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1.0 INTRODUCTION

This document presents the Lake County Community Health Program Phase 2 work plan (LCCHP Phase 2) that will continue to function as the primary blood lead reduction program for Lake County, and the institutional control for Operable Unit 9 of the California Gulch Superfund site. The performance standards for the initial LCCHP were met in 2005, as outlined in the 2005 LCCHP Annual Report. The LCCHP Phase 2 will continue efforts to reduce the risks to resident children resulting from exposure to lead from various potential sources, including school, playground, and yard soil, house dust, interior and exterior house paint and miscellaneous other sources. The LCCHP Phase 2 provides a range of services to assist residents in reducing their exposure to lead in and around their homes. Lead educational services are offered to owners and occupants of residences within Lake County, and additional services are available to children and pregnant and nursing mothers with elevated levels of lead in their blood.

1.1 Purpose and Scope of the Work Plan

This work plan presents the framework for the structure and administration of the LCCHP Phase 2, as well as specific procedures for implementing various components of that program. The overall concept and design of the LCCHP Phase 2 is described in Section 2. Section 3 describes the organization and administrative responsibilities for the program and its outreach and education and blood lead monitoring components. Sections 4 and 5 provide specific procedures for performing environmental investigations and response actions, respectively. Waste management, disposal and soil-consolidation protocols are described in Section 6. Data management, record keeping, and reporting requirements are addressed in Section 7, and plans for review and evaluation of the LCCHP Phase 2 are outlined in Section 8.

2.0 LAKE COUNTY COMMUNITY HEALTH PROGRAM PHASE 2 CONCEPT AND DESIGN

The purpose of the LCCHP Phase 2 is to provide reduction in lead exposure from a wide range of potential sources for young children and pregnant or nursing women and thereby reduce blood lead levels in children who reside within the County. This program follows the Center for Disease Control (CDC) guidance from *Preventing Lead Poisoning in Young Children* (CDC, 2005) and *Screening Young Children for Lead Poisoning* (CDC, 1997), along with program-specific procedures, to address properties where elevated blood lead levels occur. The plan to reduce childhood lead exposure addresses various sources of lead in the environment and provides remediation for media that exceed program action levels.

2.1 Identifying and Evaluating Potential Sources of Lead Exposure

Lead is widely distributed throughout the environment as a result of industrialization, and both children and adults can be exposed to lead from a number of different media (e.g., contaminated soil, dust, water, air, food, consumer products) and pathways (ingestion, dermal contact, inhalation). Children typically have higher intake rates of environmental media and tend to absorb a higher fraction of ingested lead from their gastrointestinal tract and be more susceptible to some of the adverse effects of lead than do adults. Exposure to lead via food, water and air has been greatly reduced in recent years as a result of federal regulations restricting or banning lead in solder, gasoline and paint. Even so, exposure to lead contaminated media continues to be of concern to regulators nationwide (CDC, 1991), especially in older urban areas.

In Leadville, there are currently a number of pathways by which children may come into contact with lead originating from mining activities, including ingestion of and dermal contact with contaminated soil, mine wastes, dust, ingestion of contaminated soil or garden-grown food; and inhalation of particulates. Groundwater has not been shown to be a significant contributing factor. Leadville children may also be exposed to lead from non-mining sources in and around their homes, such as lead-based paint, occupational and hobby exposures, and consumer products.

2.2 LCCHP Objectives and Elements

The LCCHP Phase 2 has been designed to reduce overall lead-related risk to children in Leadville through education of parents and blood lead monitoring of children, and for those with elevated levels of blood lead, additional responses that investigate and address numerous sources. The potential sources of lead exposure that are addressed include contaminated soil, house dust, and interior and exterior paint.

The LCCHP Phase 2 blood lead program will be administered and operated by Lake County. CDPHE will perform the environmental testing and remediation portion of the LCCHP Phase 2 program, as recommended by the LCCHP Phase 2 Work Group (as defined in Section 3.1 of this work plan). The Lake County Public Health Agency monitors blood lead concentrations in individual children who reside within the County and provides educational material to families regarding proper hygiene to control lead intake. For those children with elevated blood lead levels, additional remedial services are available through the program.

Objectives of the program are as follows:

- Continue a strong educational program, which is vital to reducing risk from lead exposure.

- Obtain participation from a large proportion of the residential population with children under the age of 6 years.
- Reduce the level of lead exposure and intake by children in a manner that results in optimal risk reduction through efficient use of resources.
- Provide for maximum flexibility in identifying sources of lead and selecting lead-risk-reduction actions at individual properties, thereby avoiding unnecessary or ineffective actions.
- Investigate the sources of lead that may contribute to a child's exposure and address sources having the greatest potential impact on a child's blood lead level.
- Conduct environmental testing to identify and remediate potential sources of lead exposure when a child has an elevated blood lead level at or above 10ug/dL, where recommended by the Work Group,.
- Identify and remediate potential sources of lead exposure when a child does not have a blood lead level of 10 ug/dl or higher, but the potential for exposure through environmental and/or commercial sources may exist. This action may be taken at the discretion of the Lake County Public Health Agency, or upon recommendation of the LCCHP Phase 2 Work Group.

To meet these objectives, the LCCHP Phase 2 integrates a variety of services and intervention methods and combines the following elements:

- Community awareness and education programs;
- Voluntary blood lead monitoring with appropriate follow-up for young children (12 to 72 months) and pregnant and nursing women;
- Voluntary environmental testing for lead in the residences of children with blood lead levels at or above 10 µg/dl, when recommended by the Work Group.
- Environmental investigation and remedial response actions to reduce the risk of lead exposure to children with elevated blood lead levels, when recommended by the Work Group;
- Use of the LCCHP soil repository for contaminated soil removed from residential, school, playground properties and/or parks and recreational facilities ;
- Data management and record-keeping program;
- On-going coordination and program review through the LCCHP Phase 2 Work Group.

Of these elements, the blood lead monitoring and environmental sampling programs are the primary mechanisms for obtaining information regarding the need for remedial actions. The LCCHP Phase 2 is funded through a Trust Fund to be administered by a trustee appointed by the parties to the LCCHP Amended and Re-stated Trust Agreement. Lake County, CDPHE, and EPA are parties to the Trust Agreement. Results from the environmental and blood lead monitoring programs are used jointly to select appropriate response actions, when needed. Environmental response actions are performed as needed, at those participating properties at which children with elevated blood lead levels reside, or as recommended by the Work Group.

The various elements of the LCCHP Phase 2 are briefly described below. More detailed procedures for implementing these elements are provided in the following sections of this work plan.

Appendices A through F include specific requirements for program outreach and education and for sample collection, handling, and analysis. These appendices will be updated, as recommended by the Work Group, as other federal or state guidance becomes available that supersedes the attached Standard Operating Procedures (SOP's), quality objectives, or other general information about lead exposure.

2.2.1 Community Awareness and Education Programs

Data collected as part of the Kids First Program and the LCCHP Phase 1 has documented the importance of community education in reducing blood lead levels in children living in the Leadville area. Therefore an extensive community awareness and education program will continue to be an integral part of the LCCHP Phase 2. The LCCHP Phase 2 Community Education and Awareness Program will focus on two primary objectives to help manage potential lead exposures at the site. The primary focus of the program will be to encourage participation in the blood lead monitoring program and provide specific education to participants of the program, especially in the case of a child with an elevated blood lead level. The educational program will also provide general information regarding lead hazards, potential sources of lead exposure, and methods of reducing potential exposures to the community at large.

A variety of media and outreach methods are utilized to maximize program participation and promote the availability and use of program information. The Community Education and Outreach Program is further defined in Section 3.3 of this work plan.

2.2.2 Blood Lead Monitoring

The LCCHP Phase 2 includes voluntary blood lead monitoring (with financial incentives, as appropriate) for all children age 12 to 72 months and voluntary blood lead monitoring for

pregnant and nursing women. The Lake County Public Health Agency will provide blood lead monitoring and will staff a telephone information line regarding this program. Blood lead data are used to identify individuals who presently have blood lead levels at or above 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$). If the blood lead level of a child or a pregnant or nursing woman is greater than or equal to 10 $\mu\text{g}/\text{dL}$ then appropriate actions are recommended to identify and address the source of lead exposure and to reduce the blood lead level. These potential range of actions are more fully discussed in section 3.4.2 of this work plan

2.2.3 Environmental Sampling

The environmental sampling and investigation program will address lead from residential soil and dust, interior and exterior paint, and other potential sources beyond an individual residence. Where recommended by the Work Group, residents or owners of a residential property with a pregnant or nursing mother or a child having a blood lead level equal to or greater than 10 $\mu\text{g}/\text{dL}$ will be strongly encouraged to participate in the environmental testing program to assess lead levels in soil, dust, and paint at that property. At the recommendation of the LCCHP Phase 2 Work Group or the discretion of the Lake County Public Health Agency, the environmental testing program will be made available in cases when a child does not have a blood lead level of 10 $\mu\text{g}/\text{dL}$ or higher, but the potential for environmental exposures exist.

Over the long term, environmental investigation and remediation should be handled promptly after the need to do them is established, and with proper written consent.

2.2.4 Identifying the Need for Response Actions

Results from the blood lead monitoring and environmental testing programs are compared to the lead action levels, or trigger criteria. The trigger criteria for LCCHP Phase 2 to conduct an environmental investigation at a residence are:

Blood Lead: greater than or equal to 10 $\mu\text{g}/\text{dL}$ in children age 12 to 72 months and in pregnant and nursing women.

The trigger criteria for performing environmental remediation, based on the results of a residential environmental investigation are as follows:

Soil: greater than or equal to 3,500 mg/Kg

House Dust: greater than or equal to 2,000 mg/Kg

Interior or Exterior Paint: Interior or exterior paint in poor condition: with lead concentration greater than or equal to 1 milligram/square centimeter (mg/cm^2) –

education provided; with lead concentration greater than or equal to 6 mg/cm^2 – active remediation.

Detection of an elevated blood level will trigger an evaluation of the data to determine if environmental investigation of a residence will be recommended. Environmental investigation will generally be recommended unless data and other information clearly show that the source of lead exposure is solely related to consumer products such as toys and candy.

When results of an environmental investigation show that one or more of the trigger criteria is exceeded, the Work Group will evaluate a range of different response actions. The appropriate response actions are determined considering the blood lead level of the child or nursing or pregnant mother and the preferences of the property owner and residents in making the recommendations. No response action will be taken without the permission of the property owner and residents.

CDPHE will design and implement response actions at individual properties as recommended by the Work Group. Each response action design is subject to review and approval by the individual property owner and the current residents (if different). CDPHE will provide construction services and oversight, and prepare final construction reports to document remedial actions at each property. Lake County may assume operation of the environmental testing and remediation program upon request by the County and agreement of CDPHE and EPA.

Residential Soil Repository Wastes generated during any environmental response action are handled in accordance with applicable State and Federal regulations, and any soil removed from individual properties is consolidated at the residential soil repository, as outlined in the separate soil repository plan document as discussed in section 6.1 of this work plan.

2.2.5 Data Management/Record Keeping

Lake County will maintain a data management and tracking system to maintain blood lead testing program results. CDPHE will maintain environmental testing and response action information along with other records related to individual lots and residential properties within residential areas. The data management system will be accessible by the Work Group for use in evaluating and developing response actions at individual properties and to track progress of investigations and response actions, and will be available to CDPHE and EPA for evaluating program effectiveness. The environmental data and response action information managed by the CDPHE will also be available to the Lake County Building/Land Use Department, and will be available for public review. Information will include the address of all properties investigated, a summary of environmental sampling results at each property, and remedial action taken.

2.2.6 Program Review and Evaluation

The LCCHP Phase 2 will be evaluated through the EPA five-year review process. In addition, CDPHE will conduct an annual statistical evaluation of the program in order to determine if remedial action objectives outlined in the Operable Unit 9 Record of Decision continue to be achieved. The statistical review of the program will continue until the next five-year review, scheduled for September 2012, or until alternative performance standards for the program are developed. Thereafter, reviews of the program will occur at intervals as CDPHE and EPA may find necessary. Specific components of the statistical analysis will be developed through the LCCHP Work Group to support the annual program review, and will be dependent on the data available for a given year.

3.0 OPERATION OF THE LCCHP PHASE 2

Lake County Public Health Agency will accomplish the blood lead testing, community education, and clinical management portion of the LCCHP Phase 2. Lake County will provide data management in support of that program, and will also have primary responsibility for the educational program. CDPHE will perform the environmental testing and remediation portion of the program. The CDPHE and EPA will provide recommendations and collaboration on data analysis and program evaluation. The obligations of Lake County and CDPHE to continue to operate the LCCHP shall end when the trust fund becomes inadequate to fund the program, or when Lake County, the State and EPA mutually agree that there is no longer a need for the program in Lake County, or if the parties mutually agree to amend or end the program.

Should Lake County determine that they are no longer willing or able to operate the LCCHP Phase 2, the County may withdraw from operating the program. Lake County will notify both EPA and the CDPHE of their intent to cease operation of the LCCHP Phase 2 to be effective 60 days following receipt of the County's notification.

3.1 Program Administration

Lake County will operate the blood lead testing, community education and clinical management portion of the program. The Lake County Public Health Agency is open to the public and is staffed with qualified individuals at hours convenient to the public. A licensed, registered nurse employed by Lake County will continue to operate the blood lead program. CDPHE will arrange for certified lead paint inspectors and qualified soil sampling personnel to be contracted for environmental sampling and remediation work.

Coordination of program activities will occur through the LCCHP Phase 2 Work Group. The Work Group, (comprised of Lake County, CDPHE, and EPA) will meet or confer whenever

a child with an elevated blood lead is identified. The Work Group may also meet at the request of the Lake County Public Health Agency, EPA or CDPHE when there is a potential for exposure to lead, but a child's blood lead level is below 10 u g/dl.

