

6. **Clean Fill:** Soil containing less than 240 parts per million (ppm) lead, 22ppm arsenic, 25ppm cadmium, and 1800ppm manganese used as an earthen materials barrier.

7. **Commercial Property**: Any land in Madison County that has a commercial building, which is not being used as a residence, located on it.

8. **Contaminants:** A contaminant is an unwanted substance in the environment. Lead is the dominant contaminant in Madison County. Soil containing lead in excess of 400 ppm is considered contaminated due to its harmful effect on human health.

9. **Contaminated Soil**: Soil containing over 400 ppm, but less than 1500 ppm lead. This soil is considered to contain lead levels which could pose a risk to human health, but is not considered hazardous waste for the purposes of hauling within Madison County.

10. **County Repository Site:** A designated area that is maintained by the county for citizens to use to dispose of lead contaminated soil.

11. **Developers of Property in Madison County:** Any person, partnership, or corporation developing property within the boundaries of Madison County, Missouri.

12. **Disposal:** The placement of contaminated media into an authorized permanent repository.

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13. **Disturbance:** A physical change to soil or other protective barrier due to excavation, construction, renovation, removal, and/or transportation activities which may expose contaminants to humans or to the environment.

14. **EPA:** The United States Environmental Protection Agency.

15. **Excavation:** Any means of digging or disturbing soil or other protective barriers capable of resulting in exposing contaminations to humans, the environment, or spreading contamination to other locations.

16. **Hazardous Soil**: Soil containing 1500 ppm or more of lead and is considered hazardous waste for the purpose of disposal and transport within Madison County unless additional testing is conducted per DNR regulations and determines otherwise.

17. **Large Project:** A project that involves the displacement of more than one cubic yard of material (approximately three large wheel barrels full) at an individual residential property or one individual building with multiple residential dwellings and property. Large projects include, but are not limited to, new building construction, demolition of existing buildings, construction of planned unit developments (and the infrastructure necessary to serve them), and construction within and maintenance of rights-of-way.

18. **Madison County Mines Superfund Site:** Madison County in it's entirety is designated a Superfund Site.

19. **MCHD:** Madison County Health Department.

20. **Multiple Building Development/Renovation Projects** – a project that includes more than one building or multiple residence dwellings development or renovation, multiple building developments and renovations, and utility work covering multiple properties. Multiple Building Development/Renovation Projects can include, but are not limited to, construction of a multiple building senior citizen complex, renovation of a

multiple building apartment complex, burying of fiber optic cable across multiple properties.

21. **ppm:** Parts per million (measurement of metals in soil). Equivalent to milligrams per kilogram or mg/kg.

22. **Property Owner:** Any person, partnership, or corporation having ownership, title, or dominion over property within the boundaries of Madison County, Missouri.

23. **Recreational Area** – Any land in Madison County that has been developed as a place of leisure or entertainment and has the potential of being frequently visited by children or large groups of people. Examples include ball parks, playgrounds, and outdoor theaters

24. **Repository:** Area designated as a permanent authorized location for disposal of contaminated soil and mine waste.

25. **Residential Property:** Any land in Madison County that is within a one hundred (100) feet perimeter of a dwelling or multiple family dwelling, public high use areas, and child high use areas including, but not limited to, daycares, schools, parks, recreation grounds, and sports fields.

26. **Satisfactory Soil**: Soil containing 400 ppm or less. This soil is not considered to contain lead levels that would affect human health.

27. **Small Project:** A project that involves the disturbance or removal of contaminated soil less than or equal to one cubic yard (approximately the amount of soil to fill three large wheel-barrows).

28. **Temporary Demarcation Barrier:** Any physical structure, material or mechanism which visually separates the pathway between contaminants and humans. These are present in the subsurface at EPA remediated residential properties where contaminated soil still remains at depth beneath clean fill

and topsoil (typically 1 to 2 feet beneath the ground surface). Demarcation barriers may be plastic sheeting, wooden sheeting, or other barriers deemed suitable by the Madison County Health Department (MCHD).

29. **VICP:** The Voluntary Institutional Controls Plan for Madison County, Missouri .

SUBJECT: Cover Page	PART: Best Practices SECTION: 2.0
REFERENCES	EFFECTIVE: Revisions: October 2013

Madison County Voluntary Institutional Controls Manual

Section 2 Best Practices

SUBJECT: Best Practices	PART: Best Practices SECTION: 2.1
REFERENCES	EFFECTIVE: Revisions: October 2013

GENERAL BEST PRACTICES ADOPTED FOR USE IN MADISON COUNTY

The best practices described in this manual are intended to assist residents and all those working on soil disturbance and removal activities to lessen contaminant migration.

Use of best practices will enable Madison County residents, property owners, and developers of property in Madison County to both manage the migration of contaminants on their own property and the migration of contaminants onto adjacent property.

Any questions concerning a standard or its specific application may be directed to the Madison County Health Department (MCHD) at 573-783-2747.

SUBJECT: What I need to know about Digging	PART: Best Practices SECTION: 2.2
REFERENCES	EFFECTIVE: Revisions: January 2014

WHAT DO I NEED TO KNOW ABOUT DIGGING ON A RESIDENTIAL PROPERTY IN MADISON COUNTY?

If you dig on a residential property in Madison County, including your own, you are responsible for managing the soil in a way that does not spread lead contamination. Whenever a hole is dug, soil is moved and lead contamination has the potential for spreading onto either non-contaminated portions of the land or previously remediated property. The lead contamination could also potentially migrate onto another property.

The United States Environmental Protection Agency (EPA) will **NOT** come in and remediate property that has been re-contaminated after they cleaned it up the first time. Instead, property clean up will become the responsibility of the property owner and potentially the responsibility of any individual or company who commercially participated in the digging and/or hauling and disposal of the contaminated soil.

By following a series of steps called "best practices" outlined in this manual, you will minimize your potential for spreading lead contamination when digging, hauling, and disposing of soil in Madison County. A list of terms and definitions helpful to understanding the language used in the "best practices" is provided in Section 1.10 of this manual.

SUBJECT: Process Before Digging	PART: Best Practices SECTION: 2.3
REFERENCES	EFFECTIVE: Revisions: January 2014

PROCESS BEFORE DIGGING

Call **1-800-Dig-Rite** (1-800-344-7483) before you begin **ANY** digging project, including, but not limited to, the digging of gas lines, telephone cables, electric cables, sewer lines, water lines, fiber optic cables, gardening, landscaping, post holes, mailbox holes, sidewalks, driveways, and foundations. Call 1-800-Dig-Rite 72 hours (three working days—Monday through Friday) before the start of the digging project or soil disturbance action.

Upon calling 1-800-DIG-RITE, a request will be made for a Madison County Health Department (MCHD) representative to contact you and discuss Voluntary Institutional Controls Plan (VICP) information relative to the property and the digging project.

The representative can screen soil for lead levels, show any remediation and/or previously labeled digging included in the United States Environmental Protection Agency (EPA) data base map, and discuss the best practices appropriate for use with your project. The representative can also answer questions you may have regarding soil conditions and use of best practices. Furthermore, the representative can also direct you to the current repository site, explain hauling regulations, and discuss clean fill and barrier options.

After the project is finished, the representative can revisit the property to screen any remaining soil and recommend best disposal practices, mark the digging project area on your copy of the property record and update the EPA data base map, so your property information is accurate. Dig Rite phone lines are open 24 hours a day, every day of the week.

Call 1-800-DIG-RITE <u>before</u> digging!

SUBJECT: Established Standards	PART: Best Practices SECTION: 2.4
REFERENCES	EFFECTIVE: Revisions: January 2014

MADISON COUNTY ESTABLISHED STANDARDS

The EPA and Missouri Department of Health and Senior Services (MDHSS) have determined cleanup goals and standards of soil lead contamination specific to Madison County. The best practices contained in this manual are based upon these standards. The soil lead standards vary depending upon the type of property. Therefore, it is important to first understand the definitions of each property type. Property types are defined as follows:

1. **Residential Property** - Any land in Madison County that is within one hundred (100) foot perimeter of a dwelling or multiple family dwelling, public high use areas, and child high use areas including, but not limited to, daycares, schools, parks, recreation grounds, and sports fields.
2. **Recreational Area** – Any land in Madison County that has been developed as a place of leisure or entertainment and has the potential of being frequently visited by children or large groups of people (ball parks, playgrounds, etc).
3. **Commercial Property** – Any land in Madison County that has a commercial building that is not being used as a residence located on it.
4. **Agricultural/Wooded Property** – Any parcel of land in Madison County outside the city limits that is not within 100 feet of a dwelling or does not have a commercial business located on it.

The Madison County VICP will use the following standards pertaining to soil lead levels:

1. Soil containing over 400 part per million (ppm) of lead in residential areas, developed recreational areas, and/or properties with high child activity will be considered a high lead level and will have recommended special guidelines for soil disturbances.

SUBJECT:	PART: Best Practices
Established Standards	SECTION: 2.4
REFERENCES	EFFECTIVE:
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2. 1200 parts per million (ppm) or over of soil lead content in nonresidential areas and commercial properties will be considered a high lead level and will have special guidelines for soil disturbances.
3. Land used for agricultural purposes within Madison County is exempt from the VICP guidelines unless activity occurs on the land, such as soil transport off the site that is likely to result in the release or migration of lead contamination to other properties.
4. 240 parts per million (ppm) or less is the recommended safe lead content for clean fill or materials used for barrier construction.
5. Soil containing 1500 parts per million (ppm) of lead or greater is considered hazardous waste and DNR standards are required.

The following terms will be used to describe soil types pertaining to lead content throughout this manual:

1. **Satisfactory Soil**: Soil containing 400 ppm or less. This soil is not considered to contain lead levels that would affect human health.
2. **Contaminated Soil**: Soil containing over 400 ppm, but less than 1500 ppm lead. This soil is considered to contain lead levels which could pose a risk to human health, but is not considered hazardous waste for the purposes of hauling within Madison County.
3. **Hazardous Soil**: Soil containing 1500 ppm or more of lead and is considered hazardous waste for the purpose of disposal and transport within Madison County unless additional testing is conducted per DNR regulations and determines otherwise.
4. **Clean Fill**: Soil containing less than 240 parts per million (ppm) lead used as an earthen materials barrier. If your property was remediated by EPA, clean fill was used to replace contaminated/hazardous soil within one to two feet of the surface.

SUBJECT: Established Standards	PART: Best Practices SECTION: 2.4
REFERENCES	EFFECTIVE: Revisions: January 2014

*This manual only contains information regarding soil lead concentrations and does not include information or hazards of additional element contamination such as arsenic, manganese, or cadmium.

*The best practices contained in this manual were primarily written for residential properties; however, they can also be applied to digging, hauling, and disposal of soil for commercial and agricultural properties. If digging, hauling, or disposing of soil from commercial or agricultural property, it may be helpful to consult with DNR at 573-840-9750 or EPA at 913-551-7603.

SUBJECT: Property Types/Soil Conditions	PART: Best Practices SECTION: 2.5
REFERENCES	EFFECTIVE: Revisions: January 2014

PROPERTY TYPES/SOIL CONDITIONS

There are five basic property types or soil conditions that could be found at Madison County residential properties. Before starting a soil disturbance project, a property owner/contractor should make sure he/she knows the property type, so the appropriate best practices can be followed. The five property types are as follows:

1. Soil tested and determined to contain satisfactory lead levels (400 ppm or less lead)
2. Soil that has been remediated (cleaned up by EPA) and and is not considered contaminated or hazardous
3. Soil that had been remediated down to one to two feet and then had a visual demarcation barrier placed between clean fill and the soil known to be contaminated or hazardous
4. Soil that has not been remediated but has been sampled and tested and is known to be contaminated or hazardous.
5. Soil that has not been tested and lead concentrations are unknown

How to know what property type exists at the location of the soil disturbance/project

A database exists that contains soil conditions of all properties sampled, tested, and remediated by the EPA. EPA should have also supplied the property owner, at the time, with a record of property conditions if the property was sampled, tested, and/or remediated. The VICP representative at the Madison County Health Department can access the EPA database and inform you of areas tested, not tested, and/or remediated at your project site.

SUBJECT: Property Types/Soil Conditions	PART: Best Practices SECTION: 2.5
REFERENCES	EFFECTIVE: Revisions: January 2014

If the property has not been sampled and/or remediated by EPA, there will be no record or database entry. If this is the case, soil screening is needed to determine the condition of the soil at the soil disturbance site. The VICP program representative at the Madison County Health Department can also assist you in determining if screening is necessary and the screening process. To contact the VICP program representative call 573-783-2747.