Funding for the LCCHP Phase 2 is from a trust fund established by ASARCO under the conditions of the 1994 Consent Decree (USDC, 1994). The trust fund will be the source of funding for all elements of the LCCHP Phase 2. Funds deposited in the trust will be administered to the LCCHP Phase 2, by a trustee, according to the conditions described in the LCCHP Amended and Re-stated Trust Agreement.

In the event the Parties cannot reach agreement as to any issue arising out of implementation of this work plan, any party may demand dispute resolution as outlined in Paragraph 19 of the LCCHP Amended and Re-stated Trust Agreement.

3.2 Contact and Recruitment

Participation by eligible residents in the LCCHP Phase 2 is critical to its effectiveness. For this reason, special efforts will be made to contact and recruit participants. These efforts will be coordinated with community awareness and education programs, as described in Section 3.3. Whenever possible, the educational materials, advertisements, and other information available from the program will encourage participation. The telephone numbers for the program will be given on educational materials for questions regarding participation in the program.

The LCCHP Phase 2, through the Lake County Public Health Agency, will coordinate with other community outreach efforts, such as the Head Start program for young children, Medicaid, Immunization, and WIC programs, in providing information about the LCCHP Phase 2 and encouraging participation.

Participation in any aspect of the program is at no cost to the participants, and financial incentives may be offered, as appropriate, to encourage blood lead monitoring. A U.S. Savings Bond in the amount of \$50 or a Safeway gift card in the amount of \$25 each is offered to each child participating in the County's blood lead monitoring program. The bonds or gift cards may be offered on an annual basis for each child tested. In addition, an additional gift card of \$25 from Safeway is offered to each family participating. The gift certificates are offered to families on an annual basis. These incentives are intended to encourage ongoing monitoring of children even when the children are not initially identified as having elevated blood lead concentrations. The incentive program is routinely reviewed so that any necessary changes can be made.

If these methods of contact and recruitment are not effective in bringing residents into the environmental testing program, then additional methods may be adopted such as mass mailings or door-to-door recruitment. If particular areas of the County are indicated as areas of consistently higher blood lead values in children, then more intensive contact and recruitment efforts may be implemented for those areas. The need for changes to recruitment approaches or

for additional recruitment efforts will be periodically re-evaluated in conjunction with ongoing program reviews.

3.3 Community Awareness and Education Programs

The LCCHP Phase 2 works to raise and maintain the community's awareness of the health risks from lead exposures. The objectives of these efforts are to provide information to the community about:

- the LCCHP Phase 2 and the services available to residents and property owners;
- the potential for children to be exposed to lead at levels that could have adverse health effects;
- basic hygiene and adequate nutrition to reduce contact with or risk from lead exposures;
- dust-suppression and remodeling methods, recommended procedures for soil excavation;
- general education about ways to prevent exposure and tracking from bare soil areas; and
- general education about ways to ensure that past response actions are not disturbed;

As described below, the community awareness and education program involves cooperative efforts with local government agencies, including the Lake County Public Health Agency, Lake County School District, Lake County Department of Social Services and Lake County Building/Land Use Department and City of Leadville.

In addition to the community-based program, the LCCHP Phase 2 also provides individual counseling and education to manage lead exposure in and around the home. Individualized education is provided to residents through their participation in the Lake County blood lead-monitoring program.

3.3.1 Educational Materials

Educational materials have been developed for several different target groups. Some of the target groups and their individual needs for information about lead are given in Table 3-1, and copies of most of the educational materials used by the program are contained in Appendix D.

Future educational materials will be reviewed and prepared with cooperation from the Lake County Public Health Agency, Lake County Building/Land Use Department, and the City of Leadville Planning and Zoning Department, CDPHE, and EPA for distribution to the public. Specific educational tools will be developed and provided in both English and Spanish for each aspect of the program, as needed. In some cases brochures will need to be updated to accommodate changes to the program.

On an annual basis, the Work Group will review all educational materials and evaluate if such materials should be replaced, updated, or discontinued.

The materials distributed by Lake County Public Health Agency and CDPHE in support of the LCCHP Phase 2 include:

- initial mailing for all property owners and residents within the former OU9 introducing the new LCCHP Phase 2;
- brochures for local realtors and brokers regarding disclosure requirements and the LCCHP Phase 2 program;
- training materials for local soil excavation contractors and utility companies; and
- Brochures for property owners and contractors regarding reducing lead exposures during remodeling or renovation.

The County in cooperation with CDPHE and EPA will periodically review, evaluate and improve the educational materials and outreach programs.

3.3.2 Distribution of Educational Materials

A number of different distribution methods will be used to provide information to the various target groups. Specific outreach and education methods may change over time. The County will periodically review and may make recommendations to the Work Group for changes to the current educational tools and distribution methods. A summary of the outreach methods that may be used is provided on Table 3-2. Copies of current educational material and mailings utilized by the LCCHP Phase 2 are provided in Appendix D.

Following the public comment period on the LCCHP Phase 2 work plan and upon completion of the final work plan, EPA will notify all residents in the Leadville area of the new LCCHP Phase 2 program in a mass mailing. The mailing will provide information about the potential health risks associated with exposure to sources of lead and a full description of the services offered to residents, especially families with young children and pregnant/nursing

women. The initial mailing will also explain how to contact the program directly to request these services. Additional mailings may be conducted periodically, following the initial mailing as determined appropriate by the Work Group.

Educational materials describing the LCCHP Phase 2 program will be provided to all parents whose children are seen at the Lake County Public Health Immunization Clinics and EPSDT Outreach clinics. All children seen in the Immunization Clinics and EPSDT Outreach clinics also will be evaluated for their eligibility to participate in the LCCHP Phase 2 program. Because the Immunization Clinics are the only sources of childhood immunization in the Leadville area, it is expected that education about the LCCHP Phase 2 program will reach the parents of most children residing in Lake County at these clinics. The Lake County Public Health Agency will develop a methodology for documenting that parents of each child seen at the clinics receive the information and blood testing opportunity. In addition, The LCCHP Phase 2 program will coordinate as needed with adjacent counties (Eagle, Summit) and Leadville area physicians to ensure that Leadville parents whose children they see are given information about the LCCHP Phase 2 program and that documentation of such notification is provided to the LCCHP Phase 2 program.

Should the Immunization Clinics cease to be the sole providers of childhood immunization in the Leadville area, the work group will identify a verifiable means to reach the children who do not receive immunizations from the clinics.

General information will be available in the community through a variety of media. Weekly advertisements during the summer months may be run in the newspaper discussing the availability of program services and information. Advertisements may change periodically depending on the time of year and feedback from the Work Group.

Program information will also be kept on file at the Lake County Public Library, and will also be available through the CDPHE Hazardous Materials and Waste Management Division Records Center at 303-692-3333.

Special emphasis will be made to reach families with children under 72 months old and pregnant/nursing women. Educational information will be given at public and private daycares, at the elementary school and to other groups that focus around young children. Periodic updates will continue at these facilities and educational brochures will be available.

Residents can call the Lake County Public Health Agency for information about the LCCHP Phase 2. The objectives of the information line is to:

- provide parents or caretakers of young children with information about lead risk reduction activities including Lake County's blood lead testing program;
- provide residents with information and guidance about reducing the exposure to lead

- monitor citizens' concerns and make referrals to the appropriate personnel.

The most effective education is individual face-to-face consultations with participants. The program will provide education, counseling and intervention to families with young children. Specific recommendations can be made based on an individual family's situation. For those with elevated blood lead levels, the environmental investigation program through CDPHE can often make customized recommendations for specific actions that will reduce the residents' risk to lead exposure based on the results of environmental lead sampling at their homes and specific information collected by the program about their daily habits and activities.

3.4 Lake County Blood Lead Monitoring

The Lake County Public Health Agency will conduct the voluntary blood lead monitoring program. The program will continue to be available to Lake County residents who are (1) children between the ages of 12 months and 72 months (6 years old), (2) pregnant and/or nursing women, or (3) older children previously enrolled in the program who continue to exhibit elevated blood lead levels. Blood lead monitoring will be available at the Lake County Public Health Agency in Leadville at convenient times for participants. The County personnel staffing the blood lead program will be able to work with other programs such as immunizations, Head Start, and Women, Infants, and Children (WIC) to identify young children who reside in and around Leadville. Spanish interpretation will also be available to Spanish-speaking families. Families with children ages 6 to 72 months will be encouraged to have their children tested annually unless a child's blood lead level is at or above 10 µg/dL in which case more frequent monitoring will be recommended. More frequent monitoring may also be recommended, under special circumstances, for children with a blood lead level below 10 µg/dL at the discretion of the County nurse. If a child's blood lead level exceeds 20 µg/dL, a zinc protoporphyrin (ZPP) test will also be conducted. ZPP tests can be helpful in the assessment of the chronicity of exposures. Additional information on ZPP testing can be found in Table 3-3. Financial incentives to participate in the blood lead monitoring program may be offered as appropriate (Section 3.2). Reminder cards will be mailed to all families either annually or as needed to have their children's blood lead levels re-tested.

The blood lead program will initially screen most children using the capillary (finger stick) collection method. The standard operating procedure (SOP) used by Lake County to collect blood samples by the capillary method is included in Appendix A. The Health Department may choose to collect the sample using the venous method if the child's sibling or a close friend tests above 10 µg/dL or if the parent requests the venous method (i.e., venipuncture). The participant will also have their hemoglobin checked at the same time the blood lead sample is drawn. If a child's blood lead level is at or above 10 µg/dL, then a follow-up venous sample will be collected as soon as possible. All adult participants will have a venous sample collected and analyzed when possible.

A discussion of the effects of lead on children and basic educational information will be given to each participating family. At the discretion of the health nurse, either telephone calls or follow-up appointments will be used to review the results of the testing. Typically, the health nurse will mail results to participants when blood lead levels are less than 5 ug/dL. Follow-up telephone calls will be made when blood lead levels are between 5 and 10 ug/dL, and follow-up appointments will be used to communicate BLLs at or above 10 ug/dL.

3.4.1 Gathering Demographic Information

Demographic information will be gathered from survey questionnaires (Appendix B) and entered into the project database. Each participating family will complete the questionnaires each time monitoring tests are performed and they will provide information regarding possible exposures to lead. Lake County Public Health Agency staff will review them, and any risk factors will be identified and discussed with families.

The questionnaire asks for family information and information on each child tested who is less than 72 months old. If a child has previously been tested in the Lake County blood lead program then the family will be given the questionnaire previously filled out to update the questionnaire instead of completing another. The questionnaire is similar to the questionnaire filled out during the initial environmental investigation; thus the answers can be compared to assist in the evaluation of results. The Lake County Public Health Agency questionnaire is shown in Appendix B.

3.4.2 Blood Lead Test Methods and Data Management

All blood lead samples will be sent to an analytical laboratory that satisfies requirements of the Clinical Laboratory Improvement Act (CLIA), by participating in nationally recognized proficiency testing programs such as those sponsored by the College of American Pathology (CAP), the Wisconsin State Laboratory of Hygiene (WSLH), the New York State Department of Health, or the Pennsylvania Department of Health. Portable screening methods such as LeadCareII may be acceptable, if approved by the Work Group, in which case the provider becomes the “analytical laboratory” and must adhere to state disease reporting requirements and CDC-recommended proficiency testing procedures. . The laboratory will use CDC-approved methods for blood analysis and conform to CDC’s recommended holding times for blood samples (refer to Appendix C, Quality Assurance Plan).

3.4.3 Results Reporting

After receiving the blood lead results from the laboratory, the Lake County Public Health Agency will either telephone the results to the parent or schedule a follow-up appointment to inform the family. Typically, the health nurse will mail results to participants when blood lead levels are less than 5 ug/dL. Follow-up telephone calls will be made when blood lead levels are between 5 and 10 ug/dL, and follow-up appointments will be used to communicate BLLs above

10 ug/dL. A computer printout with the child's blood lead level and hemoglobin results will be mailed. If a child's blood lead level is below 10 µg/dL the family will be encouraged to have their child re-tested annually until the child is 72 months old. If a child's blood lead level is at or above 10 µg/dL, then the CDPHE guidelines for retesting and clinical management, as shown in Table 3-3, will be followed, and more intensive counseling will be offered.

3.4.4 Evaluation of Results

When the Lake County Public Health Agency receives an initial blood lead test result at or above 10 ug/dL, the Health Department will send an e-mail notification to the LCCHP Phase 2 Work Group. Upon venous confirmation of the initial elevated blood level (EBL) results, results will again be forwarded to the Work Group, and the Lake County Public Health Agency will recommend an appropriate course of clinical management. Clinical management provided to an EBL household may include an initial home visit to provide education and counseling to the family and to evaluate potential sources of lead exposure present in the household. Following initial clinical management by the Lake County Public Health Agency, the Work Group will meet or confer to determine whether or not an EBL should be referred to the environmental testing program. The work group will review the need to develop protocols for recommending environmental investigations after one year of operation of the LCCHP Phase 2. Such protocols may be developed thereafter as the work group deems necessary.

Once referred to the testing program, CDPHE will provide environmental sampling and testing with the consent of the resident and/or property owner. The purpose of the environmental testing program is to identify potential sources of lead exposure in and around the home and to provide residents with information regarding potential lead hazards on their property.

3.5 Entry Into the Environmental Testing Program

Following clinical management by the Lake County Public Health Agency of an EBL, if no household source of the lead exposure is clearly identified, the Health Department will coordinate with the Work Group to determine that it is appropriate to make available residential environmental sampling and testing services for any County children or pregnant and nursing women with elevated blood lead levels. The purpose of the environmental testing program is to identify potential sources of lead exposure in and around the home and to provide residents with information regarding potential lead hazards on their property. Generally, homes that have been previously remediated under the LCCHP or LCCHP Phase 2 will not be eligible for environmental testing. However, the Work Group will evaluate every EBL case and make recommendations based upon available information.

Once the Work Group has recommended a property for the Environmental Testing Program, participation in the program will be voluntary with no cost to the participants. At properties previously tested where no changes have been made, retesting will not be performed unless recommended by the Work Group.

For properties entered into the Environmental Testing Program, CDPHE will evaluate homes for the presence of lead in paint, soil, and dust. Paint will be tested in situ. Soil and dust samples will be collected for off-site analysis. Each sample type will be analyzed for lead. CDPHE will perform all testing, sampling and sample analyses and will also report the result of environmental investigations to the individual property owner, residents, the Work Group and Lake County Building and Land Use Department. Sampling personnel will be appropriately trained for collecting and testing samples. Detailed sampling and analysis plans for environmental investigations are provided in Section 4.

If the findings of environmental investigations indicate the potential for risks to residents due to the presence of lead in one or more environmental media then the LCCHP Phase 2 Work Group will also recommend response actions to reduce the risk of lead exposure. The remedial response actions will depend on a variety of factors, which are discussed in detail in Section 4.

3.5.1 Family Surveys/Information Gathering

Following initial clinical management by the Lake County Public Health Agency, if it is determined by the Work Group that the EBL should be referred to the environmental testing program certain general property information about the family will be gathered prior to visiting the home. This information will typically be obtained by reviewing information obtained by the Lake County Public Health Agency and gathering additional information by phone at the same time that an appointment for meeting with the resident at their home is made. This information includes:

- Physical address of property and owner mailing address (if different)
- Ownership of dwelling and contact information for owner
- Telephone numbers of resident
- Language for contact with resident
- Number and age of children under 72 months old residing at property
- Pregnant or nursing woman residing at property

An appointment will be made for an initial face-to-face interview at a time convenient to the resident and as soon as possible. The purpose of the initial interview is to explain the LCCHP Phase 2 sampling program components and services and collect additional information about the family and their residence. The environmental program administrator works with the resident to fill out a “family survey” (questionnaire), which asks questions about possible exposures to lead. The questions focus on remodeling activities, cleaning habits and work and

hobby exposures. A “child survey” will also be filled out for each young child. The child survey asks questions about an individual child’s mouthing behaviors, possible exposures outside of the home, and ethnic background. The Lake County blood lead program and the CDPHE environmental program use similar surveys so that the responses given to both programs can be compared and evaluated over time. At the end of the initial meeting the condition of the property will be visually surveyed and recorded.

The information gathered on the questionnaires will then be entered into a project database and also copied to a project file.

The LCCHP Phase 2 Work Group will use the information collected on the questionnaires, along with blood lead and environmental testing results, to evaluate possible lead exposures at the property and to an individual child. If there is a possible exposure to lead, the Lake County Public Health Agency will notify the family and provide information on ways to reduce risks related to that exposure.

3.5.2 Consent for Access

Residents who participate in the LCCHP Phase 2 environmental testing program must sign a “Consent for Access” form. (Appendix E). CDPHE will be responsible for obtaining access from the homeowner. The agreement grants the LCCHP Phase 2 permission to use demographic information obtained through the questionnaires, sample the property and obtain information needed to evaluate cultural resources on the property. The consent for access also indicates that environmental investigation results will be recorded with Lake County. Before environmental testing is performed the property owner and current residents must sign the consent for access (if different).

At the same time that the consent for access is explained and presented to residents, a form authorizing release of medical information will also be requested to release blood lead records and limited family questionnaire information from the Lake County Public Health Agency to the CDPHE and EPA for use in evaluating health risks.

3.5.3 Scheduling Environmental Sampling and Remedial Response Actions.

The sampling program will be implemented in a manner that minimizes disruption and inconvenience at each residence investigated. CDPHE will schedule sampling at convenient times to residents. Whenever possible, all sampling will be performed during a single visit. The collection of outdoor samples will be dependent on weather conditions. None of the sampling procedures causes damage to structures or painted surfaces. Soil sampling may cause minimal disturbance over a very limited area.

Environmental sampling visits will be scheduled at specified times based upon the availability of environmental sampling teams and the convenience and availability of the participants. Some flexibility should exist in the scheduling to accommodate unexpected changes in the plans of the program participants.

4.0 ENVIRONMENTAL TESTING AND EVALUATION PROGRAM

4.1 Residential Properties Environmental Investigations

The primary purpose of the environmental testing program is to identify potential sources of lead exposure in and around the home and to focus response actions on those sources that present significant risks to resident children. Media sampled that exceed site action levels will be remediated. However, a single source or primary source of lead exposure may be very difficult to identify. For this reason, information collected during environmental investigations will be used in conjunction with family survey information and blood lead test results to identify the need for response actions and focus on the appropriate response actions for the types of exposures that may be taking place. Elements of the environmental investigation and evaluation approach are illustrated on Figure 4-1 and described in this section. Whenever contractors are used to perform environmental testing or remediation work for the LCCHP Phase 2, there will be a preference for hiring local contractors from Lake County to perform the work, to the extent this is allowable under State Procurement Rules. In order that local contractors may have the opportunity to provide services related to the LCCHP Phase 2, CDPHE will notify the Lake County Board of Commissioners prior to advertising to procure such services.

At each property investigated, yard soil, interior and exterior paint and house dust will be sampled and/or tested for lead content. The sampling and analysis approach for each media type investigated will be based on the sampling plans described in this section. Consistent with the goals of the LCCHP Phase 2, each of the sampling plans allows for site-specific modifications to target sources of lead most likely to be encountered by children residing at the property under investigation.

4.1.1 Soil Sampling and Analysis

Representative samples of yard soil will be collected from a number of areas around the residence, as shown on Figure 4-2 and described below. The samples will be submitted to an off-site laboratory for analyses of lead.

4.1.1.1 Sampling Plan

At each property a site-specific sampling plan will be developed based on the following guidelines:

- At a minimum, samples will be collected from each of the following areas: front, side and back yards; exterior driplines, vegetable garden area(s), if any; other garden areas

(e.g., flower beds, etc.), if any; areas of bare soil; and distinct play areas (e.g., swing set or sandbox area) or other area of typical heavy use by children where soil is bare.

- For each area sampled, one composite sample will be prepared from a minimum of three subsamples that are representative of the soil conditions within the area.
- For each area sampled, one composite sample will be collected from the 0 to 2 inch, 2 to 6 inch and 6 to 12 inch depth intervals, except in garden areas where the depth of sampling will be from the ground surface to at least 6 inches and at most 12 inches such that sampling extends to the base of tilled or worked soil.
- In cases where undisturbed native materials, such as glacial till or bedrock, comprise the soil below 6 inches no sample will be required for the 6 to 12 inch depth interval.

Prior to sampling, the sampling team will prepare a sketch plan of the house and surrounding property showing all bare areas, gardens and play areas. At this time a sampling plan will be developed for the property to meet the following sample requirements.

Front/Back/Side Yard samples:

Separate samples will be collected from the front and back yards. A separate sample(s) will also be collected from side yards if the soil characteristics are distinct from those in the front and back yards or if it is deemed that the side yard poses a potential exposure pathway. Each yard sample will be a composite comprised of at least three subsamples. One composite sample will be collected from each of three depth intervals: 0 to 2 inches, 2 to 6 inches, and 6 to 12 inches below ground surface.

Garden area samples:

Within each distinct garden area of at least 30 square feet, such as a vegetable garden or a series of similar flower beds, a minimum of three subsamples will be collected from a depth interval representing the depth of worked soil and composited to obtain a single representative sample. The number of subsamples collected will depend on the total area sampled up to a maximum of 6 subsamples per garden area. The depth of sampling will depend on the extent of soil that appears to be routinely worked or tilled in gardening activities. Typically, depths of worked soil in garden areas extend 6 to 8 inches below ground surface. The maximum depth of sampling will be 12 inches.

Bare area samples:

Bare areas of at least 9 square feet — including bare piles of soil, gravel driveways and walkways will be identified visually and up to three distinct bare areas from a single property will be sampled. Within each separate bare area, three subsamples will be collected from the 0 to 2, 2 to 6 and 6 to 12 inch depth intervals. For each bare area and each depth interval, the three subsamples will be composited to obtain one sample.

Play area samples:

Additional samples will be collected from bare-soil play areas, if any exist at the property (i.e., such as around swing sets or sand boxes, or other bare areas known to be frequented by children). The sampling procedures used for bare areas will also be used in each bare play area, except in the case of sand boxes where one composite sample will be collected from the total depth of sand present, regardless of thickness.

4.1.1.2 Sampling Procedures

A detailed Standard Operating Procedure (SOP) for Soil Sampling is included in Appendix A and is summarized here. The SOP will serve as the primary reference for LCCHP Phase 2 soil samplers.

The soil will be collected using a stainless steel trowel for scooping soil from the top 0 to 2 inches and a coring device such as a drive sampler for collecting soil from deeper intervals. At each subsample location, loose debris and any sod or dense vegetative cover will be removed and the top 0 to 2 inches of soil will be excavated using a scoop or trowel. The top 2 inches of soil from each location will be removed from a circular area approximately 4 inches in diameter and placed in a plastic bag (e.g., Ziploc bag) with other subsamples from the 0 to 2 inch depth interval. A sample will then be collected from the 2 to 6 inch depth using a 2-inch diameter by 4-inch long coring device, such as a drive sampler. The 6 to 12 inch sample will then be collected using a 1.5-inch diameter by 6-inch long coring device. If the drive sampler collection tubes or core liners are re-used at separate locations, the equipment must be decontaminated between locations to prevent cross contamination between depth intervals at each location.

For each depth interval within a single sampling area, subsamples will be combined together in a large Ziploc bag and disaggregated by hand in the sealed bag. The bag will be labeled to identify the property number, sample area (e.g., back yard), sample number, depth interval and date of collection. The sampling team will also record this information before samples are removed from the site. More information regarding sample documentation, labeling and tracking is included in the Quality Assurance Project Plan, Appendix C. The decontamination procedures for all sampling equipment are also provided in an SOP in Appendix A.

Samples will be double bagged and stored in a box or cooler prior to shipping. It will not be necessary to refrigerate samples during storage or shipping.

4.1.1.3 Field Documentation

The locations of all individual subsamples will be marked on a site sketch map with associated composite sample numbers. All sampled areas will also be delineated on the site sketch map. Sample numbers, depths and location descriptions will also be recorded on a soil

sampling worksheet (included in Appendix A, SOP for Soil Sampling). The sampling team will complete these records at the time of sampling. Copies of site maps and soil sampling worksheets will be included in hard-copy property files (refer to Section 8).

4.1.1.4 Sample Analyses

All soil samples from the 0 to 2 and 2 to 6 inch depth intervals will be shipped to an offsite laboratory for analyses of lead. The lead concentration in the 0 to 2 inch depth interval and weighted average lead concentration in the 0 to 6 inch depth interval will be considered when developing recommendations for response actions.

Samples from the 6 to 12 inch depth interval will remain in storage for possible future analysis. The decision to analyze a sample collected from the 6 to 12 inch interval will be based on the lead concentrations measured in the samples from the 0 to 6 inch depth interval at the corresponding location. If the weighted average lead concentration in the 0 to 6 inch depth sample exceeds the trigger value for lead (3,500 mg/Kg), then the 6 to 12 inch depth sample, corresponding to that location, will be submitted for lead analysis.

Soil analyses for lead will be performed in accordance with USEPA SW-846 Method 6200, x-ray fluorescence (XRF) analysis. For each composite sample, the entire sample volume submitted will be disaggregated, dried and sieved by the laboratory to homogenize prior to analysis. The less than 250-micron size fraction (passing 60-mesh sieve) will be used for analysis. Analyses for lead content will be performed on a laboratory XRF instrument calibrated using site-specific soil calibration standards. The detailed quality assurance and quality control requirements for laboratory XRF analyses, including instructions for initial calibration, are provided in Appendix A. When the XRF result is within 10 percent of the trigger criterion for soil (3,500 mg/Kg \pm 350 mg/Kg), then the sample will be reanalyzed using the ICP method (USEPA SW-846 Method 6010) to confirm the result before it is used for comparison to the trigger level. Quality control methods for laboratory analyses of soil samples are provided in the Quality Assurance Plan (Appendix C).

4.1.1.5 Alternate Sampling Plans for Multiple Dwelling Unit Properties

Alternate sampling plans may be developed for properties under single ownership but where multiple dwelling units are present, e.g., trailer parks. On these properties, individual lots may be investigated under the LCCHP Phase 2 one at a time as elevated blood levels are encountered. Common areas of such a property may also be investigated using an alternate sampling plan. Alternate sampling plans will be developed on an as-needed basis. The Work Group will review and approve each plan prior to implementation.

4.1.1.6 Sampling of Playgrounds and Common Areas

The environmental testing program will also allow sampling of non-residential areas such as playgrounds of other common areas that could be a source of lead exposure to children. Where the County elects to sample such common areas, the procedure outlined in Section 4.1.1.5 will be followed.

4.1.2 Exterior/Interior Paint

The procedures for testing exterior and interior paint are based on the U.S. Department of Housing and Urban Development (HUD) guidelines (HUD, 1995) and requirements of the State of Colorado's Air Pollution Prevention and Control Act Regulation 19, Lead-Based Paint Abatement. In cases where the LCCHP Phase 2 paint testing procedures vary from those included in Regulation 19 the procedures will provide equivalent methods for identification and evaluation of lead-based paint hazards.

The paint inspection and testing protocols presented in the work plan have been developed to meet the specific data needs of the LCCHP Phase 2. Those data needs are as follows: locate paint in poor condition to identify potential sources of direct lead exposure and lead in house dust; identify paint with lead content greater than 6 mg/cm² so that remediation may be recommended; identify paint in poor condition with lead content greater than 1 mg/cm² so that remediation may be recommended when children or pregnant or nursing women with elevated blood lead levels reside at the property. These data needs are consistent with the action levels for lead in paint presented in the OU9 ROD.

Lead-based paint hazards will only be evaluated in homes built before 1978. The year built will be obtained from Lake County Assessor's Office. If no building date is recorded with the Assessor, then the paint evaluation will be performed. Because mobile homes are typically not painted and were constructed after 1978, mobile homes will not typically be evaluated for lead-based paint hazards unless there are portions of the mobile home that are painted or the mobile home was constructed prior to 1978. If the date of construction is unknown, it will be assumed that the mobile home was constructed prior to 1978.