SUBJECT: Definitions of Project Size	PART: Best Practices SECTION: 2.6
REFERENCES	EFFECTIVE: Revisions: January 2014

DEFINITIONS OF PROJECT SIZE

The best practices for soil disturbances vary depending on the planned size of soil disturbance being created. Before starting a digging project, first call 1-800-DIG-RITE and then determine the site soil conditions (Section 2.5) and determine the size of the soil disturbance or project. Soil disturbances can be classified by size as follows:

1. **Small Projects** – a project that displaces no more than one cubic yard of soil (about three large wheelbarrow loads). Some examples of small projects are post-hole digging, planting a tree or bush, small gardening projects, installing children's play equipment, and digging a mailbox post hole.
2. **Large Projects** – a project that involves one individual residential property or one individual building with multiple residential dwellings and property that displaces more than one cubic yard of soil (approximately three large wheelbarrow loads) Some examples of large projects include, but are not limited to, putting in or replacing a driveway, building a new residence, demolition of an existing structure, renovations that include excavation work, excavation work on utilities such as sewers.
3. **Multiple Building Development and/or Renovation Projects** – projects that include more than one building or multiple-residence dwellings development or renovation, multiple building development and renovations, and utility work covering multiple properties. Some examples of multiple building development and/or renovation projects include, but are not limited to, the construction of a multiple building senior housing, excavation and renovation of a multiple building apartment complex, and installation of utilities across multiple properties.

Once the project size and property type is determined, this manual can assist you in determining the best practices to use for your specific project. If further assistance

SUBJECT:	PART: Best Practices
Definitions of Project Size	SECTION: 2.6
REFERENCES	EFFECTIVE:
	Revisions: January 2014

is needed or questions arise, you can call the Madison County Health Department at 573-783-2747 and the VICP program representative can assist you.

SUBJECT: Best Practices for Properties Tested and Determined Satisfactory	PART: Best Practices SECTION: 2.7
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR PROPERTIES TESTED AND DETERMINED SATISFACTORY (400 PPM OR LESS OF LEAD CONTENT IN RESIDENTIAL AREAS)

The following practices should be used when there is confirmation that the project site has already been tested and determined to contain a satisfactory soil lead content (at or less than 400 ppm in a residential area):

1. No additional best practices are needed for small or large projects as long as the following conditions are met:
    a. The soil disturbance site is within a 100 foot radius of the residence located on the property. If the project site is located beyond a 100 foot radius of the residence on the property, it may not have been tested for lead content. Please refer to Section 2.12 for best practices.
    b. The soil disturbance site will not affect material beneath or immediately adjacent to an existing cap barrier such as sidewalk, driveway, foundation, or landscaped area that was not removed during remediation efforts. If the soil disturbance does affect untested material below or adjacent to a cap barrier, please refer to Section 2.15 for best practices.
2. If the above conditions are met by your soil disturbance project, you are free to dig.
3. If additional soil is needed to fill a hole or for excavation, you should assure the soil fits the definition of "clean fill" (contains no more than 240 ppm lead). This will prevent contamination of the already known clean soil.
4. For multiple building development/renovation sites, you should work with an environmental contractor as practices vary depending on excavation methods and depths. If you are interested in learning more about federal and state licensing requirements for an environmental

contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.

SUBJECT: Best Practices for Remediated Properties	PART: Best Practices SECTION: 2.8
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR REMEDIATED PROPERTIES

The following practices should be used when a soil disturbance is occurring at a property that is already known to have been tested and remediated without any barriers or visual demarcations installed (the property has been cleaned and contains clean fill/ satisfactory lead levels):

1. No additional best practices are needed for small or large projects as long as the following conditions are met:
    a. The soil disturbance site is within a 100 foot radius of the residence located on the property. If the project site is located beyond a 100 foot radius of the residence on the property, please refer to Section 2.12 for best practices.
    b. The soil disturbance site will not affect material beneath or immediately adjacent to an existing cap barrier such as sidewalk, driveway, foundation, or landscaped area that was not removed during remediation efforts. If the soil disturbance does affect untested material below or adjacent to a cap barrier, please refer to Section 2.15 for best practices.
2. If the above conditions are met by your soil disturbance project, you are free to dig.
3. If additional soil is needed to fill a hole or for excavation, you should assure the soil fits the definition of "clean fill" (contains no more than 240 ppm lead). This will prevent contamination of the already known satisfactory/remediated soil.
4. For multiple building development/renovation sites, you should work with an environmental contractor as practices vary depending on excavation methods and depths. If you are interested in learning more about federal and state licensing requirements for an environmental contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.

SUBJECT:	PART: Best Practices
Best Practices for Properties Remediated with Visual Demarcation	SECTION: 2.9
REFERENCES	EFFECTIVE:
	Revisions: January 2014

BEST PRACTICES FOR PROPERTIES REMEDIATED WITH VISUAL DEMARCATION

The following practices should be used when a soil disturbance is occurring at a property that is already known to have been tested and remediated, but has contamination left beneath the clean fill or satisfactory soil and contains a visual demarcation to identify the contact zone. (The property has been remediated, but contains a visual demarcation between satisfactory and contaminated soil):

A. <u>For small or large digging projects</u>:

1. The following practices should be used when a soil disturbance is occurring on property that contains a visual demarcation. However, best practices from section 2.15 should also be applied if the soil disturbance site will affect untested materials beneath or immediately adjacent to an existing cap barrier such as sidewalk, driveway, foundation, or landscaped area.
2. Dig the clean fill or satisfactory soil, located above the visual demarcation, until the visual demarcation is reached.
3. The clean fill or satisfactory soil should be placed in a separate location and kept separately from the contaminated soil under the barrier.
4. After digging the satisfactory soil or clean fill, prepare to dig the contaminated/hazardous soil under visual demarcation. The following steps should be taken to prepare the site for temporary storage of the contaminated/hazardous soil:

    a. Identify an area of the property upon which the dug up contaminated soil will be temporarily stored. If soil is going to be hauled off site, the temporary storage area should be located within close proximity to the location where the soil will be loaded into the soil hauling vehicle.

SUBJECT:	PART: Best Practices
Best Practices for Properties Remediated with Visual Demarcation	SECTION: 2.9
REFERENCES	EFFECTIVE:
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   b. Place plastic sheeting over the area of ground where the contaminated/hazardous soil will be temporarily stored. Make sure the plastic sheeting covers an area large enough to store all the soil.
   c. If the soil needs to be stored overnight, for several days, or protected from weather elements such as wind or rain, it should be completely covered in plastic sheeting. Weighted material should also be used to push the sheeting down around the sides of the dirt pile. This will prevent weather elements from creating run-off or migration from the contaminated pile.

5. The contaminated soil can be dug and placed on the prepared plastic sheeting. The contaminated soil should not be mixed or stored with the clean fill or satisfactory soil.
6. If the hole is going to be filled back in, you should put the soil back in the hole in the same manner it was taken out. The contaminated soil should first be put back in the hole until the visual demarcation level is reached.
7. The visual demarcation should next be placed back on top of the contaminated soil. If degradation has occurred to the visual demarcation, it should be repaired to the original construction level.
8. If the visual demarcation needs to be completely or partially replaced, ensure that it is placed back into the precise location where the original demarcation was located. Any new materials used to repair or replace part of the original demarcation should be the same color as the remaining visual demarcation. Replacement visual demarcation barriers should be constructed with materials that will allow water to move and freely flow through it.
9. The satisfactory soil or clean fill then should be used last to finish filling the hole above the visual demarcation.
10. If additional soil is needed to fill the hole, it should meet the definition of clean fill (contain no more than 240 ppm lead).
11. If the contaminated/hazardous soil is not going to be reused to fill the hole, appropriate disposal practices should be used.
12. Please view Figure A below for additional detail.

SUBJECT:	PART: Best Practices
Best Practices for Properties Remediated with Visual Demarcation	SECTION: 2.9
REFERENCES	EFFECTIVE:
	Revisions: January 2014

B. For multiple building development and/or renovation projects:

1. Property owners should work with an environmental contractor as practices vary depending on excavation methods and depths.
2. If you are interested in learning more about federal and state certification requirements for an environmental contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.

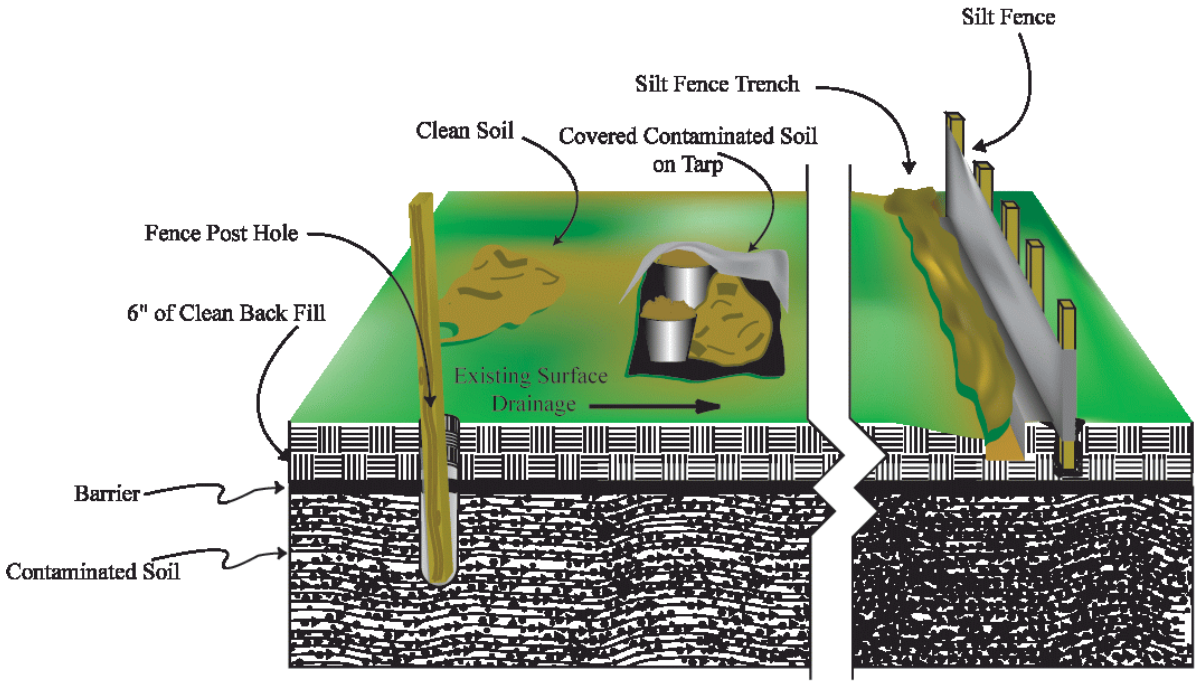

Figure A

SUBJECT:	PART: Best Practices
Best Practices for Properties Known to Contain High Soil Lead Levels with No Remediation	SECTION: 2.10
REFERENCES	EFFECTIVE:
	Revisions: January 2014

BEST PRACTICES FOR PROPERTIES KNOWN TO CONTAIN HIGH SOIL LEAD LEVELS WITH NO REMEDIATION

The following practices should be used when a soil disturbance is occurring at a property that is known to contain high soil lead concentrations, but has not been remediated (Residential property containing over 400 ppm of soil lead, but has not been cleaned):

A. For small and large projects:

1. You are allowed to dig the soil at the site, however, remember the soil is contaminated/hazardous.
2. The following steps should be taken to prepare the site for temporary storage of the contaminated/hazardous soil:

    a. Identify an area of the property upon which the dug up contaminated soil will be temporarily stored. Make sure the storage area is in a location that is also known to be contaminated and not in a satisfactory or remediated area. In order to minimize soil contamination, choose a soil storage area as near as possible to the site. If the soil is going to be hauled off site, the temporary storage site should also be located within close proximity to the location where the soil will be loaded into the soil hauling vehicle.
    b. If the soil needs to be stored overnight, for several days, or protected from weather elements such as wind or rain, it should be completely covered in plastic sheeting. Weighted material should also be used to push the sheeting down around the sides of the dirt pile. This will prevent weather elements from creating run-off or migration from the contaminated pile.

SUBJECT: Best Practices for Properties Known to Contain High Soil Lead Levels with No Remediation	PART: Best Practices SECTION: 2.10
REFERENCES	EFFECTIVE: Revisions: January 2014

3. The contaminated soil should not be mixed or stored with the satisfactory soil or clean fill.
4. The contaminated soil can be used and moved on site, but should not be moved to an area on the property that has already been remediated or determined satisfactory.
5. The freshly excavated soil, where the soil disturbance occurred, should be either seeded or covered with straw to prevent migration of contaminants off the property. You can be held responsible for any soil contamination that migrates off the property.
6. If the soil is going to be removed from the property, proper disposal techniques should be utilized.
7. After project completion, you are encouraged to contact the EPA and discuss remediation options.