A lead-based-paint risk assessor who is trained and certified in accordance with Colorado's Regulation 19 requirements will perform all paint assessment. A State-certified lead-based-paint inspector may also perform paint testing.

At each property investigated, the paint hazard evaluation begins with family and child survey questionnaires (see Section 3.5), which provide the risk assessor with information regarding resident use patterns, child's principal play areas and habits, and other potential sources of lead exposure within and outside of the home. A visual assessment of paint conditions is then performed using the visual inspection procedures included in HUD's

Guidelines for Evaluating Lead-Based Paint Hazards in Housing (HUD, 1995) and detailed in the SOP for Paint Testing and Assessment (Appendix A). After the questionnaires and visual assessment have been completed interior and exterior paint testing will be performed.

A comprehensive paint investigation will be conducted in all homes where a child (or pregnant or nursing woman) with an elevated blood lead level resides, consistent with Chapters 5, 7 and 16 of the HUD Guidelines (HUD, 1995) and as described below.

The lead content of paint will be tested in situ using a portable XRF spectrometer. The paint testing method is non-destructive to paint and will not damage painted surfaces or underlying substrates. Detailed procedures for calibrating, operating and maintaining the XRF instrument are provided in the SOP for Paint Testing and Assessment (Appendix A).

4.1.2.1 Interior Paint Testing Plan

HUD's risk assessment protocols include gathering information on resident use patterns, visual assessment and paint testing. The information gathering and visual assessment help the risk assessor select locations for environmental sampling.

Interior paint will be tested in at least three areas of the home. The areas of the home to be tested will depend on the results of the visual assessment and family and child questionnaires. If deteriorated paint is present, then the deteriorated paint will be tested in at least three areas of the home. In cases where no deteriorated paint is present, testing will be performed in the three areas of the home most frequently or most likely to be used by young children. These areas will typically include the main living area, bedroom(s) and kitchen. The areas where testing is performed will be determined by the risk assessor.

In each room tested, the lead content of paint on painted walls (up to four walls per room) window trim, doors and moldings will be determined. One XRF measurement will be obtained from each wall in the room up to four walls per room. If walls show distinct painting history each wall with distinct paint will be tested. Paint will also be tested on the oldest appearing painted working window in the room. If there are no working windows in the room, either the oldest appearing window will be tested or a window selected at random will be tested. Paint on the window casing, sash and interior sill will be tested. One door assembly will be tested in each room and it will be the door likely to receive the most use. The lead content will be measured for the casing, the jamb (a possible friction surface) and the door. Molding or decorative trim that is accessible to young children (less than 4 feet above the floor level) will be tested. The lead content of paint on molding will be measured for each type of molding in the room, such as baseboard and chair rail types. If the paint on crown molding is in poor condition, it will also be tested. Other painted areas that may represent a source of exposure for young children, such as painted cabinets, may also be tested. Although the same general plan will be followed at each property, the risk assessor will determine the paint condition in other locations and determine the need for additional paint testing.

For homes where young children or a pregnant or nursing woman have elevated blood lead levels, deteriorated paint present in any area of the home frequented by young children will be tested and any painted furniture, cribs, toy closets or other areas that a young child may routinely and frequently come in contact with may also be tested when the paint is in poor condition. In addition, paint will also be tested in the main living area, child's bedroom and kitchen, regardless of paint condition. If paint in these areas is in poor condition, testing will be performed to evaluate the lead content of the deteriorated paint. This approach will allow for identification of lead-based paint hazards throughout the home. In addition, when a child with an elevated blood lead level resides at the home, the lead-based paint risk assessment will always be accompanied by additional investigation of other potential sources of lead exposure (e.g., contaminated soil, hobbies, consumer products, etc.).

4.1.2.2 Exterior Paint Testing Plan

Paint on the exterior of the house and other structures (e.g., garage, storage shed, etc.) on the same property will also be visually assessed and tested when necessary.

The visual assessment will be performed first to identify any areas of deteriorated paint. If deteriorated paint is present, it will be tested for lead content. If no deteriorated paint is present on or around the home, testing will be performed on one side of the home. Testing will include one wall, the main entry door assembly, a representative window assembly and the horizontal and/or vertical trim components on one side of the house. If a more extensive investigation is warranted, XRF measurements will be obtained from each painted side of the house for up to four sides in addition to the locations described above. Results from the family questionnaire and visual assessment may be used by the risk assessor to select locations for exterior paint testing.

For the window, measurements will be obtained from the sill, casing and sash. For the main entry door, the casing, jamb (possible friction surface) and door will be tested. Horizontal and/or vertical trim components will be tested on one side of the house and that side will be either the front of the house or the side with the largest number of architectural features (typically the front of the house). In addition, painted fences and painted storage sheds or other outbuildings on the property will be tested if the paint is in poor condition.

4.1.3 Dust

Interior house dust will be collected for lead analysis at every home evaluated, regardless of age. Sources of lead to interior house dust include outside sources such as contaminated soil and mine waste and inside sources such as lead-based paint. The amounts of dust and lead concentration in dust will vary throughout a house. For this reason, dust will be collected from at least three areas of the home, including (1) heavy traffic areas such as main entries where tracking from outdoors may result in elevated lead levels in dust, (2) areas that are most

accessible to children such as play areas and (3) areas where the paint is in poor condition (if any). The risk assessor will always select locations for dust sampling based on the results of visual paint assessment, family and child surveys and family use patterns. A risk-assessor or inspector will collect dust samples once the risk assessor has selected locations.

A minimum of three dust samples will be collected in each home. Typically, the areas sampled will include the main entry, the primary entry to the main living area and the entry to a young child's bedroom. If a pregnant or nursing mother resides at the home, then heavy traffic areas such as entries and hallways may be tested instead of bedrooms. When a young child residing at the property has an elevated blood lead level, dust samples may also be collected from other areas of the home frequented by that child and areas where paint is in poor condition.

At each of the dust sampling locations, dust will be collected either from carpeted areas using a battery-operated air pump to collect dust in a pre-weighed filter cartridge or from uncarpeted areas using wipe samples. The exact location and type (carpeted, uncarpeted) of sample will be described in field notes and recorded with other sample information in the property file and the electronic database. If there are two separate carpets in a room, such as an area rug overlying wall-to-wall carpeting, the area rug will be sampled since it is the most likely source of exposure for a child.

Using a sampling template, a one-square-foot area will be completely vacuumed using the air pump to collect the dust present. This procedure is documented in USEPA's *Residential Sampling for Lead: Protocols for Dust and Soil Sampling* (USEPA, 1995) and included in LCCHP's SOP for Dust Sampling (Appendix A). Dust samples will be shipped to an offsite laboratory for analysis of lead by flame atomic absorption spectrometry (USEPA SW-846 Method 7420), as described by the Quality Assurance Plan (QAP) in Appendix C.

The trigger criterion for lead in dust is expressed as the lead concentration, or the mass of lead per unit mass of dust (mg/Kg). In order to provide the results of dust analysis in concentration-based units, a known mass of dust must be collected and analyzed. For this reason, the LCCHP Phase 2 uses the vacuum dust collection method (USEPA, 1995), which is the only documented methodology from Colorado's Regulation 19 that allows for analysis and reporting of results in concentration units. These results may also be used to determine the lead loading per unit area ($\mu\text{g}/\text{ft}^2$), if necessary to further evaluate lead exposure in the home.

Dust wipe samples will also be collected. One dust wipe sample will be collected from a windowsill in each room where a floor dust sample is collected. The methods for collecting dust wipe samples are described in the SOP for Wipe Dust Sampling included in Appendix A. The dust wipes will be analyzed for lead and results will be reported as a lead load per unit area (e.g., mg/ft^2).

4.2 Data Evaluation for Individual Properties

Once the results of an environmental investigation are available, they will be released to the property owner and the current residents. The results from the property-specific environmental investigation, released blood-lead data and family information survey will be reviewed and evaluated. This information will be used to identify the properties where response actions may be warranted. Response actions will be offered when the blood lead level of a 1 to 6 year old child and pregnant or nursing mother exceeds 10 ug/dL, and any of the following environmental lead concentration levels are exceeded:

Soil: greater than or equal to 3,500 mg/Kg

Dust: greater than or equal to 2,000 mg/Kg

Interior or Exterior Paint: for paint in poor condition with lead concentration greater than or equal to 1 mg/cm²— education provided; for paint in poor condition with lead concentration greater than or equal to 6 mg/cm²— active remediation.

When one or more of the trigger criteria is exceeded the Work Group will evaluate a range of response actions appropriate to the potential sources of lead exposure identified. The appropriate types of response actions will be presented to the property owner and residents for their consideration, and the property owner/residents will describe their preferences. CDPHE will follow procedures established in this work plan to select response actions and make recommendations to the property owner/residents. No response actions will be taken without the prior permission of the property owner and residents.

Results of blood lead testing will be released to the family by a Lake County Public Health Agency health-care professional. The results will be explained to the family and compared to the trigger level. The family will receive educational information discussing common sources of lead exposure and their associated health risks. This information will also include recommendations on hygiene, nutrition and home cleaning. If a child has an elevated blood lead level, and the Work Group has recommended that the property be entered into the Environmental Testing Program, then CDPHE will contact the resident and property owner to encourage environmental testing of their home. Specific risk factors for children will also be discussed and evaluated for each child tested based on the responses provided to the Lake County Public Health Agency's questionnaire. Further investigation into possible sources of lead — including mini-blinds, dishware, other consumer products, or childcare provider's homes may also be recommended if the results of environmental testing are inconclusive with respect to a potential source (or sources) of lead exposure in the home. Analytical testing of consumer products or other potential sources may be conducted, where practical and recommended by the Work Group to better determine the potential contribution to exposure.

The CDPHE will also provide residents with the results of environmental testing and response action recommendations in person, whenever possible. The Property Summary Table will be provided and results will be discussed and compared to the trigger levels for each media

tested. If trigger levels are exceeded, then the types of response actions recommended by the LCCHP Phase 2 Work Group will be reviewed with the property owner and residents. If the house was built before 1978 or if paint with a lead content greater than 1 mg/cm² is reported, residents and property owners will also receive information on ways to reduce lead exposure during renovation and remodeling activities and information describing monitoring and maintenance of paint in good condition. Property owners will also receive information on the HUD disclosure requirements for lead-based paint.

Based on the property owner's and residents' preferences, CDPHE will prepare a Response Action Plan for review and approval by property owner and residents.

4.2.1 Prioritization of Response Actions

Response actions will be prioritized, as practical, by maximum blood lead levels of children and pregnant or nursing women .

4.3 Response Action Options

The following section outlines the range of possible response actions that will be considered in developing recommendations for action at each property. As described in Section 4.2, environmental testing results will be reviewed with the property owner/resident and the response action recommendations will be explained. As this program is voluntary, the entire range of options, including "No Action," will be explained to the owner/resident. In cases where a property owner or resident elects no action or a response action that is potentially less protective than the LCCHP Phase 2 Work Group's recommendations, the potential risks will be discussed with the property owner/resident, and recommendations will be provided on ways to minimize these potential risks.

Since the program is voluntary, no actions will be taken without the permission of the residents and property owner. In the event that the resident's opinion is different than the property owner's and either the resident and/or owner chooses not to continue with the recommended response action, the final investigation results will be provided to the property owner and its residents and retained on file by CDPHE, and the potential risks of not proceeding with the recommended action(s) will be explained. If there is disagreement between the property owner and resident, efforts will be made to resolve the disagreement and reach a consensus on an appropriate action as part of gaining consent for access from these parties. If these efforts fail and no action is taken, the property will be considered "not remediated" but remediation may be performed at a later date if requested by the property owner.

The following sections describe in general the range of response actions identified in the Operable Unit 9 Record Of Decision to be considered when any of the trigger criteria are exceeded for the media investigated (e.g., soil, dust, paint). In some cases, general preferences

for response action recommendations are established and other considerations to be evaluated relative to specific options are discussed. The comprehensive response action developed for each property will consist of one or more options for each media for which trigger criteria exceedances are observed. The response actions selected will give consideration to the property owner's and residents' preferences.

The development of a Response Action Plan and related attachments is the last step in the response action design process, as discussed in detail in Section 5. The general procedures and specific requirements for implementing the selected response action components at individual properties are included in Section 5 as well.

4.3.1 Elevated Blood Lead

When a young child is identified with an elevated blood lead level ($\geq 10 \mu\text{g/dL}$) the Lake County Public Health Agency will work with the family to develop a plan to reduce the child's blood lead level. The Health Department will follow the response procedures outlined in Section 3.4 and CDPHE guidelines for retesting and clinical management. The program will review the responses from the child questionnaire with the child's parents to identify any possible risk factors unrelated to the environmental media evaluated. Further investigation into other possible lead sources may be needed, such as sampling mini-blinds or pottery or other consumer products.

Information about the child will also be reviewed and evaluated, including:

- responses to the child and family questionnaires;
- possible exposures at daycare, playgrounds, or other dwellings frequented by the child;
- adult/family member work- or hobby-related exposures;
- exposure related to remodeling activities;
- paint condition; and
- yard condition.

All information available from the environmental sampling program will be evaluated to identify potential sources and develop a response action. The response actions to be considered for identified potential sources of lead exposure resulting in blood lead concentrations greater than or equal to $10 \mu\text{g/dL}$ shall include any of the actions described below for soils, dust and paint. In addition, other potential lead sources beyond an individual residence and within Lake

County may be considered by the LCCHP Phase 2 Work Group for remediation and/or education to address exposure.

When a young child (or pregnant or nursing woman) has an elevated blood lead level, actions may be recommended even though none of the environmental media sampled at the home have a lead concentration exceeding the trigger criteria. In response to an elevated blood lead level, soil response actions may be considered even when soil lead concentrations do not exceed 3,500 mg/Kg and paint response actions may be considered when lead-based paint (≥ 1 mg/cm²) in poor condition is present. The Work Group will have the ability to recommend such response actions for any property where a child or pregnant or nursing woman with an elevated blood lead resides.