B. <u>For Multiple Building Development and/or Renovation Sites</u>:

1. Property owners should work with an environmental contractor as practices vary depending on excavation methods and depths.
2. If you are interested in learning more about federal and state licensing requirements for an environmental contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.

SUBJECT: Best Practices for Properties Not Tested	PART: Best Practices SECTION: 2.11
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR PROPERTIES NOT TESTED

The following practices should be used when a soil disturbance will be occurring at a location not previously tested:

A. <u>For small and large projects</u>:

1. You are allowed to dig the soil at the site, however, the soil should be treated as if it is contaminated/hazardous.
2. The following steps should be taken to prepare the site for temporary storage of the dug soil:

    a. Identify an area of the property upon which the dug up soil will be temporarily stored. Make sure the storage area is not located in a known satisfactory or remediated area. If the soil is going to be hauled off site, the temporary storage area should also be located within close proximity to the location where the soil will be loaded into the soil hauling vehicle.
    b. If the soil needs to be stored overnight, for several days, or protected from weather elements such as wind or rain, it should be completely covered in plastic sheeting. Weighted material should also be used to push the sheeting down around the sides of the dirt pile. This will prevent weather elements from creating run-off or migration from the contaminated pile.

3. The soil should not be mixed or stored with the known clean fill or satisfactory soil.
4. The soil can be used and moved on site, but should not be moved to an area on the property that has already been remediated or determined satisfactory.
5. The freshly excavated soil, where the soil disturbance occurred, should be either seeded or covered with straw to prevent migration of

contaminants off the property. You can be held responsible for any soil contamination that migrates.

6. If the soil is going to be removed from the property, proper disposal techniques should be utilized. The soil should be treated as contaminated until it has been tested and verified. If screening of the soil is needed, contact the VICP program representative at the Madison County Health Department 573-783-2747.
7. After project completion, you are encouraged to call EPA at 913-551-7603 to discuss property testing and remediation if needed.

B. <u>For Multiple Building Development and/or Renovation Sites</u>:

1. You should work with an environmental contractor as practices vary depending on excavation methods and depths.
2. If you are interested in learning more about federal and state licensing requirements for an environmental contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.
3. If you are beginning a new development project on undeveloped land, you should contact the EPA at 913-551-7603.

SUBJECT: Best Practices for Soil Disturbances Located Over 100 Feet from Residence	PART: Best Practices SECTION: 2.12
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR SOIL DISTURBANCES LOCATED OVER 100 FEET FROM A RESIDENCE

The following practices should be used when a soil disturbance is occurring over 100 feet from a residence (EPA remediation efforts only extend 100' from a residence. Therefore, these locations are usually going to be untested).

A. <u>For small and large projects</u>:

1. You are allowed to dig the soil at the site; however, the soil should be treated as if it is contaminated/hazardous.
2. The following steps should be taken to prepare the site for temporary storage of the dug soil:

    a. Identify an area of the property upon which the dug up soil will be temporarily stored. Make sure the storage area is not located in a known satisfactory or remediated area. In order to minimize soil contamination, chose a storage area as near as possible to the dig site. If the soil is going to be hauled off site, the temporary storage area should also be located within close proximity to the location where the soil will be loaded into the soil hauling vehicle.
    b. If the soil needs to be stored overnight, for several days, or protected from weather elements such as wind or rain, it should be completely covered in plastic sheeting. Weighted material should also be used to push the sheeting down around the sides of the dirt pile. This will prevent weather elements from creating run-off or migration from the contaminated pile.

3. The soil should not be mixed or stored with the known clean fill or satisfactory soil.

SUBJECT:	PART: Best Practices
Best Practices for Soil Disturbances Located Over 100 Feet from Residence	SECTION: 2.12
REFERENCES	EFFECTIVE:
	Revisions: January 2014

4. The soil can be used and moved on site, but should not be moved to an area on the property that has already been remediated or determined satisfactory.
5. The freshly excavated soil, where the soil disturbance occurred, should be either seeded or covered with straw to prevent migration of contaminants off the property. You can be held responsible for any soil contamination that migrates.
6. If the soil is going to be removed from the property, proper disposal techniques should be utilized. The soil should be treated as contaminated until it has been tested and verified. If screening of the soil is needed, contact the VICP program representative at the Madison County Health Department 573-783-2747.
7. After project completion, you are encouraged to call EPA at 913-551-7603 to discuss property testing and remediation if needed.

B. <u>For Multiple Building Development and/or Renovation Sites</u>:

1. You should work with an environmental contractor as practices vary depending on excavation methods and depths.
2. If you are interested in learning more about federal and state licensing requirements for an environmental contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.
3. If you are beginning a new development project on undeveloped land, you should contact the EPA at 913-551-7603.

SUBJECT: Best Practices for New Development Projects	PART: Best Practices SECTION: 2.13
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR NEW DEVELOPMENT PROJECTS

The following practices should be applied when a new residential or a new multiple building development/renovation projects are being developed in an area that has not been previously identified as residential or developed:

A. <u>For small and large projects</u>:

1. You are allowed to dig the soil at the site; however, the soil should be treated as if it is contaminated/hazardous.
2. The following steps should be taken to prepare the site for temporary storage of the dug soil:

    a. Identify an area of the property upon which the dug up soil will be temporarily stored. Make sure the storage area is not located in a known satisfactory or remediated area. If the soil is going to be hauled off site, the temporary storage area should also be located within close proximity to the location where the soil will be loaded into the soil hauling vehicle.
    b. If the soil needs to be stored overnight, for several days, or protected from weather elements such as wind or rain, it should be completely covered in plastic sheeting. Weighted material should also be used to push the sheeting down around the sides of the dirt pile. This will prevent weather elements from creating run-off or migration from the contaminated pile.

3. The soil should not be mixed or stored with the known clean fill or satisfactory soil.
4. The soil can be used and moved on site, but should not be moved to an area on the property that has already been remediated or determined satisfactory.

5. The freshly excavated soil, where the soil disturbance occurred, should be either seeded or covered with straw to prevent migration of contaminants off the property. You can be held responsible for any soil contamination that migrates.
6. If the soil is going to be removed from the property, proper disposal techniques should be utilized. The soil should be treated as contaminated until it has been tested and verified. If screening of the soil is needed, contact the VICP program representative at the Madison County Health Department 573-783-2747.
7. After project completion, you are encouraged to call EPA at 913-551-7603 to discuss property testing and remediation if needed.

B. <u>For Multiple Building Development and/or Renovation Sites</u>:

1. You should work with an environmental contractor as practices vary depending on excavation methods and depths.
2. If you are interested in learning more about federal and state licensing requirements for an environmental contractor contact the Environmental Protection Agency at 913-551-7603 and/or Missouri Department of Natural Resources at 573-840-9750.
3. If you are beginning a new development project on undeveloped land, you should contact the EPA at 913-551-7603.

SUBJECT: Best Practices for Gardening Projects/Special Projects	PART: Best Practices SECTION: 2.14
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR GARDENING PROJECTS/SPECIAL PROJECTS

A. Gardening Areas

It is important to utilize the following practices when developing a garden area as lead contamination in a garden area has a potential for creating health risks. Some fruits and vegetables can absorb lead contained in soil. The lead then can be absorbed into the body when those fruits and vegetables are eaten. Children, pregnant women, and unborn children are at the highest risk for absorption of lead. The following practices should be utilized when developing a garden area:

1. If the garden area is located on property that has already been remediated by the EPA, it will be suitable for gardening with no further action needed.
2. If the garden area is located on property that has not been tested or remediated, it may not be suitable for gardening. You should use twenty-four inches of clean fill (240 ppm lead or less) to cover the gardening area before planting.
3. If you are unsure if the garden area property has been tested and/or remediated, you can contact the VICP program representative at the Madison County Health Department 573-783-2747.

B. Children's Sand/Dirt Play Areas

It is also important to include the following practices for children's play areas such as sand and dirt boxes as children are highly susceptible to lead contamination. The following are best practices recommended for children's sand/dirt play areas:

1. If the dirt/sand is part of or from an area remediated by the EPA, it will be suitable for children's play area.

SUBJECT: Best Practices for Gardening Projects/Special Projects	PART: Best Practices SECTION: 2.14
REFERENCES	EFFECTIVE: Revisions: January 2014

2. If the dirt/sand is not on or from an area remediated by the EPA, it may not be suitable for children. The recommended standard for children's dirt and sand play areas is 240 ppm or less lead content. If you need an area screened for lead content, you can call the VICP program representative at the Madison County Health Department 573-783-2747.
3. If you are purchasing new sand or dirt for a children's play area, make sure the quarry/seller can verify that it meets the definition of clean fill (less than 240 ppm lead).

SUBJECT: Best Practices for Working with Barriers	PART: Best Practices SECTION: 2.15
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR WORKING WITH BARRIERS

For purposes of the Madison County VICP, barriers are any physical structure, material, or mechanism which breaks the pathway between contaminated/hazardous soil and human exposure. Barriers can be permanent or temporarily put in place during construction activities. The primary purpose of a barrier is to prevent the migration of contaminated soil.

The following are some examples of materials that may be used as barriers:

1. Clean fill (240 ppm or less lead content)
2. Crushed Gravel (240 ppm or less lead content)
3. Asphalt
4. Concrete
5. Fences
6. Plastic Sheeting
7. Wooden Sheeting

Driveways, sidewalks, patios, and parking lots are considered barriers to soil contamination as the concrete or asphalt keeps the potentially contaminated soil from moving to the surface.

Barriers can be placed between contaminated/hazardous soil and satisfactory soil/clean fill or they can be used to cover or cap contaminated/hazardous soil. Either option will prevent the migration of contaminated soil.

The following practices should be followed when working with barriers:

1. Cap barriers, such as older concrete driveways or sidewalks, have a potential for containing lead contaminants within their own makeup. Therefore, it is important to take precautionary measures to prevent lead contamination at the site when degradation or replacement of a cap

barrier occurs. It may also be necessary to follow recommended disposal practices when replacement or destruction of a cap barrier occurs.

2. Maintain existing barriers. If degradation occurs during excavation or due to natural elements, repair the barrier to the original construction level sufficient to manage the migration of contamination.
3. Use temporary barriers during excavation or project construction (Ex: place contaminated/hazardous soil on plastic sheeting).
4. Cap barriers such as concrete and asphalt need maintenance and repair in case of degradation. If degradation occurs, the cap barrier should be repaired as needed to prevent contaminated/hazardous soil from breaching the surface.
5. If you are digging up a cap barrier such as a driveway, sidewalk, patio, or parking lot, the best practice to prevent soil lead contamination is to replace it with a new one. Remember the existing cap barrier itself could contain lead contaminants. The replacement driveway, sidewalk, patio, or parking lot, should cover the entire exposed area of the original cap barrier.
6. Areas under cap barriers such as sidewalks, driveways, and foundations were not tested by EPA during initial remediation efforts, therefore, these areas and exposed materials such as soil or chat could contain lead contamination. If the soil conditions are unknown after a barrier is dug up or the material beneath the dug up barrier remains exposed, it is recommended to have the exposed soil screened, contact the VICP program representative at the Madison County Health Department 573-783-2747.

SUBJECT: Best Practices for Proper Cleanup	PART: Best Practices SECTION: 2.16
REFERENCES	EFFECTIVE: Revisions: January 2014

BEST PRACTICES FOR PROPER CLEAN UP

Proper clean up after working in contaminated soil is important to prevent lead contamination from spreading into your home or migrating onto uncontaminated areas of your property or neighboring properties. Remember, you are responsible for any migrating soil contamination. The following practices should be used after digging or working in contaminated/hazardous soil:

1. If the soil exceeds 400 ppm lead, or if the concentration of lead in the soil is unknown, either reseed or place straw over the freshly excavated soil.
2. Dispose of containment materials, such as temporary barrier materials, in a covered trash receptacle.
3. Wash all tools to rid them of contaminated soil. Make sure not to wash the tools in an area that has been determined to be satisfactory or remediated.
4. Take off shoes before entering the inside of a residence. Shoes should then be washed or cleaned with a damp cloth.
5. Wash your hands and face or shower directly after entering a residence.
6. Wash your clothes separately from other clothes.

SUBJECT: Best Practices for Natural Disaster	PART: Best Practices SECTION: 2.17
REFERENCES	EFFECTIVE: Revisions: February 2014

BEST PRACTICES FOR NATURAL DISASTER

The devastation from a natural disaster can be overwhelming in many aspects. Natural disasters not only create physical damage, but can also spread or expose environmental contamination such as lead. For example, tornados, floods, and wind storms can cause potentially contaminated sediment to accumulate when wind or water displaces sand, silt, or soil. Fires can produce ash that contains lead. Fires, tornados, and floods can also expose foundations or chat that contains lead contaminants. Furthermore, debris from the disaster may also contain lead contaminants.

Every natural disaster poses its own unique challenges and potential for the spread of contaminants. Therefore, it is recommended that if you encounter damage or destruction from a natural disaster, such as tornado, wind storm, flood, or fire, you contact the Madison County Health Department's VICP program representative prior to clean up or recovery from the disaster for further direction and recommended best practices to prevent the migration of contaminants.

SUBJECT: Cover Page	PART: Disposal & Hauling SECTION: 3.0
REFERENCES	EFFECTIVE: Revisions: October 2013

Madison County Voluntary Institutional Controls Manual

Section 3 Disposal & Hauling

SUBJECT: Introduction and Definitions	PART: Disposal & Hauling SECTION: 3.1
REFERENCES	EFFECTIVE: Revisions: January 2014

DISPOSAL & HAULING

The Missouri Department of Natural Resources (DNR) regulates the hauling and disposal of contaminated soils. The DNR normally requires contaminated soil to be tested by a laboratory to determine if it is hazardous before it can be transported. However, DNR is permitting the use of an alternate testing option for Madison County. DNR is allowing soil in Madison County to be screened using an XRF for initial determination of soil lead concentrations. THIS ALLOWANCE ONLY APPLIES TO HAULING LEAD CONTAMINATED SOIL IN MADISON COUNTY. Therefore, Madison County residents can call the VICP program representative at the Madison County Health Department 573-783-2747 to have remaining project soil screened (if lead content is unknown) for disposal and hauling recommendations.

Any contaminated soil that it going to be transported off a dig site should be screened by the VICP program representative from the Madison County Health Department so the proper disposal and transport guidelines can be implemented. The VICP program representative will take samples of the remaining project soil and screen the soil by averaging three readings from an XRF.

Disposal practices for project soil vary depending upon the lead content of the soil. For disposal and hauling purposes, soil can be classified in three categories:

1. **Satisfactory Soil** – Soil containing 400 ppm or less lead. This soil is not considered to contain lead levels that would affect human health.
2. **Contaminated Soil** – Soil containing over 400 ppm lead but less than 1500 ppm lead. This soil is considered to contain lead levels which could pose a risk to human health, but is not considered hazardous waste for the purposes of hauling within Madison County.

SUBJECT: Introduction and Definitions	PART: Disposal & Hauling SECTION: 3.1
REFERENCES	EFFECTIVE: Revisions: January 2014

3. **Hazardous Soil** – Soil containing 1500 ppm lead or greater. This soil poses considerable risk to human health if ingested. Hazardous soil should only be hauled by a licensed hazardous waste hauler.

All Madison County soil containing more than 400 ppm lead that has been excavated **shall be** disposed of using Madison County Best Practices found in the Disposal and Hauling section of this manual.

The encouraged practice for disposal of all soil containing over 400 ppm lead is for it to be hauled to the Madison County repository site.

SUBJECT: Disposal and Hauling Practices for Satisfactory Soil	PART: Disposal & Hauling SECTION: 3.2
REFERENCES	EFFECTIVE: Revisions: January 2014

DISPOSAL & HAULING PRACTICES FOR SATISFACTOY SOIL

The following practices should be followed when disposing or transporting satisfactory soil. Satisfactory soil is defined as project soil containing 400 ppm or less lead that is not expected to affect human health.

1. Satisfactory soil can be used or stored at any location on the site.
2. Satisfactory soil can be transported without further recommendations or guidelines.
3. If satisfactory soil is mixed with contaminated and/or hazardous soil, it should be treated as contaminated or hazardous.

SUBJECT: Disposal and Hauling Practices for Contaminated Soil	PART: Disposal & Hauling SECTION: 3.3
REFERENCES	EFFECTIVE: Revisions: January 2014

DISPOSAL & HAULING PRACTICES FOR CONTAMINATED SOIL

The following practices should be followed when disposing or transporting contaminated soil. Contaminated soil is defined as project soil containing over 400 ppm lead, but less than 1500 ppm lead. This soil is considered to contain lead levels which could pose a risk to human health, but is not considered hazardous waste for the purposes of hauling and disposal within Madison County.

1. The recommended best practice for disposal of contaminated soil is for it to be hauled to the Madison County repository site.
2. Small Digging Projects – This is the only exception to hauling contaminated soil to the repository site, since the amount of soil left over from a small digging project will be minimal. You will be permitted to dispose of the contaminated soil on the originating property as long as the following conditions are met:

    a. The soil must be disposed in an area that remains contaminated at the surface.
    b. The disposal area is a minimum of 100’ away from a residence.
    c. You should be aware that you could be held responsible for any soil contamination migrating off the property.
    d. The disposed of soil should be either seeded or covered with straw to prevent the migration of contaminants off the property.

3. Small amounts of soil may be transported to the Madison County repository in buckets containing lids.

SUBJECT: Disposal and Hauling Practices for Contaminated Soil	PART: Disposal & Hauling SECTION: 3.3
REFERENCES	EFFECTIVE: Revisions: January 2014

4. Contaminated soil can also be transported to the repository using a pickup truck or other transport vehicle. The following practices should be followed when using a vehicle to haul contaminated soil:

    a. Only vehicles with a working tail gate or some other type of back end bed closure should be used to haul contaminated soil.
    b. After the contaminated soil is placed into the bed of the vehicle, the transporter should make sure to cover and secure the soil. This can be done by covering the contaminated soil with plastic sheeting. If the bed is not completely enclosed, the plastic sheeting should be either weighed down or tied to the sides of the bed to assure the contaminated soil does not become airborne during transport.
    c. After disposal of the soil, the transporter should thoroughly sweep out the remnant soil from the bed of the transport vehicle while still at the repository site.

5. Failure to follow these guideline could result in enforcement action by the DNR.

SUBJECT: Disposal & Hauling Practices For Hazardous Soil	PART: Disposal & Hauling SECTION: 3.4
REFERENCES	EFFECTIVE: Revisions: October 2013

DISPOSAL & HAULING PRACTICES FOR HAZARDOUS SOIL

The following practices should be used for the disposal and hauling of hazardous soil. Hazardous soil is defined as project soil containing at or over1500 ppm lead. This soil poses a considerable risk to human health if ingested.

1. Soil containing 1500 ppm or greater lead is considered hazardous waste for the purposes of disposal and hauling within Madison County unless additional testing is conducted per DNR regulations and it is determined otherwise.
2. A licensed hazardous waste hauler should be used to assure all applicable regulations in transportation and disposal of hazardous wastes are followed
3. Failure to follow the best practices for disposal and hauling or hazardous soil could result in enforcement action by the DNR.

SUBJECT: Contact Numbers	PART: Disposal & Hauling SECTION: 3.5
REFERENCES	EFFECTIVE: Revisions: June 2023

CONTACT NUMBERS

1. U.S. E.P.A. Region 7 Project Manager for Madison County:
   Brad Eaton—Office: 913-551-7265

2. Mo. Dept. of Natural Resources Project Manager for Madison County:
   Muhammad Hanif—Office: 573-751-1990

3. Mo. Dept. of Natural Resources Southeast Regional Office:
   Poplar Bluff, MO—Office 573-840-9750

4. Mo. Dept. of Natural Resources Hazardous Waste Program's Compliance and Enforcement Section:
   Regarding the transportation of hazardous waste: 573-751-7560

5. Madison County Health Department:
   Regarding roundtable information meeting schedule, lead health and safety information, or lead testing for children: 573-783-2747

6. The Southeast Regional Office of MDNR also has a website that lists compliance information and certified hazardous waste haulers (http://www.dnr.mo.gov/asp/hwp/transporter/trans-list.asp) This local site is different from the state DNR website.

SUBJECT: Cover Page	PART: Training Exam SECTION: 4.0
REFERENCES	EFFECTIVE: Revisions: October 2013

Madison County Voluntary Institutional Controls Manual

Section 4 Training Exam

SUBJECT: Training Exam	PART: Training Exam: Education for Professionals Engaged in Excavation, Hauling and Disposal of Lead Contaminated Soil
	SECTION: 4.1
REFERENCES	EFFECTIVE: October 1, 2012
	Revisions: January 2014

Madison County Voluntary Institutional Controls Professional Training Exam (Excavation, Hauling, and Disposal of Lead Contaminated Soil)

SECTION A:

MULTIPLE CHOICE: Circle the letter of the best response for each question.

1) The processing and smelting of lead in Madison County left MAJOR areas of elevated levels of lead and other heavy metals which we now know pose a threat to human health and the environment. The mine waste contaminated…
   a. soil
   b. sediment
   c. surface water
   d. groundwater
   e. all of the above

2) Much of the property in Madison County contains some lead contamination because…
   a. lead mining sites existed on all the land of Madison County
   b. lead waste was spread by natural modes of transportation (water, wind)
   c. lead waste was spread by human modes of transportation
   d. both b and c
   e. all of the above

3) In 2003, Madison County was named a Superfund site because of the following conditions…
   a. health department studies concluded that some children in Madison County had elevated levels of lead in their blood
   b. the presence of mine waste piles
   c. EPA conducted removal actions in Harmony Lake, Fredericktown, and in child-sensitive population areas
   d. water sampling determined that metals concentrations exceeded the Missouri Department of Natural Resources aquatic life standards

e. all of the above

4) Once EPA remediates Madison County's properties, EPA mandates that a management plan (usually called institutional controls) be put in place so that the land does not get re-contaminated. These plans…
   a. are based on local, state, and federal contamination management laws
   b. reflect the unique needs and requirements of Madison County
   c. focus only on digging and disposal of soil
   d. both a and b
   e. all of the above

5) The contamination management methods to be used as institutional controls are referred to as…
   a. Best Practices
   b. Ordinances
   c. Regulations
   d. both a and b
   e. all of the above

6) Madison County's contamination management plan is called the Voluntary Institutional Controls Plan or VICP. The word, "voluntary" in the title means…
   a. residents may choose to use the plan or not without any authoritative oversight by EPA and/or DNR
   b. there are no local ordinances overseeing the digging, hauling, and disposal of soil
   c. both a and b
   d. authoritative oversight from EPA and DNR exist regarding soil disturbance activities that re-contaminate remediated land
   e. both b and d

7) If you engage in excavation, hauling, and/or disposal activities in Madison County…

a. you are responsible for managing the soil in a way that does not spread lead contamination
b. you could be held accountable for future cleanup needed because of re-contamination from your activities
c. lead contaminated soil could migrate onto non-contaminated soil
d. both a and c
e. all of the above

8) The Madison County Health Department has created a digging assistance and education plan. The assistance call number for this plan is
a. 1-573-783-2747
b. 1-800-DIG-RITE
c. 1-800-HEALTHY
d. 1-913-551-7603
e. 1-800 DIG-SOIL

9) Once you have made the assistance call, the health department representative can…
a. screen soil for lead levels
b. show any remediation and/or previously labeled digging included on the EPA database map
c. discuss the best practices appropriate for use with your project
d. direct you to the current repository site
e. all of the above

10) According to the VICP, a "barrier" can be…
a. any physical structure, material or mechanism which breaks the pathway between contaminants and humans
b. concrete or asphalt
c. soil containing more than 240 ppm lead
d. both a and b
e. all of the above

11) One of the VICP resources is a soil repository site for use by county residents. The soil repository is used to…
   a. dispose of soil containing equal to or more than 240 ppm lead but less than 1500 ppm lead
   b. dispose of soil containing more than 400 ppm lead but less than 1500 ppm lead
   c. dispose of soil containing equal to or more than 1500 ppm lead
   d. dispose of soil containing any amount of lead
   e. both c and d

12) The following best practices should be used for soil containing less than 1500 ppm lead:
   a. soil should be disposed of at the repository during daylight hours
   b. the exterior of the hauling vehicle should be kept as free from soil as possible
   c. clothes worn during the hauling should be washed separately from other clothes
   d. both a and b
   e. all of the above

13) Based on sampling conducted in Madison County by the EPA, DNR is allowing testing using an XRF to make an initial determination of whether additional testing should be conducted.
   a. This allowance only applies to hauling lead contaminated soil in St. Francois and Madison Counties
   b. This allowance only applies to the State of Missouri
   c. This allowance only applies to Madison County
   d. This allowance only applies to lead testing in the United States
   e. This allowance only applies to Superfund sites with lead contamination