In every case where a child with an elevated blood lead is identified, education about strategies for reducing exposure to lead will be provided to the family. In cases where the program is not able to identify a source of lead exposure for such children, continued frequent blood lead monitoring will be strongly recommended and educational support will be offered to the family on a continuing basis. The Health Department will also provide for continued monitoring of children with elevated blood lead concentrations beyond the age of six, although those children would be beyond the age group at highest risk from exposure to lead. As new information becomes available, the Health Department in consultation with the Work Group, will re-evaluate the case.

4.3.2 Soil

The trigger criterion for residential soil response actions under the LCCHP Phase 2 is: soil-lead concentration greater than or equal to 3,500 mg/Kg. The following response actions could be taken for residential soils:

No Action

No action may be selected when soil lead concentrations do not exceed the trigger criterion of 3,500 mg/Kg. .

Education

Appropriate educational materials will be provided to the owner regarding maintaining areas of existing soil cover, including vegetated areas; safe methods for soil excavation and disposal; and information about reducing risk through good hygiene and nutrition. Annual blood lead monitoring for young children will also be strongly recommended.

Containment

This option includes the following installation alternatives to contain contaminated soils. Alternatives listed here may be used in combination on any given property.

- Soil cap: Borrow soil placed over impacted areas.

- In situ mixing: Mixing of surficial soils having lead concentration above 3,500 mg/Kg with underlying unimpacted soils could be performed to reduce lead concentrations to acceptable levels. Homes with soil-lead concentrations greater the 3,500 mg/Kg in the 6-12 inch depth interval are not considered amenable to this alternative due to the difficulty in mixing to the depths required to achieve the objective.
- Sod placement: Sod placed over impacted soils.
- Compacted clay cap: Compacted clay placed over impacted areas with a minimum one-foot silty or sandy protective layer to maintain cap integrity.
- Sprayed asphalt: Sprayed asphalt placed over impacted areas and covered with soil or opaque reflective paint to protect the asphalt from ultraviolet light and retard oxidation.
- Asphaltic concrete: Asphalt for paving grades or special blends mixed with well graded, crushed aggregate, placed over impacted areas.
- Concrete cap: Concrete placed over prepared impacted areas.
- Multi-layered cap: Cap composed of some combination of natural soils, soil admixtures, clay, asphalt, asphaltic concrete, or Portland cement and placed over impacted areas.

The capping material selected depends on the type of cover that exists at the property, drainage patterns, the needs of the property owners and the local availability of capping materials. The types of cover materials to be used may include topsoil, sod, gravel, road base, concrete and/or asphalt. Compacted clay caps and sprayed asphalt will not be routinely considered and are not described in Section 5.

Diversion Ditch Construction

Construction of diversions and/or culverts may prevent run-on to source areas and reduce both erosional and leaching release of metals from a source to a residential property. Diversion ditches or culverts are typically included in a response action in conjunction with other soil actions and are intended to increase the long-term effectiveness of the selected remedy.

Removal

Removal of soil would be accomplished through hand excavation with the aid of mechanical excavation equipment. The removal depth would be decided on a case-by-case basis based on site-specific information, but would be no more than 12 inches. During excavation and

transport, dust suppression will probably be necessary. After excavation, borrow materials would be transported to the residence and placed. Yards would be revegetated, generally with sod. Excavated materials could be put to beneficial reuse as approved by the County and the regulatory agencies or could be removed to the LCCHP soil repository. Cap or cover materials used in response actions will be similar to the materials currently in place at the property. For example a gravel driveway will be replaced with new gravel or road-base material.

Soil removal to a depth of either 6 inches or 12 inches will be considered based on the results of soil sampling and analysis. Any soil response action performed by the CDPHE and/or its contractors will include family and property owner education and appropriate disposal of soil.

4.3.3 House Dust

Potential sources of lead for in-residence dust are: lead-based paint in poor condition, bare soil areas, gardens, streets, alleys, tailings and mine waste, hobbies and work activities. Dust may be transported into the home by wind or on items taken outside and then returned inside. The response actions available to address elevated lead levels in interior dust are:

No Action

No action may be recommended when dust lead concentrations are less than 2,000 mg/Kg or for an interim period when another primary source, such as yard soil or interior paint, is addressed.

Education

Appropriate educational materials will be provided and annual blood lead monitoring for young children will be strongly recommended.

Physical Protective Measures

This response action includes sealing off unfinished basements, attics or crawl space areas to limit exposure to dust from these areas. As these sources for dust are not typically evaluated, these types of actions will be considered only in cases where the blood lead trigger level has been exceeded in young children who reside at the property.

Removal and Disposal

One or a combination of the following methods may be considered for removing interior lead-dust:

- Vacuum interior living spaces with a HEPA vacuum. Dust can be disposed of in a RCRA Subtitle D landfill as it is considered a household waste.
- Damp mop all floors, window wells and other wood work with a trisodium phosphate (TSP) cleaning solution (or other appropriate cleaning fluid).

- Wet wash walls, floors and wood work with TSP cleaning solution (or other appropriate cleaning fluid).
- Clean furnace ducts using the USEPA-approved program for duct cleaning.
- Place mats at entry doorways so that shoes may be appropriately shaken or wiped before entering, reducing the amount of soil entering the residence.
- Remove settled dust from horizontal surfaces.

Dust abatement is always performed following a paint removal or abatement action that generates dust inside the home (see below) but may also be performed in response to lead concentrations in dust above the trigger level of 2,000 mg/Kg. Dust abatement specifically includes a HEPA vacuuming and wet washing of all surfaces within the work area, as defined in HUD's *Guidance for the Evaluation and Control of Lead-Based Paint Hazards* (HUD, 1995). When no response actions are performed to address lead-based paint, other dust removal actions can be selected to address elevated lead concentrations in dust, as appropriate to the conditions at the property.

Following completion of a dust removal or abatement action, a set of clearance samples will be collected to confirm that dust remaining in the work area no longer represents a lead hazard. Methods for collecting these clearance samples are described in Section 5. If the results from such samples do not meet the clearance criteria, then the removal action will be repeated until the clearance level is achieved.

4.3.4 Exterior and Interior Paint

Residences may have interior and/or exterior paint that is lead-based. Lead-based paint in poor condition may contribute to lead exposure through inhalation and ingestion of dust or direct consumption of paint chips.

Before response actions are initiated, repairs may be required. For example, repairs to leaking pipes that contributed to paint degradation and lead-based paint hazards. These repairs may be provided by the program as part of the response action for the affected area only. Some repairs may be required to be completed by the owner or resident before response actions are continued.

Depending on the paint's lead concentration and condition the following response actions may be considered:

No Action

No action will be taken if no lead-based paint (at or above 1 mg/cm²) is identified through the environmental testing program.

Education

If paint contains lead at or above 1 mg/cm² and is in poor condition (peeling, chipping, chalking) or coating a friction surface, education, risk counseling and information on actions they may take themselves will be provided to residents. Appropriate educational materials, including information regarding risks related to renovation and remodeling activities and ways to maintain paint in good condition, will be provided and annual blood lead monitoring for young children will be strongly recommended.

Source Control, Containment, Covering or Removal

If paint has lead levels either greater than or equal to 6 mg/cm², active remediation would be recommended. Source controls may be implemented to minimize deterioration of lead-based paint and include repair of defective substrates, paint encapsulation, repair of friction surfaces for smooth operation, enclosure of a painted area or component (e.g., with drywall). If either encapsulation or removal is chosen for remediation, the remediated areas will have a surface paint-lead level no greater than 1 mg/cm².

Paint Removal and Replacement

Removal and replacement actions may involve individual painted components, such as doorframes, or paint removal from an area of the home. Paint removal without replacement involves removal and refinishing. Removal could also include component removal, replacement and refinishing. The materials used in removal and replacement actions will be similar to those existing on the property.

For homes where lead-based paint is known present based on the results of paint testing, information will be available to property owners involved in renovation or remodeling activities requiring a building permit (refer to Section 7). In addition, the Federal lead-based paint disclosure law (Residential Lead Based Paint Hazard Reduction Act and 24 CFR Part 35 and 40 CFR Part 745) requires property owners to provide any available information regarding the presence of lead-based paint to interested purchasers of the property prior to any property transfer.

After any action that leads to the disturbance of lead-based paint, dust abatement will be performed to remove dust potentially containing lead-based paint. Dust abatements will be performed in accordance with procedures included in Colorado's Air Pollution Prevention and Control Act, Regulation 19 – Lead-Based Paint Abatement. Clearance sampling to confirm that dust abatement has been effective will be performed at the completion of dust abatement actions (refer to Section 5.6).

4.4 Cultural and Historical Resource Evaluations

Portions of the County lie within the Leadville National Historic Mining District (National Register of Historic Places No. 5LK846) and some portions lie within the Leadville Historic Landmark District (NHLD) (No. 5LK40). Properties within these districts may be individually listed on the National Register of Historic Places (NRHP), determined eligible for individual listing, or determined to be contributing elements of either of the districts. For this reason, planned response actions that address physical conditions on a property need to be developed with consideration for historic preservation. These actions fall within the definition of a federal action, and as such, require participation from the State Historic Preservation Officer (SHPO) in evaluating properties and developing response actions that mitigate adverse effects to cultural resources. Therefore, Lake County will work directly with SHPO to evaluate architectural resources at properties within the NHLD where response actions are planned and to evaluate potential archaeological resources at all properties participating in the LCCHP Phase 2 where soil response actions are planned. For each property entering the program, the location will be compared to the boundary of the NHLD to determine whether the property lies within that district, and this information will be recorded in the property file.

For properties within the NHLD where buildings or other structures built prior to 1950 are present, the buildings and structures will be photographed and a Preliminary Cultural Resource Evaluation Form will be completed by Lake County. The Preliminary Cultural Resource Evaluation Form, photographs and information describing the location of the property will be supplied to SHPO along with information describing the location of the property and a request for determination of the property's contribution to the historic district, according to the following criteria:

- **Contributing elements:** elements that retain a sufficient degree of integrity as related to the district.
- **Potentially contributing elements:** elements that may retain a sufficient degree of integrity as related to the district. Further review and evaluation will be necessary to determine the status.
- **Non-contributing elements:** elements that have been substantially altered and/or constructed within the last 50 years (after 1950). Consequently, they do not represent the period of historic use.

In short, in order to be considered contributing to the NHLD the property must retain sufficient physical integrity to convey the characteristics for which the historic district is significant. Physical integrity means that the property must in fact date to the period(s) and retain the physical appearance to convey the period. For the Historic Mining District, the same criteria apply except that any type of property associated with the historic mining periods may contribute, such as mine waste piles, roads, rail grades and other landscape features and resources that may have potential to contribute additional information (archaeology) such as town sites and trash dumps.

The SHPO has accepted certain types of response actions as actions resulting in no adverse effects to cultural resources. The list of actions accepted as having no adverse effects and other actions that may be routinely performed as part of the LCCHP Phase 2, the “no adverse effect” actions, follows:

- **Residential Soil:** education and institutional controls; replacement of driveways or walkways following existing configuration and with in-kind materials; containment, diversion ditches and soil removal are considered to have no adverse effect when monitoring is performed, as needed, during these activities (refer to discussion below)
- **House Dust:** education; physical protective measures; dust removal and disposal by cleaning and decontamination
- **Interior/Exterior Paint:** education; containment and covering when historic architectural features remain in place; encapsulation; painting with lead-free paint; removal or replacement of non-historic components; historic component removal when replacement is with like-kind or compatible materials; paint removal and repainting; cleaning.

If the planned response action at a property includes only the “no adverse effect” actions listed above, then a detailed resource evaluation will not be necessary. If, however, the response actions needed at a property have the potential for adverse effects on historical resources then a preliminary evaluation of the property and a determination of its architectural significance and contributing status to one of the historic districts will be conducted.

SHPO will notify Lake County of their determination regarding contributing status within 14 days of receipt of these materials. Lake County will then notify the Lake County Historic Preservation Advisory Board (LCHPAB) of each property’s contribution status with respect to the historic district. The SHPO determination will also be recorded in the project’s electronic database.

For properties determined to be non-contributing, no additional cultural resource evaluation or consideration will be necessary to develop and implement final designs.

At properties determined to be contributing or potentially contributing to the NHLD and where response actions with potential adverse effects are planned, SHPO must be consulted concerning the effects of any proposed actions, after the types of response actions needed have been identified. In order to comment on effects, SHPO may need information in addition to the Preliminary Form previously submitted. Additional information would be in the form of completed Colorado Historical Society Management Data Forms and Historic Architectural and/or Historic Archaeological Component Forms, as appropriate. The completed information will be provided to SHPO and LCHPAB prior to final design of the appropriate response actions. No final response actions will be implemented until the additional information has been reviewed.

Any property, regardless of age of buildings and other structures on the property, has the potential to contain archaeological resources that contribute to the Leadville Historic Mining District. For this reason, additional measures will be taken to observe, document and describe features of potential archaeological significance prior to and during any soil response actions. Because even the most invasive soil response action will be limited to removal or other disturbance of the top 6 to 12 inches of soil, large-scale disturbance or destruction of significant archaeological features is not expected. In addition, based on experience monitoring soil response actions at more than 625 residential properties so far, it appears unlikely that significant cultural resources will be encountered. If concentrations/deposits of historic materials (artifacts) and/or evidence of intact features or structural remains are encountered during a soil response action, work will be stopped until a cultural resources professional, i.e., archaeologist, can examine and evaluate the significance of the resource or remains encountered. The presence of sparse or scattered artifacts or the disturbed remains of features within the work area is not cause for work to be halted; the materials should be set aside for examination by the archaeologist at a later date. If there is any question as to the nature of the materials discovered (density of materials, intactness of features), the professional archaeologist will be notified. This approach will apply to all properties where soil response actions are planned, regardless of NHLD or Historic Mining District contributing status.