SUBJECT: Training Exam	PART: Training Exam: Education for Professionals Engaged in Excavation, Hauling and Disposal of Lead Contaminated Soil SECTION: 4.1
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

14) What level is considered hazardous waste according to DNR standards for hauling and disposal of soil?
   a. soil containing less than 1500 ppm lead"
   b. soil containing 1500 ppm or more lead
   c. soil containing less than 1200 ppm
   d. soil containing 1300 ppm lead
   e. none of the above"

15) If soil has high enough concentrations of lead to be defined as "hazardous waste", regulations state…
   a. the soil must be disposed of at the county soil repository
   b. a licensed hauler must haul and dispose of the soil
   c. records of the hauling should be filed with the health department
   d. both a and b
   e. all of the above

16) VICP best practices state that "satisfactory soil" that cannot fit back into the excavated site….
   a. can be left on the property
   b. should be disposed of at the county repository site
   c. can be mixed with contaminated soil and left on the property
   d. both a and c
   e. none of the above

17) VICP hauling best practices state that hauling vehicles should…
   a. should contain a working tailgate or backend closure
   b. should cover the soil so the soil cannot easily become airborne
   c. should be swept out at the repository site once soil has been dumped
   d. both a and b
   e. all of the above

18) VICP best practices state that in order to figure out what soil conditions exist on a remediated or previously developed property you should…
a. test the soil for lead contamination and report your findings to the health department
b. call EPA for property information
c. call 1-800-DIG RITE
d. call DNR for a site inspection
e. none of the above

19) In order to prepare a small projects excavation site for the digging and temporary storage of contaminated soil, VICP best practices state you should…
a. identify the area of property upon which the dug up contaminated soil will be temporarily stored
b. place plastic sheeting over the storage area or use other suitable temporary barrier for storage
c. enclose the excavation and storage area with a temporary fence
d. both a and b
e. all of the above

20) An orange mesh barrier located approximately two feet under the soil is the sign that…
a. soil containing lead that is considered contaminated with lead lies below it
b. soil with less than 400 ppm lead lies below it
c. you are free to dig without using any best practices below it
d. both b and c
e. both a and c

21) The definition, "Soil containing less than 240 parts per million (ppm) lead, refers to which term?

a. hazardous soil
b. clean fill
c. contaminated soil
d. barrier
e. satisfactory soil

22) After any project, the EPA database map should be updated with the following information…
a. specific location and depth of project
b. date project occurred
c. names of all employees working on the project
d. both a and b
e. all of the above

23) Since hazardous waste issues can be larger and more complex when working on sites containing multiple buildings VICP best practices recommend…
a. only professional contractors work on them
b. only companies licensed to handle and/or haul "hazardous waste" work on them
c. only contractors residing in Madison County work on them
d. only companies who have participated in the VICP professional training work on them
e. none of the above

24) The definition,"Soil containing over 400 ppm, but less than 1500 ppm lead. This soil is considered to contain lead levels which could pose a risk to human health, but is not considered hazardous waste for the purposes of hauling within Madison County" refers to what term?
"

a. clean fill
b. contaminated soil
c. barrier
d. satisfactory soil
e. none of the above

SECTION B:

TRUE/FALSE: For each of the following statements, answer True or False.

1) VICP hauling best practices state, if transporting small amounts of soil (a few buckets worth) containing less than 1500 ppm lead, buckets covered with lids may be used.

2) If hauling contaminated soil in a pickup, best practices state that the truck should have a tailgate or enclosed back end and that the soil should be covered to lessen the opportunity for the soil to become airborne.

3) "Clean fill" is defined in the VICP as soil containing less than 400 ppm lead, 22 ppm arsenic, 25 ppm cadmium, and 1800 ppm manganese.

4) "Large Project" is defined in the VICP as a project that involves one individual residential property or one individual building with multiple residential dwellings and property and that displaces less than one cubic yard of soil.

5) Residential property is defined as, "Any land in Madison County that is within a one hundred foot perimeter of a dwelling or multiple family dwelling, public high use areas, and child high use areas.

6) Soil that has been found to contain no more than 400 ppm lead is not considered "contaminated" nor considered "hazardous".

7) If you are working on either a small or large project and the soil tests under 400 ppm lead, you are free to dig without using any other best practices as long as the disturbance site is within 100 foot of the residence on the property and does not disturb an area near a cap barrier.

8) If a large project dig site has contaminated soil on the surface, whatever contaminated soil remains can be left at the dig site as it is a location that contains surface contamination.

9) No matter its size, any property public high use area in Madison County is considered "residential " property relative to the VICP.

10) The Madison County Superfund Site is comprised of only the northern portions of the county as this is the area where most of the metals mining operations took place.

SECTION C:

SUBJECT:	PART: Training Exam: Education for Professionals Engaged in Excavation, Hauling and Disposal of Lead Contaminated Soil
Training Exam	SECTION: 4.1
REFERENCES	EFFECTIVE: October 1, 2012
	Revisions: January 2014

SHORT ANSWER: Fill in the information for the following two questions regarding the digging and backfilling best practices for project sites that have a visual demarcation two feet under the soil.

1. Explain the steps to digging in a location that contains a visual demarcation two feet under the soil. Make sure you mention the visual demarcation, satisfactory soil, and contaminated soil.

2. Explain the steps to backfilling in a location that contains a visual demarcation two feet under the soil. Make sure you mention the visual demarcation, satisfactory soil, and contaminated soil.

SUBJECT: Cover Page	PART: Education for School Children SECTION: 5.0
REFERENCES	EFFECTIVE: Revisions: October 2013

Madison County Voluntary Institutional Controls Manual

Section 5 Education for School Children

SUBJECT: Lead Health and Safety Education Program	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.1
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

Voluntary Institutional Controls Education for School Children-- Lead Health and Safety Education Program

General District Proposed Framework:
Intermediate Level—Lead education based on a science perspective
Middle and High School Levels—Lead education based on a historical perspective

A lead health and safety curriculum specific to Madison County, Missouri has been developed for the intermediate level of school. This curriculum provides lead health and safety information and lead health and safety experiments for instructors to use with appropriate science units. This curriculum provides instructors with local resources to teach state-mandated curriculum while also providing the school-aged children with lead health and safety information crucial to the success of the Voluntary Institutional Controls Plan. The curriculum is included in the VICP manual, and copies have been provided to the appropriate instructors within the county school districts.

A lead history resource manual has been developed for use at both the middle and high school levels. This resource manual provides news articles, academic reports, government files, and personal accounts gathered locally from the Madison County Historical Society. The educational resources give instructors information local to Madison County's lead history that they can use in partnership with the state-mandated curriculum. These individual pieces have been bound in a resource manual and provided to the appropriate instructors within the county school districts. The manual is not included in the VICP; however, a copy has been provided to the Madison County Health Department.

SUBJECT: Madison County Lead Health and Safety Science Curriculum Introduction and Listing of Resources	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.2
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

Madison County Lead Health and Safety Science Curriculum

Curriculum Introduction and Listing of Resources

The Madison County Health Department has created a lead health and safety education program to work in partnership with the Voluntary Institutional Controls Plan (VICP) for Madison County, MO. This lead health and safety program consists of two levels of education: lead health and safety science materials for the intermediate and middle school levels, and a local lead history resource manual for the middle high school levels. For additional copies of these materials or to learn more about the VICP, please contact the Madison County Health Department at 573-783-2747.

The following resources are included as the lead science materials:

1) One manual of lead health information for teachers to present to students.
2) One rock and lead kit—this kit has different types of rocks important to the area and several forms of lead. (different ages of granite, LaMotte sandstone, transitional rock--both granite and sedimentary rock fused together, soil with chat mixed in, rock with lead and other minerals).
3) Instruction and materials list for two separate experiments:
   A) The first experiment shows the difference between lead encased in rock and the waste form, chat, and is designed to heighten awareness of soil that is defined as “hazardous” to dig in versus soil that is not defined as “hazardous” to dig in.
   B) The second experiment showcases best practices for digging in leaded soil which can lead to safer digging and cleanup activities at home.

SUBJECT: Madison County Lead Health and Safety Science Curriculum Lead Science	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.3
REFERENCES	EFFECTIVE: Revisions:

Lead Science Information Manual

Geological Information Pertaining to Madison County and the "Old Lead Belt":

The St. Francois Mountains

The St. Francois Mountains are the highest and oldest rock formations contained in Missouri. The average mountain "knobs" rise to elevations between 1300-1600 feet. The highest, Taum Sauk (1772 feet), is Missouri's highest mountain.
The granite forming the St. Francois Mountains is approximately 1.5 billion years old. The granite was formed during a volcanic period of geologic activity. It was formed in a three-phase process of eruption, displacement, and compaction. Four major eruption centers have been identified: Taum Sauk, Lake Killarney, Butler Hill, and Eminence Caldera. Granite from this area ranges in color from shades of pink, gray, black, even a bluish tint. The variance in color designates the different ages of formation of the rock.
The mountains themselves were formed approximately 295 million years ago when two continents collided with one another and caused an uplift of land mass called the Ozark Dome. This uplift shifted the granite upward and formed the mountains.

A Great Sea

At one point in our geological history, all of what is now known as the "Old Lead Belt" was covered by a large sea. Approximately 520 million years ago, the sea began receding, leaving sand deposits in its wake. The sand deposits eventually formed rock. This rock, called, LaMotte Sandstone (named for the French explorer, Antoine de Lamothe Cadillac) is the oldest sedimentary rock in Missouri.

Some History Behind the Science

The Old Lead Belt, which includes Madison County, has recorded evidence of mineral exploration and mining from 1713 through 1972. European exploration reports and inhabitant history during the 1700's show evidence that the native tribes inhabiting the area gathered lead from rocks on the surface and engaged in

SUBJECT: Madison County Lead Health and Safety Science Curriculum Lead Science	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.3
REFERENCES	EFFECTIVE: Revisions:

shallow mining efforts at the area European settlers named Mine LaMotte. In fact, trading efforts may have been going on between the Chickasaw Indians and French settlers soon after their settlement of the areas just east of the Mississippi River. Although there is evidence of native tribes smelting copper in the Southwest portions of the United States, there is, however, no evidence that native tribes smelted lead in this area. The natural resource used to build the fires necessary for smelting, both in early mining and in industrial mining was coal. The rock kit contains pieces of coal dug up during remediation efforts in the county. These coal chunks could have been used in the industrial smelting era between 1880 and 1960 or used as early as the 1700's in log smelting furnaces—the oldest method of smelting used in this area. These particular pieces were found at a site that contained evidence of the kind of shallow pit mining that occurred from the early mining era up through the 1940's.

Local Minerals and Metals

Minerals found in and around Madison County include galena (mined for lead), sphalerite (mined for zinc), chalcopyrite (mined for copper) and hematite (mined for iron). The metals silver, cobalt, manganese and gold (trace amounts) were also mined. At the turn of the century, Madison County was home to the only cobalt mine west of New York; it was one of only two that existed in the entire country.

Summation of lead health research

The latest science is showing us that there is no safe level of lead. The more people are exposed to lead, the more potential they have for absorbing lead into their bloodstream. Children are at highest risk because their bodies do not rid themselves of lead as easily as adults. Ages 0-6 comprise the highest risk category because these children more easily put things into their mouths. Ages 7-12 are the next highest risk category. Children ages 12 and up are the last risk category at this time. Pregnant woman are also considered at higher risk because their unborn children can be exposed to the lead their mother swallows or breathes. Absorbed lead will stay in the bloodstream for a few weeks. Some of the lead is naturally

excreted while the remaining lead is deposited in the body's soft tissues or absorbed into the bones. Presently, research is being conducted to study the impact of absorbed lead in older adults, particularly adults over the ages of 50 who have broken a bone.

Interesting Lead Health Facts

Most likely the first recorded regulation about lead health was enacted in the late 1600's in Germany. At that time a lead additive was put into wine to sweeten the taste. After finding several people sick and dying after consuming large quantities of wine, the rule was enacted that anyone putting the lead additive into the wine henceforth would be subject to death. If someone knew of another who was still putting in the lead and didn't tell community officials, that person was subject to death as well.

In 1821, just after Missouri became a state, legislation was enacted to help foster lead safety around smelting furnaces. French miners had discovered that their livestock were getting sick and dying when they were kept close to smelting furnaces, so they began putting up fences around their furnaces to separate them from their cattle and horses. The law enacted stated that a fence had to be erected at least ten feet from a furnace for the purposes of separating the furnace from the livestock area.

The following is an article published in "The News Democrat" (September, 2011). The article presents lead health and safety information as well as an introductory description of the Madison County Voluntary Institutional Controls Plan (VICP):

LEAD WASTE PROVEN A DANGEROUS FOE; EDUCATION KEY WEAPON IN FIGHT

By Laura Grindstaff and the Madison County Health Department

SUBJECT: Madison County Lead Health and Safety Science Curriculum Lead Science	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.3
REFERENCES	EFFECTIVE: Revisions:

Madison County contains many different forms of lead. Lead in larger forms—lead sulfide, or galena, is not inherently dangerous to humans. Lead encased in rock form, known as galena, is not an inherent danger because the form is too large to easily ingest, thus having a low bioavailability to humans. However, several forms of lead existing in Madison County are dangerous. Because of their tiny sizes, lead paint flakes, chat and slime can easily be ingested by human beings. During the 300 year mining era, as large chunks of galena were milled and broken down into smaller pieces, the lead waste –slime and chat—became exposed to the atmosphere—wind, air, soil, water. Research shows that once the lead sulfide is exposed to the atmosphere, it begins to change chemically into lead sulfate, lead carbonate, lead oxide, and other forms. In addition to atmospheric exposure, the last 100 years of vehicle use has also contributed to the breakdown of lead particles. These broken-down forms are more easily inhaled or ingested by humans. In other words, lead waste is more bio-available than lead encased in rock, and the longer these forms are exposed to the pressures breaking them down, the more bio-available they become.

SUBJECT: Madison County Lead Health and Safety Science Curriculum Lead Science	PART: Voluntary Institutional Controls Education for School Children
	SECTION: 5.3
REFERENCES	EFFECTIVE:
	Revisions:

Lead exposure, either swallowed or inhaled, is dangerous, particularly for pregnant women and children. Once lead particles have been eaten or breathed in, tissue in the body absorbs it. The body stores lead in bones; it can be there for decades. Lower levels of lead poisoning can damage the nervous system and the brain, interfere with growth, impact hearing, lower IQ, and in general, make learning more difficult. The same information explains that higher levels of lead poisoning can cause comas, convulsions, and even death.

The Agency for Toxic Substances and Disease Registry (ATSDR) reports that adults pass most (99%) of lead swallowed as waste within two weeks, but children only pass about a third of the lead swallowed (32%). The ATSDR information also states, pregnant woman are at risk because their unborn children can be exposed to the lead inhaled or ingested by the mother. Lead impacts to the baby are premature birth, low birth weight, decreased mental ability and learning difficulties and reduced growth as young children.

According to Madison County Health Dept. records, in 1996, two percent (2%) of an estimated population of 900 children less than six years of age had their blood tested for lead levels. Twenty-seven percent (27%) of the children tested

SUBJECT: Madison County Lead Health and Safety Science Curriculum Lead Science	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.3
REFERENCES	EFFECTIVE: Revisions:

had higher than acceptable blood-lead levels. Additional testing in future years continued to show higher than acceptable results for blood-lead levels in children until lead paint flakes began to be removed from homes and health education was given to families, providing them with "best practices" to act in ways to lessen lead ingestion.

However, Madison County's lead pollution challenge involves a much broader set of issues than lead paint flakes. The designation of Madison County as a "Superfund Site" by the Environmental Protection Agency provided a good deal of resources to create health education initiatives so families can both help children already adversely impacted by lead poisoning and learn best practices to keep future poisoning from occurring. In addition, a voluntary institutional controls plan (VICP) was created in collaboration with county, state, and federal agencies to educate residents about the most current "best practices" to manage the spread of additional lead contamination in the soil. The VICP effort is the most extensive lead education initiative in Madison County history and is the next step in county-wide remediation actions. Once a property has been remediated, the

SUBJECT: Madison County Lead Health and Safety Science Curriculum Lead Science	PART: Voluntary Institutional Controls Education for School Children
	SECTION: 5.3
REFERENCES	EFFECTIVE:
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VICP will educate residents how to manage their property in ways to lessen any future migration of lead contamination.

As Madison County residents begin their next 300 years of living with lead, the key to good health is to understand how lead waste can contaminate land, water, and air, and can be absorbed into the body. The more residents talk about their experiences with lead and work together using practices that reduce soil contamination and absorption opportunities, the healthier Madison County becomes.

SUBJECT: Rock and Lead Forms Kit Contents List	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.4
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: February 2014

Rock and Lead Forms Kit Contents List

DIRECTIONS: Although all lead forms are encased in either a plastic bag or glass jar, there is the possibility of small pieces of lead being transferred either to classroom furniture or directly on the hands of children. It is EXTREMELY important to clean up the activity area immediately following use and to have students wash their hands immediately following the activity. You are strongly encouraged to keep all lead forms encased at all times. When packing the case, you are encouraged to protect the glass jars from the rocks using some kind of softer packing material. A yearly cleaning of the box housing the materials is also recommended.

Non-Lead Rock Forms Important to Area:

1. One piece of pink granite—younger formation of granite from area's volcanic activity approx. 1.5 billion years ago
2. One piece of LaMotte Sandstone—formed from sand deposits after recession of great sea approx. 520 million years ago
3. One piece of transitional rock—some granite and some sedimentary rock or two different colors of granite rock, depending on your rock sample.
4. Several pieces of coal used when smelting lead in log furnaces. These furnaces were primarily used in the 1700's and early 1800's, but a few remained in use by individual families into the early 1900's. The age of these coal samples is not known. As the coal was found in soil containing lead contamination, you are strongly encouraged to keep the coal enclosed in its container.

Samples of Lead Forms

SUBJECT: Rock and Lead Forms Kit Contents List	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.4
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: February 2014

1. One piece of rock containing lead (gray colored areas), iron (red colored areas), and other minerals.
2. One jar containing smaller lead pieces. These were most likely waste materials from smelting processes older than 20th Century techniques.
3. One jar containing larger chat pieces along with soil. The amount of lead was not measured. These chat pieces came from mining processes used in the 20th Century.
4. One container of smaller chat pieces along with soil. The amount of lead was measured at 3,332 parts per million (ppm). Remediation activities in Madison County took place when surface soil contained more than 400ppm and was located around areas designated as residential, recreational, or play.
5. One container of chat from a driveway. The amount of lead measured at 5,545 ppm.

Lead Health and Awareness Experiments

NOTE: No lead in any form is used in either of these two experiments the way they have been written and originally intended for use. Using soil in Madison County for Experiment #2 is STRONGLY discouraged because the lead content may be unknown. Instead, please refer to the materials list and use as written.

EXPERIMENT #1: A Large Chunk of Lead vs. Small Particles of Lead—What are the Risks?

Materials List

Each team of two students needs: 2 “original” (not soft) chocolate chip cookies , one sealable sandwich bag, one small cup of water, two napkins. One large bowl to place the cookies in and three spoons are also needed.

SUBJECT: Rock and Lead Forms Kit Contents List	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.4
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: February 2014

Preparation Instructions

The instructor should place the cookies needed in the large bowl with the spoon to the side of it. The other items can be readied for the students to take back to their experiment area.

This experiment has two parts to it. Part One models, in general, how a mining company worked and will help the students respond to Question One below. Part Two measures the risk from lead between a large chunk and many small pieces and helps students respond to Question Two below. The experiment can be done as two separate parts on two separate days. However, it is most effective when both parts are done within the same week of class work.

Questions Posed

Question One: Lead waste can be found many places in south-eastern, south-central, and south-western Missouri, even places where there wasn't active lead mining. How did lead waste spread to such a large area?

Question Two: Which form of lead is usually considered most risky—a large chunk of lead or small pieces of lead?

Have the students form a hypothesis statement in response to each question, and provide an explanation for each hypothesis statement.

Part One Conclusions

At the end of Part One, the class should state out loud their supply choices. The teacher can show the results on an overhead or smart board. Did the teams choose the same locations and uses, or did they choose differently? Use observations of the teams' choices to answer why lead waste could have been spread so far and wide, even where there was no active mining.

SUBJECT: Rock and Lead Forms Kit Contents List	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.4
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: February 2014

Part Two Conclusions

Knowing that lead is poisonous when enough of it is either swallowed or breathed by humans, what are the conclusions about the health risk of a large chunk of lead versus small particles of lead. In order for students to answer, have them check observations for Part Two, Steps 1, 2, and 3 recorded on the data sheets and write down their conclusions on their data sheet.

SUBJECT: How a Mining Company Works and Impacts the Spread of Lead Waste	PART: Voluntary Institutional Controls Education for School Children
	SECTION: 5.5
REFERENCES	EFFECTIVE: October 1, 2012
	Revisions: January 2014

PART ONE: How a Mining Company Works and Impacts the Spread of Lead Waste

Student Directions

Pretend you are a mining company. There are four steps your company must take in order to be successful—picking a site for your company and acquiring your tools, mining the lead, processing the lead, and supplying the lead and its waste products to people.

Step One—Picking a Site and Acquiring Tools

Before you can start the mining, you need to pick your work site and gather your company's tools. Locate your work site first, and then send one teammate for the following tools: one sandwich bag, one small cup of water, and two napkins.

Step Two—Mining for Lead

Now that you have your work site and tools, it's time to begin mining! One teammate will take a spoon and mine two large chunks of lead (each cookie represents a chunk of lead). Be careful not to break the chunks. That will mean a loss of profit for your company! When you have the four chunks of lead, bring them back to your work site to begin processing.

Step Three—Processing the Lead

Set one of the chunks of lead aside on a napkin; you will use them later. Place the remaining chunk in the sandwich bag and seal it tightly. Make sure the seal is closed all the way. Using your hands, carefully crush the cookie until it becomes small crumbs inside the bag. Be careful not to rip or tear the bag. When lead ore was processed in the smelters, two products resulted, lead and lead waste. The crushed cookie now represents lead waste.

Step Four—Supplying Lead and Lead Waste to People

The area you live in once supplied most of the whole world's need for lead! Lead from Madison County went all over the United States, to Europe, to Africa, and to South America. On your data sheet, circle the continent your company would

SUBJECT: How a Mining Company Works and Impacts the Spread of Lead Waste	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.5
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

choose to transport your lead to. (There is no wrong answer. Make your own company choice; don't talk to other teams)

Lead waste went to many different places all over the United States as well. It was used like sand. People used it to make roadways and driveways. People used it in parks and play areas. People mixed it with their soil when farming as a nutrient for their crops. On your data sheet, circle the location and use your company would choose for your lead waste. (There is no wrong answer. Make your own company choice; don't talk to other teams.)

After awhile, lead was found to be poisonous to humans if they swallowed or breathed in enough of it. So, lead and lead waste stopped being used in some of the ways it had been used before.

SUBJECT: Analyzing the Risks from Lead in Large and Small Pieces	PART: Voluntary Institutional Controls Education for School Children
	SECTION: 5.6
REFERENCES	EFFECTIVE: October 1, 2012
	Revisions: September 11, 2012

PART TWO: Analyzing the Risks from Lead in Large and Small Pieces

Analysis

Step One

Lead is taken in the human body in two different ways, by breathing it in and by swallowing it. Pick up your whole cookie (chunk of lead) and observe. How easy would it be to breathe the whole cookie in? How easy would it be to swallow the whole cookie? (DO NOT ATTEMPT TO SWALLOW THE COOKIE WHOLE!) Respond to these questions on your data sheet.

Now take the bag of cookie crumbs (small lead and waste particles). Ask the same questions. How easy would it be to breathe in a few of these particles? How easy would it be to swallow these particles whole? Respond with your observations on your data sheet. From your observations respond to this question: Which would be easier to swallow, a large chunk of lead or small pieces of lead?

Step Two

Lead in the air can be more easily breathed in than lead particles on the ground. Place the whole cookie on a napkin and blow at it. How easy is it to blow the cookie and move it to another place on the napkin? Mark you observations on your data sheet. Take some of the crumbs from your sandwich bag and place them onto the other napkin. Blow at the crumbs. How easy is it to blow the crumbs and move them to another place on the napkin? Mark your observations on your data sheet. From your observations respond to this question: Which would be easier for the wind to move through the air, a large chunk of lead or small particles of lead?

Step Three

Lead stuck on clothes or on the body can more easily reach the mouth and nose than lead on the ground. Wet two fingers in the cup of water and try to pick up the whole cookie. Were you able to “stick” the cookie onto your body? Record your observations on your data sheet. Next, use two different fingers and wet them in the cup of water. Try picking up some of the crumbs inside the sandwich bag.

SUBJECT: Analyzing the Risks from Lead in Large and Small Pieces	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.6
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: September 11, 2012

Were you able to "stick" the crumbs onto your body? Record your observations on your data sheet. From your observations, respond to this question: Which would be easier to stick to the body if the body is wet, a large chunk of lead or small particles of lead?

SUBJECT: Student Data Sheet	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.7
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

Name:_____ Date:_____

EXPERIMENT #1: A Large Chunk of Lead vs. Small Particles of Lead—Which is Worse and Why?