Mitigation of disturbance of significant archaeological features, as recognized by a professional archaeologist, will be achieved through onsite monitoring of soil disturbance activities and documentation of any features observed. When monitoring is performed or when artifacts, features or remains are identified and later examined, the archaeologist will complete the Management Data Form, and if necessary, Historical Archaeological Component Forms. This information will be provided to SHPO and LCHPAB.

In unusual cases where a child with an elevated blood lead level has been relocated during a response action, the response action must be completed as quickly as possible to protect the health of the child and to clear the property for child occupancy. In these cases, the response action is considered critical and must be expedited to the extent possible. Most of the response actions required under the LCCHP are those listed as having no adverse effects on cultural resources. In those cases where actions with potential for adverse effects are performed as emergency response actions, SHPO will be notified of the selected remedy and the time-critical nature of the action. In these cases only, SHPO concurrence with the selected response action will not be necessary to initiate and complete work at the property.

5.0 ENVIRONMENTAL RESPONSE ACTIONS

Following the evaluation of environmental and blood lead data and the coordinated effort between the CDPHE and the individual property owners and residents to develop a site-specific Response Action Plan discussed in previous sections, the recommended and accepted plan will be formalized with the appropriate level of detail needed to facilitate implementation of the remedy. Response Action Plans will be sufficiently detailed to provide the property owner and resident with a detailed understanding of the work to be performed and guide the actual performance of the work. This section addresses the development of the Response Action Plans, and related attachments, as well as providing the general requirements and more specific procedures and specifications that will be followed in implementing response actions. This information is provided in the following sections by media type and is organized by providing the general requirements necessary to prepare and control work areas followed by more specific requirements or material or procedural specifications that may govern certain aspects of a selected response action. Because the specific details of remediation will be developed on a property-by-property basis, with a priority placed on accommodating the preferences of property owners and residents, the information contained in this work plan may not specifically address every component of a selected remedy.

5.1 Response Action Plan

As discussed in Section 4.3, a Response Action Plan will be prepared to document the recommended response actions and obtain necessary approvals from the property owner and resident. The Response Action Plan will include the environmental test results and a written description of the corresponding response action components and will be provided to the property owner and residents for review.

A Soil Remediation Site Plan (Site Plan) will also be prepared for properties where a soil response action is planned. The Site Plan is a drawing that will identify the areas to be remediated and the associated response action(s) for those areas. More specifically, it will illustrate the boundary of the developed property, locations of the main residence and other structures, driveways, sidewalks, flower beds, garden areas, bare areas, and any other pertinent property features. The Site Plan will indicate the existing types of vegetation, landscape materials, and other ground cover (e.g., concrete, asphalt, gravel, etc.) present. For containment or removal actions, the Site Plan will outline the areas to be excavated and/or covered and the type of replacement and/or cover materials (i.e., topsoil, road base, sod, concrete, asphalt, etc.) to be used, and will identify vegetation to be removed or left in place and fences or other landscape features to be removed and replaced, if necessary, to complete the remediation. The property boundary indicated on the Site Plan will be based on visual observations of the property and discussions with the property owner, but will not necessarily be based on the legal description of the property, unless provided by the property owner.

Prior to remediation, both the Response Action Plan and the Soil Remediation Site Plan (if any) will be submitted to the property owner/resident for final approval. The property owner and resident will be required to initial both documents indicating their acceptance of the remediation activities to be performed.

5.2 Consent for Access

Property owners/residents must grant access to their property before remedial activities can begin. A consent for access form will be prepared for each property requiring remedial action (the Consent for Access for Remediation Activities is included in Appendix E). The Response Action Plan and the Soil Remediation Site Plan (if any) will be included as attachments to the consent for access form.

The Response Action Plan will contain the property owner/tenant and contractor responsibilities. Residents and visitors will be requested to limit travel, to the extent possible, through the affected areas during remediation activities and will be asked to adhere to all safety precautions outlined in the agreement. The property owner/resident will also be responsible for removing obstructions within the work area that may hinder activities.

After the consent for access has been signed and dated (by both the property owner and the resident), the program will develop the remediation schedule and coordinate work with the contractor(s). Property owners/residents will be given notification before the work begins.

5.3 Oversight and Reporting

Response actions will be performed under the direction and oversight of CDPHE or their designated representatives. Oversight activities will include: monitoring response action activities and ensuring adherence to the Response Action Plan, Site Plan (if applicable) and project specifications; maintaining appropriate records and documentation of the work performed; and coordination with the property owner and/or resident as work progresses. Photo documentation, by still photographs and/or videotapes, will be used to document pre-remediation and post-remediation conditions of each property. In addition, condition of buildings and other fixtures will be noted, and photographically documented, as necessary, including verification of the integrity of structures and foundations with respect to the anticipated depth of excavation. Post-remediation photographs and/or videos will be taken within a week of completion of response action activities.

A Property Documentation Report (PDR) will be prepared for each property upon completion of the response action(s). The PDR will include information on the property description and location, the environmental investigation, the development of remedial actions, remedial actions performed, changes or problems encountered during construction activities and any completion information required (i.e., any clearance sampling, replacement soil sampling

and educational materials distributed). The Property Summary Table and Soil Remediation Site Plan (if any) for each property will be included as attachments to the PDR. A PDR will also be completed for properties where no action was performed, based either on the LCCHP recommendation or owner preference, and will include property information and results of environmental sampling.

Copies of the PDR will be provided to the property owner for his/her records. Copies will also be maintained at the Lake County Building/Land Use Department files for public access. Copies will also be sent to the LCCHP Phase II Work Group via e-mail.

5.4 Soil Response Actions

This section outlines the requirements and procedures common to all soil response actions and provides general requirements or specifications specific to each type of action selected. The general categories of action options available, other than no action, are as follows:

- Removal and Replacement
- Containment (Capping and In-Situ Mixing)
- Construction of Diversion Structures

The objective of a soil response action is to either remove the source of lead or to eliminate the pathway of exposure through covering or other means of containment. In general, the replacement or cover material utilized will be similar in kind to the existing materials to be removed or covered, with consideration given to property owner/resident preferences. In the process of identifying appropriate options and making recommendations for soil response actions, the condition of existing vegetation, the use patterns of the property, and current drainage patterns within and adjacent to a property will be evaluated. In general, removal and replacement will be the preferred soil response action option.

Containment options such as soil cover will be recommended, as appropriate, considering property owner/resident preference, where excavation is not practicable, or where additional soil is necessary to provide proper drainage (e.g., replacement soil thickness greater than the removal thickness). Containment utilizing asphalt or concrete, may be recommended for driveway, sidewalk, or walk-way areas if replacing an existing concrete/asphalt surface which is in poor condition, allowing a pathway to underlying lead contaminated soils, or in situations where removal is not practicable and the placement of concrete or asphalt is a cost-effective alternative. The placement of sod as a cover can provide an effective barrier to limit exposure to lead contaminated soil if the sod is properly maintained. However, the use of sod alone as a containment option will not be recommended. In-situ mixing may be used as a containment option in situations where lead concentrations above 3,500 mg/Kg are observed in the 0-2 inch depth interval only and lead concentrations in the underlying soils are relatively low.

Construction of properly placed diversion structures (i.e., diversion ditches, berms, or culverts) may be necessary to protect a remedy or to prevent re-contamination of the property from other sources. Surface water diversion options will be recommended, as needed, as a component of the soil response action but will not typically be the primary response action at a property.

5.4.1 Contractor Requirements

Soil remediation personnel must have successfully completed the Occupational Safety and Health Administration (OSHA) 40-hour HAZWOPER training in accordance with 40 CFR 1910.120.

5.4.2 Yard Preparation and Site Controls

Certain preparatory and site-control activities, common to all soil response action options, will be conducted at each property as generally described in the following sections.

5.4.2.1 Access Controls

During remediation activities, clean access will be provided to the resident at all times. Clean access means the resident will not have to walk through soil prior to entering their home. Sidewalks will be thoroughly brushed and washed off with water after each workday to provide as clean an entry as possible to the residence. If there is no sidewalk to the residence, a clean pathway to the residence will be provided by laying down plywood, pallets, plastic, or using other temporary measures to prevent exposure and tracking of contaminated soils. All residents (especially children) will be asked to stay away from the construction area during remediation activities. Unsafe excavation areas or stockpiled soils will be fenced to prevent accidents and exposure.

5.4.2.2 Utilities and Surface Obstacles

Prior to beginning any work, the remediation contractor will be responsible for coordinating with local utility companies to locate electrical, water, sewer, gas, cable, and phone lines. The property owner/resident will be asked to provide any information they may have on the location of subsurface obstacles (i.e., septic systems and abandoned utility lines). Should excavation/mixing activities impinge upon any known buried utilities/obstacles, the remediation contractor will be required to hand-excavate the area.

Surface obstacles to be removed prior to remediation will be identified by the CDPHE and the remediation contractor. The property owner/resident will be asked to move such obstacles and any personal possessions away from the area to be remediated. In special cases, where the property owner/resident is physically unable to move the identified obstacles, the contractor will be available to assist them in the removal process. Fences and gates will be removed, if necessary, to facilitate access to the work area. All fences and gates will be replaced at the end of remediation activities.

5.4.2.3 Dust Control

Water application will be used to minimize the potential for fugitive dust emissions. Application rates will be regulated to control dust during excavation yet not result in the development of mud. The objective is to minimize airborne dust and, at the same time, minimize production of mud that could be transported off-site on haul trucks and other mobile equipment. Dust suppression equipment will consist of standard garden hoses and spray regulators. Outdoor faucets and hydrants from private residences and public areas will be used as water supply sources. The CDPHE and their contractors will coordinate with residents and the local municipalities regarding water use. At properties where water sources are not available, a tanker truck or trailer will provide the water supply.

The remediation contractor will provide water applications during the course of remediation and restoration operations on an as-needed basis, as follows:

- Prior to excavation activities and prior to travel of equipment and work crew on the site on a daily basis;
- During soil removal operations by heavy equipment and by hand crews;
- At work intervals where wind and/or dry weather require such actions to prevent airborne emissions;
- During stockpiling and/or loading of soils for transport;
- To wash down sidewalks, alleys, or streets impacted by soil handling and transportation activities (these areas may be swept if it can be accomplished without dust);
- Prior to the placement of fill or cover materials during the restoration process; and
- Prior to leaving the premises at the end of each workday.

5.4.2.4 Protection of Structures and Plants

Excavation by hand will be required for all areas susceptible to potential damage from heavy equipment operations. Areas of concern include structures (i.e., houses, garages, sheds, paved driveways and sidewalks) and landscaping vegetation (i.e., trees, hedges, and large shrubs). Oversight personnel will periodically inspect structures and buildings for evidence of damage resulting from remediation activities. If remediation activities do result in any damages, the CDPHE will immediately contact the property owner to determine and discuss the extent of the damage and any repair work needed.

5.4.3 General Remediation Procedures

This section outlines the construction procedures and specifications to be followed when implementing each of the soil response action options. Soil response action activities will be planned to minimize both physical and lead-related hazards for workers and residents. This includes sound safety measures, operating heavy equipment in a safe manner and performing actions at each property quickly and efficiently to limit disturbance to the residents. The requirements for clean replacement soil and capping materials are provided in Section 5.4.3.7.

5.4.3.1 Removal and Replacement

The extent of removal will be based on the results of soil sampling efforts and will be identified in the Response Action Plan and on the Soil Remediation Site Plan. Individual areas selected for excavation will generally encompass, at a minimum, the entire area represented by a single composite sample unless another type of action is selected for a portion of the area. Yard soils will be excavated to a minimum depth of 6 inches and a maximum depth of 12 inches. Vegetable garden areas identified during the sampling efforts would typically be excavated to depths of 12 inches, depending on the results of the soil sampling in these areas. In general, the following areas may be excavated (subject to the results of sampling in these areas): sod areas; landscaped areas; roadway shoulders (if curb and gutter are not present) to the edge of the road and to the lateral extent of the property lines; garden areas; play areas; unpaved driveways; garages with earthen floors; unpaved storage areas; and areas under temporary structures such as storage sheds, landscape timbers, stepping stones, etc. Excavation will not occur in areas that are paved or otherwise covered (such as concrete pads, patios, sidewalks, paths, and driveways) or in areas where permanent structures are present, which preclude exposure (such as houses, garages with paved floors). Larger trees and shrubs will be left in place. Excavation around shrubs and tree roots will be performed by a combination of equipment and handwork to remove as much contaminated soil as practical without undue damage to the plant's root system. Smaller shrubs can be removed if required. If a property owner/resident wishes to save any small plants, shrubs, or bulbs in the removal areas they will be required to remove them prior to the initiation of excavation activities. Once excavation around plants is completed, backfill will be initiated as soon as possible using dampened replacement soils to reduce plant stress.

Existing contaminated soil and sod can be removed using a variety of powered equipment and hand tools, as necessary. Primary equipment will consist of skid steer loaders, front-end loaders and small backhoes. Clean replacement material may consist of topsoil, road base, gravel, decorative rock or other landscape materials (decorative bark or mulch) and will be selected to match the existing materials or other suitable material based on the property owner's/resident's preference. Replacement soil material will meet the requirements specified in Section 5.4.3.7.

Oversight personnel will perform inspections to verify the depth of removal. Replacement fill shall be placed to depths to match surrounding grade or to greater depths if necessary to correct drainage problems. Prior to placing fill material in the excavated area, the contractor should establish final grade lines to ensure the required amount of fill will be placed. The area should be sloped to keep drainage away from the house and other structures. Compaction of the replacement soil in areas to be vegetated will be accomplished using the loader bucket of the placement equipment to back-blade the material to the required thickness prior to the application of sod or seeding. Gravel or road base used as fill material for driveway or walkway areas will be compacted, as appropriate, using suitable equipment to avoid future settlement and drainage problems. Garden soils, flowerbed soils and sand for play areas will be placed loose and left uncompacted.