Hypothesis

State your hypothesis about which is worse—a large chunk of lead or many small particles of lead. Explain why you think the way you do.

Conclusions for Parts One and Two to be Finished After Reporting Observations

Question One: Lead waste can be found many places in south-eastern, south-central, and south-western Missouri, even places where there wasn't active lead mining. How did lead waste spread to such a large area?

Question Two: Which form of lead is usually considered most risky—a large chunk of lead or small pieces of lead?

SUBJECT: Student Data Sheet	PART: Voluntary Institutional Controls Education for School Children
	SECTION: 5.7
REFERENCES	EFFECTIVE: October 1, 2012
	Revisions: January 2014

Name:_____ Date:_____

PART ONE: Circle choice for supplying lead

Southern United States England French African Colonies

Spain Mexico Western United States

English African Colonies English Colonies in Middle East

Eastern United States Argentina Germany

Circle choice for supplying lead waste:

Arkansas for building roads Missouri for play sand

Kansas for railroads Tennessee for building roads

Missouri for farm use Arkansas for railroads

SUBJECT: Student Data Sheet	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.7
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

PART TWO

Step One

Lead is taken in the human body in two different ways, by breathing it in and by swallowing it. Pick up your whole cookie (chunk of lead) and observe. How easy would it be to breathe the whole cookie in? How easy would it be to swallow the whole cookie? (DO NOT ATTEMPT TO SWALLOW THE COOKIE WHOLE!) Respond to these questions on your data sheet.

Now take the bag of cookie crumbs (small lead and waste particles). Ask the same questions. How easy would it be to breathe in a few of these particles? How easy would it be to swallow these particles whole? Respond with your observations on your data sheet. From your observations respond to this question: Which would be easier to swallow, a large chunk of lead or small pieces of lead?

Observations about a Large Chunk of Lead

Observations about Small Particles of Lead

SUBJECT: Student Data Sheet	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.7
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

Name:_____ Date:_____

Step Two

Lead in the air can be more easily breathed in than lead particles on the ground. Place the whole cookie on a napkin and blow at it. How easy is it to blow the cookie and move it to another place on the napkin? Mark you observations on your data sheet. Take some of the crumbs from your sandwich bag and place them onto the other napkin. Blow at the crumbs. How easy is it to blow the crumbs and move them to another place on the napkin? Mark your observations on your data sheet. From your observations respond to this question: Which would be easier for the wind to move through the air, a large chunk of lead or small particles of lead?

Observations about a Large Chunk of Lead

Observations about Small Particles of Lead

SUBJECT: Student Data Sheet	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.7
REFERENCES	EFFECTIVE: October 1, 2012 Revisions: January 2014

Name:_____ Date:_____

Step Three

Lead stuck on clothes or on the body can more easily reach the mouth and nose than lead on the ground. Wet two fingers in the cup of water and try to pick up the whole cookie. Were you able to "stick" the cookie onto your body? Record your observations on your data sheet. Next, use two different fingers and wet them in the cup of water. Try picking up some of the crumbs inside the sandwich bag. Were you able to "stick" the crumbs onto your body? Record your observations on your data sheet. From your observations, respond to this question: Which would be easier to stick to the body if the body is wet, a large chunk of lead or small particles of lead?

Observations about a Large Chunk of Lead

Observations about Small Particles of Lead

SUBJECT: **Lead Health and Awareness Experiments**	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.8
REFERENCES	EFFECTIVE: Revisions: January 2014

Lead Health and Awareness Experiments

NOTE: No lead in any form is used in either of these two experiments the way they have been written and originally intended for use. Using soil in Madison County for Experiment #2 is STRONGLY discouraged because the lead content may be unknown. Instead, please refer to the materials list and use as written.

EXPERIMENT #2: Digging in Soil Containing Lead—Finding a Better Way

Introduction

This experiment will show students one kind of remediated soil condition now present in Madison County. It will also give them an opportunity to figure out ways to dig in contaminated soil that decrease the spread of contamination versus ways that could potentially increase the spread of contamination. They also will come to understand the digging practice encouraged by the Madison County Voluntary Institutional Controls Plan (VICP).

Materials List

Each team of three students needs: one large disposable cup, preferably clear filled with soil and sand according to the preparation directions, one plastic spoon, and two plastic sandwich bags. The cup filling materials are listed in the preparation directions below.

Preparation Instructions

The following materials are needed for filling up the cup: Soil, sand, one penny for each cup, a box of plastic wrap. Before the experiment can be conducted, the instructor needs to fill one cup per team with a soil and sand combination. **It is important to use soil and sand purchased from a local store, not local soil or sand dug as these materials could be contaminated with lead.** Each cup of

SUBJECT: **Lead Health and Awareness Experiments**	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.8
REFERENCES	EFFECTIVE: Revisions: January 2014

"lead" should be filled with sand from the bottom to the halfway mark. Place a penny in this sand at some point during the filling process. Once the penny has been buried, and the sand has reached the halfway mark of the cup, cover the sand with plastic wrap. Next, fill the rest of the cup with soil. This filled cup represents many remediated yards in Madison County. The top two feet of contaminated soil was replaced with clean fill, but the soil under the top two feet still contains lead contaminants. To demarcate the clean fill from the contaminated soil, there is a plastic orange mesh. The sand in the cup represents the contaminated soil. The soil represents the clean fill. And the plastic wrap represents the orange meshing. Once the cups have been filled, set them out along with the other materials to ready them for students' use.

Questions Posed

Question One: List the steps you took when trying to dig out your penny without mixing the clean fill with the contaminated soil.
Question Two: What problems did you encounter along the way?
Question Three: Would you do anything differently if you did the experiment a second time?
Question Four: Who were your team members? What did each of you do to participate in the experiment?

Conclusions

At the end of the experiment students should be able to state how to dig out the penny in a way that does not mix the sand and soil. The teacher can then assist students in comparing the Voluntary Institutional Controls Plan "best practices for digging" with the students' findings. The comparison should show many similarities between the students process of digging and the stated "best practices".

To Begin the Experiment

To introduce students to the experiment, ask each team to carefully take a cup, a spoon, and two plastic bags back to their work space. Remind them that for the experiment to work properly, their cup cannot be spilled or bounced around too much. Talk with them about the EPA remediation that has taken place in the

SUBJECT: **Lead Health and Awareness Experiments**	PART: Voluntary Institutional Controls Education for School Children
	SECTION: 5.8
REFERENCES	EFFECTIVE:
	Revisions: January 2014

county. Go over the fact that exposure to lead can be harmful, and that a good amount of soil in Madison County has lead in it. Much of the time, the lead looks similar to soil, so you can't always tell if lead is in the soil by just looking. In order to keep people from being exposed to the lead in the soil, "clean fill", soil, without all the lead contamination was put on top of some of the lead contaminated soil around people's homes. Present to them the challenge: People still have to dig in their dirt sometimes. They dig basements, sewer lines, gardens, fence post holes, and wells, among other things. How can people dig without mixing the contaminated soil with the clean fill?

SUBJECT: Student Data Sheet: Lead Health and Awareness Experiments	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.9
REFERENCES	EFFECTIVE: Revisions:

Name:_____ Date:_____

DATA SHEET—Page One

EXPERIMENT #2: Digging in Soil Containing Lead—Finding a Better Way

Challenge Posed

Your cup represents a remediated yard. The bottom half of the cup contains sand (contaminated soil), and the top half contains soil ("clean" fill). There is a penny buried somewhere in the contaminated soil. Using only the materials in front of you-- a spoon and two plastic bags--how can you dig out the penny without mixing the contaminated soil with the clean fill. You will find a piece of plastic in your cup, separating the clean soil from the sand. When you are finished digging out the penny, replace the soil the way you found it, contaminated in the bottom, clean fill on the top, with the plastic separating the two. List your steps below, and respond to the other questions.

Hypothesis

Before starting to dig, write down the process you think will allow you to dig the penny out without mixing the sand and soil together.

SUBJECT: Student Data Sheet: Lead Health and Awareness Experiments	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.9
REFERENCES	EFFECTIVE: Revisions:

Observations

1. List the steps you took when trying to dig out your penny without mixing the clean fill with the contaminated soil.

2. What problems did you encounter along the way?

3. Would you do anything differently if you did the experiment a second time?

4. Who were your team members? How did each of you participate in the experiment?

SUBJECT: FOR THE INSTRUCTOR TO SHARE WITH THE STUDENTS AFTER THE EXPERIMENT IS FINISHED	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.10
REFERENCES	EFFECTIVE: Revisions: January 2014

FOR THE INSTRUCTOR TO SHARE WITH THE STUDENTS AFTER THE EXPERIMENT IS FINISHED

According to the Madison County Voluntary Institutional Controls Plan (VICP), the best practices encouraged for digging in the scenario represented by this experiment are as follows:

If the surface soil at your dig site is "clean fill", but under the surface, the soil is contaminated:

A. Dig "clean fill" soil until the visual demarcation. Do not dig under the barrier.
B. Keep all surface "clean" fill separate from the contaminated soil.
C. Dig under the visual demarcation to desired depth, placing all this contaminated soil on plastic sheeting or another suitable temporary barrier, separate from the clean fill.
D. Once object is placed in hole, fill hole with contaminated soil up to the visual demarcation depth.
E. Replace visual demarcation on top of contaminated soil.
F. Fill in the remaining hole with the surface clean fill.

The best practices also encourage the following:

Proper cleanup after digging:

A. Wash all tools to rid them of contaminated soil. DO NOT wash in an area that has been remediated.
B. Take shoes off before entering the inside of your home. Wash clothes separately from other clothes. Non-washable shoes should be cleaned with a damp cloth.
C. Dispose of plastic sheeting or other temporary barrier materials in a covered trash receptacle. Take care not to spill or drop soil off sheeting or other barrier materials. This way soil cannot re-contaminate the ground.

SUBJECT: FOR THE INSTRUCTOR TO SHARE WITH THE STUDENTS AFTER THE EXPERIMENT IS FINISHED	PART: Voluntary Institutional Controls Education for School Children SECTION: 5.10
REFERENCES	EFFECTIVE: Revisions: January 2014

Wrap-Up Discussion

Ask students how their digging process compared to the VICP "best practices for digging".

What were the similarities? What were the differences?

If the students' process differed from the "best practices", discuss why the VICP processes suggest the practices they do.

Ask students why using these cleanup steps would be important. Their responses should indicate some understanding that tools and clothes/shoes can carry remnants of the contaminated soil, so that soil needs to be disposed of in a way that doesn't spread the contamination.

SUBJECT: Cover Page	PART: Pamphlets SECTION: 6.0
REFERENCES	EFFECTIVE: Revisions: October 2013

Madison County Voluntary Institutional Controls Manual

Section 6 Pamphlets

RESOURCES

U.S. EPA Region 7– Midwest

800-223-0425

Madison County Health Department

573-783-2747

Missouri Department of Natural Resources

(Southeast Regional Office,

Poplar Bluff , MO)

573-840-9750

****IF YOUR PROPERTY HAS NOT BEEN TESTED AND/OR REMEDIATED, YOU ARE ENCOURAGED TO CONTACT THE EPA AND/OR THE MADISON COUNTY HEALTH DEPARTMENT FOR TESTING AND REMEDIATION OPTIONS****

Revised 06/2023

Help Reduce Lead Soil Contamination

For information about obtaining copies of this brochure, contact the Madison County Health Department.

MADISON COUNTY HEALTH DEPARTMENT
105 ARMORY STREET
FREDERICKTOWN, MO 63645

PHONE: 573-783-2747
WEBSITE: https://
madisoncountymohealth.com

Voluntary Institutional Controls Plan Educational Pamphlet

BEFORE YOU DIG

WHAT IS VICP?

Lead is a part of our lives in Madison County, partially because of the unique geological qualities of our land and partly due to 300 years of mining and processing that occurred within our county. Because of the amount of lead found within the land, in 2003 our county was listed on the EPA's National Priorities List of contaminated sites.

EPA has spent several years testing, remediating and cleaning up residential properties within the county. Now, we have developed a Voluntary Institutional Controls Plan (VICP) in an effort to have a plan for the control and prevention of lead soil contamination.

Lead is poisonous and can create ill health effects in both children and adults if ingested. The Madison County VICP strives to reduce lead health risks by providing "best practices" to effectively manage lead contamination and prevent migration. The ultimate goal of the VICP is to reduce human exposure to lead contaminants within the soil.

FACTS TO KNOW BEFORE STARTING A DIGGING PROJECT:

If you dig on a residential property, including your own, you are responsible for managing the soil in a way that does not spread lead contamination.

The EPA will NOT come in and remediate property that has been re-contaminated after they have completed the remediation process.

Property clean-up becomes the responsibility of the property owner and potentially any individual or company who commercially participated in the digging hauling and disposal of contaminated soil.

It is important to understand how state and federal regulations apply to hauling and disposal of contaminated soil. IMPROPER HAULING OR DISPOSAL OF CONTAMINATED SOIL IS ILLEGAL. **Follow "Best Practices" outlined in the VICP manual, to minimize the potential for spreading lead contamination when digging, hauling, or disposing of soil.**

The VICP manual can be found at the Madison County Health Department.

STEPS TO TAKE BEFORE YOU DIG

1. **Call Missouri One Call (1-800--344-7483)** before ANY digging project. This action notifies the VICP Coordinator at the Madison County Health Department who can assist you with "best practices" for digging, hauling and disposal of project soil.
2. **Know soil conditions at the dig site.** If your property was tested or remediated, you should have a property record that contains this information. If you do not know the condition of your soil, call the VICP Coordinator at the Madison County Health Department (573-783-2747) for assistance.
3. **Understand "best practices" appropriate for your digging project.** Refer to the VICP manual on the health department website: madisoncountymohealth.com
4. **To comply with state and federal regulations, the VICP strongly recommends that you request soil screening prior to hauling any soil in Madison County if the lead content is unknown. All VICP services, including soil screening is FREE.**

RESOURCES

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573-840-9750

****IF YOUR PROPERTY HAS NOT BEEN TESTED AND/OR REMEDIATED, YOU ARE ENCOURAGED TO CONTACT THE EPA AND/OR THE MADISON COUNTY HEALTH DEPARTMENT FOR TESTING AND REMEDIATION OPTIONS****

Revised 6/2023

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MADISON COUNTY HEALTH DEPARTMENT
105 ARMORY STREET
FREDERICKTOWN, MO 63645

PHONE: 573-783-2747
WEBSITE: https://
madisoncountymohealth.com

Voluntary Institutional Controls Plan Educational Pamphlet

DISPOSAL/ HAULING SOIL IN MADISON COUNTY

Disposal/Hauling Soil In Madison County

The Madison County Voluntary Institutional Controls Plan (VICP) strives to reduce lead health risks by providing "best practices" to effectively manage lead contamination and the prevention of the migration of lead contamination. The ultimate goal of the VICP is to reduce human exposure to lead contaminants within the soil. It is also a goal of the VICP to protect and prevent recontamination of remediated or cleaned up properties throughout Madison County. To reach these goals, it is important that "best practices" are not only followed when digging, but also when disposing and hauling soil in Madison County.

The Department of Natural Resources regulates the hauling and disposal of contaminated soils. The standard of 400 parts per million (ppm) lead or less has been established as a satisfactory soil lead content in Madison County. **Any soil containing over 400 ppm lead is considered contaminated and has specific regulations for hauling and disposal.**

FACTS ABOUT DISPOSAL/JHAULING SOIL IN MADISON COUNTY:

- State and federal regulations do apply when hauling and disposing contaminated soils. I**MPROPER HAULING OR DISPOSAL OF CONCONTAMINATED SOIL IS ILLEGAL.**
- A property owner or contractor can potentially be held responsible for migrating soil contamination caused by improper hauling or disposal of contaminated soil.
- The VICP encourages you to request soil screening prior to hauling any soil in Madison County if the lead content is unknown. "Call before you haul". Screening is **FREE** of cost and can be requested at the Madison County Health Department (573-783-2747).
- It is recommended that all excavated contaminated soil (over 400 ppm) in Madison County be hauled to the designated repository site. The VICP Coordinator at the health department can assist you with repository disposal.

"CALL BEFORE YOU HAUL"

STEPS TO TAKE BEFORE DISPOSAL/HAULING SOIL IN MADISON COUNTY

Know the lead content of the soil being hauled. Request screening as needed.
DNR normally required soil to be tested by a laboratory. However, ONLY IN MADISON COUNTY, AS PART OF THE VICP, the DNR is allowing the use of a XRF (Field X-ray Fluorescence Instrument) as a testing method. Health department officials have the training and equipment to provide this testing method. Soil testing above 400 ppm lead will be considered contaminated material. If the soil is being hauled off the excavation site, it should be hauled to the designated repository site and VICP best practices should be followed.
Soil hauled to a site can also be screened as requested in a effort to avoid contamination or recontamination of properties.

Understand "best practices" for the hauling/disposing of soil at the Specific site. Refer to the VICP manual at the Madison County Health Department website: madisoncountymohealth.com and/or the VICP Coordinator at the health department can assist you.

RESOURCES

U.S. EPA Region 7– Midwest

800-223-0425

Madison County Health Department

573-783-2747

Missouri Department of Natural Resources

(Southeast Regional Office,

Poplar Bluff , MO)

573-840-9750

****IF YOUR PROPERTY HAS NOT BEEN TESTED AND/OR REMEDIATED, YOU ARE ENCOURAGED TO CONTACT THE EPA AND/OR THE MADISON COUNTY HEALTH DEPARTMENT FOR TESTING AND REMEDIATION OPTIONS****

REVISED JUNE 2023

Help Reduce Soil Lead Contamination!

For information about obtaining copies of this brochure, contact the Madison County Health Department.

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HEALTHY GARDENING PRACTICES

General Information

Lead is a part of our lives in Madison County partially because of the unique geological qualities of our land and partly because of mining waste left behind from 300 years of mining operations. We are striving to minimize the impact of the lead on our land and manage it in healthy ways. The Voluntary Institutional Controls Plan (VICP) is a management plan created by Madison County which contains "best practices" for the control and prevention of lead soil contamination.

Best practices should be used when developing a garden to prevent lead exposure. Some fruits and vegetables can absorb lead contained in soil. Root vegetables such as carrots, beets, and potatoes are more likely to uptake lead than fruiting crops such as tomatoes, squash, peppers, okra, cucumbers, peas, beans, and corn. Also, leafy vegetables that grow close to the ground (such as lettuce, spinach, beets, and herbs) are apt to contain lead contaminants from settled dust or soil. However, lead levels found in garden produce are usually low and there are preventive steps to take before eating garden produce.

Steps To Follow Before Developing A Garden Area:

- **Know the soil conditions of the garden area.** If you do not know the soil conditions, you can call the VICP Coordinator at the health department (573-783-2747) for assistance
- **If the garden area is located on property that has already been remediated by the EPA, it is suitable for gardening.**
- **If the garden area is located on property that has not been tested or is know to contain high lead levels, there are several recommendations.** The best option is to use 24 inches of clean fill (soil containing 200 parts per million less lead) to cover the gardening area before planting or use a raised bed.
- **The following steps should be taken to ensure garden produce is safe to eat:**

1. Wash all produce before eating it with a 1% vinegar solution (1 gallon of water to 2 1/2 Tbs vinegar).
2. Wash, peel and scrub all root vegetables before cooking or eating.
3. Soak leafy vegetables that grow close to the ground in cool water and rinse before eating

OTHER STEPS:

It is also important to take precautionary measure when working at a garden site known to contain high lead levels or unknown lead levels.

- Avoid eating or drinking while working in the garden.
- Wash your hands and work clothes to remove dirt and dust after gardening.
- Take off your shoes at the door to avoid tracking soil into your home.
- Avoid allowing children to play in the area.

Resources for Lead Soil Management:

- **The VICP Coordinator at the health department can assist you with questions about digging, hauling, and disposal questions.**
- **Lead health information can be obtained at the Madison County Health Department.**

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PURCHASING OR RENTING PROPERTY

General Information

Madison County is located in the St. Francois Mountains which has a beautiful landscape of rolling farmland and heavily wooded areas filled with natural wildlife. Madison County is also located within what is known as the "Old Lead Belt" which is an area known for rich lead ore deposits. Mining operations supported our ancestors and is an important part of the history of our county.

However, the mining operations created a challenge, as mine waste left behind in some areas contains elevated levels of lead. Madison County has taken positive steps to overcome this challenge. In 2003, the EPA started remediating (cleaning up) contaminated soil on residential properties in the county. Furthermore, Madison County has developed a plan to minimize and manage lead contamination on our land. The management plan, called the Voluntary Institutional Controls Plan (VICP) contains "best practices" for the control and prevention of lead contamination.

Madison County is proud of it's land and all it's natural beauty and strives to keep the quality of our land, health and environment.

Questions to Ask Before Purchasing/Renting Property:

- Was the home built before 1978? If so, does the paint contain lead?
- Has the property been tested for soil lead content?
- What is the soil lead content?
- Has the property been remediated so that it contains a safe and satisfactory lead level?
- If remediated, does the property contain a visual demarcation between the remediated soil and the contaminated soil?
- If remediated, has any excavation, construction, or renovation taken place on the property since the remediation?
- Have soil management "best practices" been used on the property?

DIG RIGHT!
HAUL RIGHT!
DUMP RIGHT!

After the Purchase or Rental:

- Is the property record available and up to date?
- If soil conditions a the property are unknown, you can call the VICP Coordinator at the Madison County Health Department for assistance (573-783-2747).
- If the property has not been tested or remediated, you are encouraged to contact the EPA and/or the Health Department for testing and remediation options.
- For any renovation or digging projects, follow "best practices" outlined in the VICP manual.

THE VICP MANUAL CAN BE FOUND AT THE MADISON COUNTY HEALTH DEPARTMENT OR ON THE WEBSITE:

madisoncountymohealth.com

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PRIVATE WATER CONTAMINATION

General Information

Private water sources can be contaminated by bacteria and/or metals. Some metals, such as fluoride, lead and iron occur naturally in water sources. A hazardous level of metals or bacteria in a water source can cause detrimental health effects when consumed.

Water contamination can occur after a natural disaster such as a flood or tornado. Natural disasters can damage water systems or submerge them creating contamination, Furthermore, contamination in water can occur any time there is damage to the water system such as a broken waterline or cracked well head or casing.

Lead contamination in water can be found in older homes built or remodeled before 1970. The plumbing in older homes was often constructed from copper pipes and lead solder. Lead contaminants in piping can be transferred to water as it travels through the piping.

If you suspect your water is contaminated, it is important to take the appropriate steps to have it tested. If dangerous levels of bacteria or metals are found then you should take the proper action to eliminate the consumption of teh contaminants to protect you and your family's health.

When Should Private Water Be Tested:

- A newly dug well.
- If your private water source has been damaged or affected by a natural disaster (Example: Submerged with flood waters).
- Any damage to your water source such as broken water lines or cracked well casing has occurred.
- Unexplained illnesses occur in the homes that are consistent with symptoms of water contamination.

TESTING:

- Private water testing is available at the Madison County Health Department.
- Testing available includes new well series test and total metals test. These tests include results of both metals and bacteria levels.
- For questions, you can contact the Madison County Health Department at 573-783-2747.
- The Madison County Health Department is unable to provide water sampling and testing for residents with a public water supply. Public water systems are managed and controlled by the owning entity (Ex: City of Fredericktown) and governed by the Department of Natural Resources.

Treatment Options:

- Treatment recommendations for private water systems containing bacteria include disinfecting the water source. Disinfecting instructions can be located at the Missouri Department of Health and Senior Services Website, https://health.mo.gov/living/environment/privatedrinkingwater/index.php
- The treatment recommendations for metal contamination in private water systems is to contact a reputable water softening company to determine what filters or other treatment options will be appropriate for the specific contamination.
- If lead contamination is occurring from old piping, it is recommended to replace the water piping system so that it contains no lead materials.
- For questions, call the Madison County Health Department.

SUBJECT: Credits	PART: Introduction SECTION: 0.2
REFERENCES	EFFECTIVE: Revisions: October 2013

CREDITS

The Madison County Voluntary Institutional Controls Plan is unique from all other institutional controls plans which focus on lead contamination. Its unique quality is its voluntary nature. Like other lead contamination control plans, Madison County's plan outlines specific controls based on United States Environmental Protection Agency (EPA), Missouri Department of Natural Resourses (DNR) and Missouri Department of Health and Senior Services (DHSS) regulations/policies, and these controls are further expressed in individual "best practices" regarding excavation, hauling and disposal activities. However, unlike other lead contamination plans, the Madison County plan provides education as one of its primary institutional controls.

This manual was created with the assistance of the following entities:

The Madison County Commission in the State of Missouri
The Madison County Health Department
The Madison County Voluntary Institutional Control Plan Coalition consisting of residents of Madison County Missouri
The Missouri Department of Health and Senior Services
The Missouri Department of Natural Resources
The United States Environmental Protection Agency
The Grindstaff Partnership, LLC

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the authors and do not necessarily represent the official views of EPA or the DHSS.