Sprinkler systems encountered will be either excavated by hand and saved or removed and disposed of with other debris. Generally the sprinkler heads will be removed and saved along with major components such as manifolds, valves and controllers. The pipes will be removed and disposed. Upon backfill the pipes will be replaced and the saved or usable components re-installed.

5.4.3.2 Soil Cover/Capping

The extent of areas selected to receive soil cover will be identified in the Response Action Plan and Soil Remediation Site Plan. Cover soil consisting of general fill, topsoil, or gravel road base will be placed to a minimum depth of 6 inches or to greater depth as needed to match surrounding grades or to correct an identified drainage problem. The selection of the appropriate type of cover material will be based on the existing materials currently in-place and the property owner's/resident's preference. Decorative rock or landscape materials (i.e., decorative bark or mulch) will not be suitable for use as the sole cover material. Cover soil material will meet the general requirements identified in Section 5.4.3.7. Compaction of the cover material will be accomplished using the same procedures identified in Section 5.4.3.1 for replacement soils.

5.4.3.3 Concrete and Asphalt Caps

Concrete and asphalt caps are generally constructed in high traffic areas such as driveways, porches and sidewalks. The use of asphalt or concrete as a cover material will be

limited to special circumstances, which may include: situations requiring the removal of existing concrete or asphalt, and where removal is not practicable and the placement of concrete or asphalt is a more cost-effective alternative.

Prior to placing concrete or asphalt, subgrade soils shall be excavated to the appropriate grade, leveled (if needed) and compacted. If the existing subgrade soil is determined to be unsuitable (material with a high organic matter content or which may exhibit swell potential or is otherwise difficult to compact) by the oversight personnel, a 2- to 4-inch-thick, compacted, gravel road-base material may be placed to provide adequate support.

Concrete utilized for sidewalks, walkways, or porches will be designed to achieve a 28-day compressive strength of 3,000 pounds per square inch (psi), will include standard admixtures for air entrainment and will be placed with a nominal slab thickness of 4 inches. Control joints will be placed approximately every 8 linear feet. Concrete utilized for driveways will be designed to achieve a 28-day compressive strength of 4,000 psi, will include standard admixtures for air entrainment and will be placed with a nominal slab thickness of 4 inches. Control joints will be placed a minimum of 15 feet in all directions. Ten-gauge, welded-wire steel fabric will be placed as reinforcement for crack control in driveway concrete. Concrete testing will not be routinely performed.

Asphalt utilized as cover material will be a locally available, plant-mixed, asphaltic concrete pavement designed as a standard hot-laid roadway mix and will be placed at a nominal thickness of 2 inches, or greater depending on subgrade conditions.

5.4.3.4 In-Situ Mixing

As identified in the ROD, mixing of surficial soils having lead concentrations above 3,500 mg/Kg with underlying unimpacted soils could be performed to reduce lead concentrations to acceptable levels. In-situ mixing, or deep tilling, of the upper 6 inches of soil may be performed in some situations where soil-lead concentrations in the 0 to 2 inch depth interval exceed 3,500 mg/Kg, lead concentrations in underlying soils are relatively low and the weighted-average lead concentration for the top 6 inches of soil is below 3,500 mg/Kg. Properties with lead concentrations greater than 3,500 mg/Kg in the 6 to 12 inch depth interval are not considered amenable to this alternative due to the difficulty in mixing to the depths required to achieve a reduction in lead concentration below the trigger level.

Deep tilling will be performed using equipment capable of completely turning and mixing soil to a minimum depth of 6 inches. Tilling will be performed by making a minimum of two passes with the tilling equipment, in perpendicular directions, to achieve adequate soil mixing. Following tilling/mixing the area will be graded and prepared for vegetation establishment or other actions per the Response Action Plan. Verification sampling will be performed to ensure surficial soils are below response trigger levels.

5.4.3.5 Seeding and Sod Placement

Vegetation will be established by either seeding or sod placement only where previously existing vegetation was removed, and will typically be performed only after a yard area has been remediated (i.e., in-situ mixing, soil capping or removal and replacement) as indicated on the Soil Remediation Site Plan. The selection of seeding or sod placement will be based primarily on the pre-remediation conditions of the property but may also be influenced by other site conditions that could preclude sod application. The use of sod alone as a cover material (without removal or capping), while listed in the ROD as an appropriate containment option, will not usually be recommended due to the uncertainties with maintaining the sod in good condition.

Prior to seeding or sod placement and in conjunction with fertilizer application, the area will be prepared by lightly raking or disking (to a 2-inch depth) the surface. Typically, an inorganic fertilizer will be applied using the following mix: nitrogen (as N), 60 lb/acre; phosphorous (as P₂O₅), 60 lb/acre; and potassium (as K₂O), 30 lb/acre (i.e., N-P-K of 60-60-30). Alternate organic fertilizer blends may also be considered.

Companies specializing in sod production will supply sod. The sod shall be a blend of grass types suitable for the growing conditions at the site. Success has been achieved in the past, under the Kids First Program, utilizing a blend of 60% bluegrass, 30% rye, and 10% fine fescue.

Sod will be placed as soon as possible after delivery. Sod will be installed with tight seams and joints to meet with adjoining lawns, walks, fences or borders and no overlapping. The remediation contractor will water areas of new sod immediately after installation and will lightly roll the sod to achieve a good bond between the sod and soil. The property owner or resident will be responsible for maintaining sod once the installation and initial watering is completed. Maintenance includes the necessary fertilizing and watering required according to the grower's specifications. Information on the proper care and maintenance of sod will be provided to all residents receiving new sod.

Seeding will be performed utilizing a native-grass seed mixture suitable for the growing conditions at the site and acceptable to the property owner/resident. Seed may be applied by dry broadcast, hydroseed or drill methods. If dry broadcasting is used, the surface shall be lightly raked following seed application. Mulch will not typically be applied for seeded yard areas.

5.4.3.6 Surface Water Diversions

As discussed previously, surface water diversions may be implemented as a component of a soil response action, but they will not typically be the primary response action at a property. In some cases, diversion ditches or berms may be constructed or culverts placed to reroute run-on from adjacent areas if necessary to protect a remedy or to prevent future contamination.

Specific details of appropriate surface water diversions will be developed on a property-by-property basis and will be included in the Response Action Plan and Soil Remediation Site Plan.

5.4.3.7 Cover and Replacement Fill Requirements

Soils used as replacement fill or cover material will be obtained from local borrow sources and will be tested to verify compliance with the program's "clean fill" standard. All sources of fill material (i.e., general fill, topsoil, or road base) will be tested to confirm that the concentrations of lead, arsenic and cadmium are below the standards established for the program, as listed on Table 5-1. The fill material will also be submitted for paste pH and gradation analysis for comparison to the requirements listed on Table 5-1. With respect to soil texture or gradation, material used for general fill or topsoil will generally be a sandy silt material with less than 10 percent by weight made up of material sized greater than 2 inches in diameter. Gravel road-base material used for driveway, walkway or other areas at the request of the property owner/resident shall generally meet the requirements of a Class 6 (3/4-inch maximum) or Class 5 (1.5-inch maximum) aggregate as specified by the Colorado Department of Transportation and will most likely be obtained from a commercially operated gravel pit.

Gravel road base or other general fill material obtained from a commercial source will be sampled and tested once prior to use at any residential properties within OU9. Fill materials obtained from borrow areas or other sources within the California Gulch Superfund Site will be sampled and tested once prior to use and periodically thereafter at the minimum frequency of approximately one sample per 1,000 cubic yards of material used. Clean fill material may be stockpiled at a central location and delivered for use at individual properties as the need arises. When sampled, a composite sample will be collected from a stockpile or original source of fill material and analyzed for the parameters listed in Table 5-1.

Composite samples representative of the material in use at the time of sampling will be analyzed for the parameters listed in Table 5-1 in accordance with the SOP for Fill Sampling (Appendix A). Each fill sample will be analyzed for lead at an off-site laboratory by USEPA SW-846 Method 6010B (refer to QAP, Appendix C). In addition to lead, samples will be analyzed for arsenic, cadmium, pH, organic content and particle size retained on the No. 200 sieve (>0.075 mm). Table 5-1 specifies the requirements for fill materials placed on residential properties. If these requirements are not met, the materials will not be used.

For each sampled stockpile the properties receiving the material will be tracked and the lead concentration as well as other physical characteristics of the sample will be recorded in the property file. The lead concentration of fill used at each property will also be recorded in the electronic database.

5.4.3.8 Soil Transport and Disposal

Excavated soil, sod and related yard debris will be transported to the LCCHP soil repository, as discussed in Section 6. Excavated soils will be removed from the property at the earliest opportunity. Transport to the soil repository will require travel on public roads, will generally be limited to daylight hours and will be performed in a safe and controlled manner in accordance with State and local rules and regulations. Loads will be kept below the upper edges of the truck bed and moistened with a water spray, as necessary, to minimize the dispersal of excavated soils through airborne emission or spillage.

5.5 Dust Response Actions

This section outlines the requirements and procedures common to all dust response actions and provides general requirements or specifications for each type of action selected. The general categories of action options available, other than no action, are as follows:

- Education
- Physical Protective Measures
- Removal and Disposal

The most commonly recommended and implemented dust response options, for situations where dust-lead concentrations exceed the trigger criterion of 2,000 mg/Kg, will be removal options. For the purposes of the LCCHP Phase 2 there are two categories of removal response actions. One is defined as a dust removal action and the other as a dust abatement action. A dust removal will typically be recommended in situations where there are no exceedances of trigger criteria for lead in interior paint and the paint is in good condition. A dust abatement, which includes some additional activities, will typically be recommended if paint is identified as a potential contributor to lead in dust and will always be implemented following the completion of a paint removal or abatement action which potentially generates lead-containing dust inside the home. Where dust lead levels are found between 500 and 2,000 mg/Kg, residents will also be informed about lead dust abatement methods.

Educational support will always be provided to residents where lead in dust is a concern. Residents will be provided educational materials on how to effectively reduce lead-dust through cleaning activities (e.g., regular cleaning routines, wet dusting, etc.). Annual blood lead monitoring for young children will be strongly recommended.

Physical protective measures such as sealing off unfinished attic, crawlspace or cellar areas, as referenced in the ROD, will not constitute a typical dust response action. These areas of a home are not sampled during LCCHP Phase 2 dust sampling efforts as described in Section 4.1.3. These types of actions will be considered only in cases where the blood lead trigger has been exceeded in a young child who resides at the property and after all other media have been

addressed. Specific physical protective measures to be considered will be developed and evaluated on a property specific basis using the results of additional investigative and sampling efforts.

5.5.1 Contractor Requirements

All personnel performing dust abatement or dust removal activities must have successfully completed an accredited training course for lead-based paint abatement workers, in accordance with Section III.B. of Regulation 19. Supervisors are required to complete an accredited supervisor training course and be certified by the State of Colorado, in accordance with Section III.B. of Regulation 19. Evidence of appropriate training and required certifications for all personnel will be kept on record with CDPHE.

5.5.2 Site Controls

The following general site controls and containment procedures will be followed during dust removal and dust abatement response actions.

- Whenever dust removal/dust abatement activities are conducted, residents (especially children) will be asked to stay out of the house. If residents must stay inside the house during remediation, the appropriate barrier systems will be erected.
- “Lead Hazard” warning signs will be posted at the entry to each area being treated. A physical barrier is required to prevent access to the work area by the resident(s).
- The ventilation system will be turned off during cleaning activities.
- A State-certified supervisor is required to be on the site during work-site preparation and abatement activities and during post-abatement cleaning activities.
- A site Health and Safety Plan, including a Lead Compliance Plan, will be developed to address worker health and safety at properties where dust removal and abatement actions are performed.
- Prior to performing remediation activities, the abatement supervisor will determine the appropriate work-site containment level (based on the requirements specified by Regulation 19). The work-site containment level is based on the size of the area to be disturbed and the type of remediation activities performed. For dust abatement actions following a paint action, the containment established for the paint action (refer to Section 5.6) will be maintained during dust abatement actions.

- All waste generated by removal/abatement activities should be removed from the house and stored in a secure, locked area. Disposal will be performed as discussed in Section 6.

5.5.3 Dust Removal Actions

Dust removal response actions will be conducted to remove the lead dust accumulation generated by lead-containing soils and other materials that have been tracked into a residence from an on-site or off-site source. In general, on-site sources of lead dust come from the property's lead-containing soils. Dust removal for an on-site source of lead can be conducted as an interim control measure or after soil remediation activities have been performed.

Dust removal actions consist of thoroughly cleaning all horizontal surfaces with the exception of ceilings. The detailed procedures for dust removal activities as described in Chapter 11, Section IV.b.2. of HUD's 1995 Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (HUD Guidelines) will be followed. All hard surfaces will be cleaned with a minimum of two passes with a HEPA-filter-equipped vacuum cleaner (HEPA vacuum) and then wet-washed with a tri-sodium phosphate (TSP) detergent and rinsed with clean water. Cleaning should begin with the highest horizontal surface and end with the lowest. Tops of windows would be cleaned first followed by tops of sashes, mullions, interior window sills and troughs. Areas that tend to trap dust should also be cleaned (i.e., radiators, baseboards, vents/registers, and all horizontal components of ventilation ducts).

Wall-to-wall carpeting and area rugs are cleaned with a HEPA vacuum equipped with a beater bar or agitation attachment. Area rugs are first vacuumed on the pile side at a rate no faster than one (1) minute for every 10 square feet. The rug is then folded in half, exposing the backing. The backing is vacuumed at the same rate as before without using the beater bar. The rug is unfolded and folded in half the other direction exposing the backing on the other half of the rug. The vacuuming procedure is repeated on the second half. The top or pile side of the rug is then vacuumed again using the beater bar at a rate no faster than 2 minutes for every 10 square feet. Wall-to-wall carpeting is vacuumed in two segments using the beater bar attachment. The two segments are in perpendicular directions. The vacuum rate is no faster than 2 minutes for each 10 square feet.

After all cleaning activities have been completed, a State-certified lead-based-paint inspector or risk assessor will perform a visual inspection and conduct clearance sampling, as described in Section 5.5.6. and the SOP for Clearance Dust Sampling (Appendix A).

5.5.4 Dust Abatement Actions

Dust abatement actions are generally associated with lead-based-paint abatement activities. The procedures for dust abatement activities, as described in Chapter 14, Section V of the HUD Guidelines and Section V.H. of Colorado's Regulation 19, will be followed. All surfaces (horizontal and vertical) are cleaned during dust abatement. Procedures are generally the same as those for dust removal actions. Cleaning begins with the highest surface and ends with the lowest surface. Ceilings are cleaned first, then the tops of walls and so on working downward to the floor. The surfaces are first cleaned with a HEPA vacuum then wet-washed with TSP detergent and then rinsed with clean water. The rinsed surfaces are allowed to dry and one final pass is made with the HEPA vacuum. Wall-to-wall carpeting and area rugs will be cleaned using the same procedures outlined above for dust removal actions. After all cleaning activities have been completed, a State-certified inspector or risk assessor will perform a visual inspection that will then be followed up by clearance sampling, as described in Section 5.5.6. and the SOP for Clearance Dust Sampling (Appendix A).

A dust abatement should be performed a minimum of one hour after all paint-related activities have ceased to let dust particles settle. All containment plastic placed prior to remediation activities should be misted with water and cleaned. Plastic used to isolate contaminated rooms from non-contaminated rooms should be left in place and are the last to be removed.

5.5.5 Dust Clearance Sampling

Following response actions to address lead-dust, samples will be collected to confirm that the actions performed have been effective in reducing the exposure to identified lead-dust hazards. A visual inspection will also be performed to confirm that all areas adjacent to the work area and used to access the work area are visibly free of dust, debris or residue and to confirm that work was conducted as specified in the Response Action Plan. The clearance samples will be collected from within the work area at least one hour after the completion of remediation and cleaning activities. Clearance dust samples are collected using the wipe method described in the SOP for Clearance Dust Sampling (Appendix A).

Clearance samples will be collected by a trained and State-certified lead-based-paint inspector or risk assessor. One wipe sample will be collected from the floor and one from a windowsill, if present, in each room of the work area. If any paint sealants were used as part of the response action, then the clearance samples will be collected at least one hour after the sealant has dried. All clearance samples will be submitted to a National Lead Laboratory Accreditation Program (NLLAP)-recognized laboratory for analysis of lead.

Each wipe sample must meet the following clearance levels for lead in order for work to be considered complete: floor samples $100 \mu\text{g}/\text{ft}^2$ and window samples $500 \mu\text{g}/\text{ft}^2$. If a clearance sample exceeds these levels, dust response actions will be repeated and clearance samples will be collected again.

5.6 Interior/Exterior Paint Response Actions

The objective of a paint response action is to provide an appropriate level of risk reduction from potential exposure to lead in paint. A wide range of options may be considered in response to lead in paint and, as with other media responses, an appropriate action will be determined on a case-by-case basis considering the preferences of the property owner/resident. This section outlines the requirements and procedures common to most paint response actions and provides general requirements or specifications for each type of action selected. References are provided, as appropriate, to specific requirements contained in other guidance or regulations.

The general categories of action options available and sub-categories are as follows:

- Education
- Source Control, Containment, or Covering
 - Paint film stabilization
 - Encapsulation
 - Enclosure of a painted area
 - Friction and impact surface treatments
- Paint Removal and Replacement
 - Paint removal

Because of the dual trigger criteria for paint, education is an important component of all paint response actions. In situations where paint contains lead above 1 mg/cm^2 and is in poor condition or coating a friction surface, education will be the primary intervention provided to help reduce potential risks associated with lead-based paint. In situations where paint has lead levels greater than 6 mg/cm^2 and is in poor condition, active remediation will be recommended, but education will continue to play an important role in overall risk reduction.

Active remediation may consist of one or more of the source control and paint removal options listed above. Several options provide risk reduction through ‘source control’ (i.e., through actions other than removal) including paint film stabilization, encapsulation, enclosure, and friction and impact surface treatments. Paint film stabilization is the process of applying a protective coating over existing lead-based paint surfaces. Encapsulation is the process of applying a liquid coating or adhesively bonded covering material to act as a barrier between lead-based paint and the environment. Enclosure is the installation of a rigid barrier over lead-based paint surfaces in order to prevent access and exposure. The treatment of friction and impact surfaces by repairing, replacing or covering the affected components may also be implemented. Removal options consist of either removing the paint alone or the entire painted component (e.g., door, window, or trim).

Certain activities or work practices, as described in Section V.B.1 of Colorado's Regulation 19, will be prohibited for use in activities related to lead-based paint. In general these restricted activities include: open-flame burning or torching; dry sanding or scraping; machine sanding, grinding, abrasive blasting, sandblasting; drilling or cutting; and high-pressure water washing. Machine sanding, grinding or abrasive blasting may only be used if equipped with HEPA exhaust control devices which are capable of continually capturing all particulates generated. Similarly, high-pressure water washing, or hydro blasting, may only be used if the point of operation is completely self-contained and the water is captured within a local shroud. Chemical stripping methods will be used only to remove paint from highly decorative or ornate components or surfaces that are otherwise difficult to abate by any other method, and to accommodate the preference of the homeowner.

For properties investigated by CDPHE, paint testing and assessment results will be available on request to future property owners. In addition, any information provided by CDPHE or the Work Group, to a property owner regarding the presence of lead-based paint must be disclosed to future purchasers of that property in accordance with HUD's lead-based-paint disclosure rules. Educational materials targeting homeowners and remodelers will provide relevant information about methods to reduce exposure to lead from lead-based paint in the home (refer to Section 3.3 above).

5.6.1 Contractor Requirements

All personnel performing lead-based paint remediation activities must have successfully completed an accredited training course for lead-based paint abatement workers, in accordance with Regulation 19. Supervisors are required to complete the accredited supervisor training and be certified by the State of Colorado as described in Section III.B. of Regulation 19. Evidence of appropriate training and required certifications for all personnel will be kept on record with CDPHE. Personnel performing work not directly involved in lead-based paint abatement (e.g., the installation of enclosures or the replacement of building components) must be skilled in their respective trade but will not be required to have specific training for lead-based paint activities. A State-certified lead-based paint abatement supervisor will supervise such personnel.

5.6.2 Site Controls and Containment Procedures

This section addresses general site controls and containment procedures that will be implemented prior to and during paint abatement activities.

As part of the Response Action Plan for response actions addressing lead-based paint, measures to be taken during the response action to protect the residents from exposure to any lead-based paint hazards will be identified, consistent with the requirements of an "Occupant Protection Plan," described in Section V.A.6 of Regulation 19. At a minimum, residents will be required to stay out of work and containment areas and asked to stay out of the house during

active operations. The need for temporary relocation of the residents during interior paint response actions will be considered on a case-by-case basis, depending on the area of the home affected by activities, the level of containment required, the anticipated duration of activities, and the preferences of the residents.

Prior to performing remediation activities, the abatement supervisor will determine the appropriate worksite containment level based on the type of activities to be performed, the size of the area affected, and other requirements specified by Regulation 19. The appropriate level of containment will be selected in accordance with the following sections of Regulation 19: Section V.C. for interior abatement (excluding window abatements); Section V.D. for exterior abatement; and Section V.E. for window abatements. In general, the containment activities addressed will include the following items:

1. Warning Signs
2. Warning Barriers
3. Ventilation System Shutdown (interior abatements only)
4. Protection of Objects
5. Floor or Ground Protection
6. Cleanup Activities
7. Special Work Area Egress Requirements (if any)
8. Conditions Requiring the Use of a Negative Air Flow Machine

The integrity of all containment systems will be inspected regularly and maintained to prevent the potential spread of lead contamination outside the work area. In the event of a breach or malfunction of any containment component, appropriate measures will be taken to remedy the situation and the area potentially contaminated will be cleaned in accordance with the procedures described in Section 5.5.4 of this work plan as soon as the condition is observed.

A State-certified lead-abatement supervisor is required to be on site during remediation activities. The abatement supervisor will ensure that work is conducted in accordance with the Health and Safety Plan and Lead Compliance Plan developed for the project. Oversight will be performed by CDPHE or their representative, certified as an inspector or risk assessor to monitor the performance of the work in accordance with the Response Action Plan and applicable provisions of Regulation 19.

During remediation or abatement activities, all horizontal surfaces in the work area will be cleaned of visible dust and debris prior to ceasing work each day. Following the completion of activities, dust abatement will be performed as described in Section 5.5.4 of this work plan and in accordance with Section V.H. of Regulation 19. Waste generated by remediation activities will be handled in accordance with Section V.K. of Regulation 19. In general, lead-contaminated waste will be wrapped and sealed in 6-mil polyethylene sheeting prior to removing the waste from the work area and will be stored in a covered container in a locked area if not transported off-site immediately for disposal. Disposal activities are addressed in Section 6.

5.6.3 Interior/Exterior Paint Remediation Procedures

Lead-based paint response actions utilize the same basic techniques for performing both interior and exterior remediation. Following are general procedures for each type of remedial response listed above in Section 5.6.

5.6.3.1 Education

When lead-based paint is present, CDPHE will provide educational materials to the property owner and current residents (if different) to explain the risks related to lead-based paint and ways to reduce exposure to lead originating from lead-based paint. Relevant educational materials provided by CDPHE may include USEPA publications such as: *Reducing Lead Hazards When Remodeling Your Home* (USEPA, 1994) and *Protect Your Family from Lead in Your Home* (USEPA, 1999a). At the same time that educational materials are provided, LCCHP staff will explain risks and methods to reduce those risks to the family.

In addition, before starting any response actions that are likely to disturb lead-based paint, the owner and/or residents will be informed of the dangers associated with these types of activities due to the potential for increased exposure during these activities.

5.6.3.2 Source Control, Containment, or Covering

This section describes the general procedures and references relevant specific regulations and guidelines for source control actions, including paint film stabilization, encapsulation, enclosure, and friction and impact surface treatments.

Paint Film Stabilization

Paint film stabilization is the process of painting over existing lead-based painted surfaces with a non-toxic, protective coating and will be performed in accordance with Section V.I.1 of Regulation 19. The types of finish coats to be used for lead-based paint stabilization include varnish, acrylic latex, polyurethane and deck enamel. Prior to coating, the substrate will be inspected and items such as loose wall or ceiling plaster, loose trim or wallpaper, missing hinges or doorknobs, etc. should be repaired or replaced. In addition, the source of any water damage should be identified and repaired. All surfaces will be prepared, as necessary, to help ensure adequate adhesion or bonding. Steps to be taken to prepare the surface may include: (1) removing all loose surface material by wet scraping or wet sanding; (2) removing all surface contaminants that will reduce the adhesion of the paint with degreasers or detergents; (3) treating (roughening) glossy surfaces by wet sanding, HEPA-vacuum-assisted sanding or chemical

etching; and (4) enhancing substrate adhesion by chemical etching, wet sanding, spot sealing and applying rust inhibitors. After the affected surface has been prepared for painting, it will be vacuumed with a HEPA-filter-equipped vacuum cleaner to eliminate any lead dust. To maximize the life of the paint cover, a system of compatible coatings is necessary. In selecting an appropriate coating or paint, the following factors will be considered; the type of substrate involved, type of the existing substrate coating, type of primer to be used, whether it will be applied inside or outside and the type of topcoat.

Encapsulation

Encapsulation is a process that makes lead-based paint inaccessible by providing a barrier between the lead paint and the environment. The requirements for encapsulation systems provided in Section V.G. of Regulation 19 will be followed. The barrier is formed using a reinforced or non-reinforced liquid-applied coating (e.g., LeadMaster, L-B-C Lead Barrier Compound and Insl-Cap Lead Encapsulating Compound) or an adhesively bonded covering material (e.g., sheet vinyl systems, floor tile, wall systems and other adhesively bonded systems). Liquid encapsulants are usually applied with brushes, rollers, sprayers or trowels. Only surfaces with non-deteriorated substrates may be considered for encapsulation. Deteriorated components or paint films (i.e., rotten wood, rusted steel, spalled plaster, masonry in need of repainting, and areas that are subject to moisture problems) are not recommended for encapsulation. Friction surfaces, such as window jambs, interior floors, exterior wood flooring and stairs, are also unsuitable for encapsulation. The surface preparation procedures described above for paint film stabilization will be performed prior to applying an encapsulant.

Because most lead-based paint films are made up of many paint layers, a measure of how well these layers adhere to each other and to the base substrate will be a good indicator of whether or not the surface should be encapsulated. The paint film must demonstrate adequate adhesion between the layers and to the substrate, as determined by a certified inspector, using appropriate methods in accordance with HUD Guidelines.

To determine whether or not an existing painted surface is a viable candidate for encapsulation and to determine the proper encapsulant, a “patch test” will be performed. A patch test is a field test procedure in which a small area of the existing lead-based paint surface is prepared and the encapsulant applied. At least one patch test should be performed for each type of component in each room or exterior location where the encapsulant is to be used. Patch tests should also be performed on those surfaces that are the most likely to fail. For instance, patch tests should be performed in areas that have been identified with potential adhesion problems due to moisture or on load-bearing walls because they are subject to higher stresses.

In general, encapsulants must not be applied over dirt, rust, oil, grease, mildew, chalk or other surface contaminants. The painted surface should be cleaned with a tri-sodium phosphate (TSP) detergent. After washing, the surface is rinsed with clean water. Some lead-based paint films are glossy and should be deglossed to improve adhesion with the selected encapsulant. Special deglossing materials are usually suggested by the encapsulant manufacturer. In some cases, wet sanding may be the only effective method of deglossing. All loose paint should be

removed from the surface by wet-scraping. The area prepared for the patch test should be at least 2 inches larger in each direction than the area to be encapsulated for the test. For liquid-applied encapsulants, a patch test will be conducted on a 6-inch by 6-inch area on one wall of each room being treated unless it has been established that both rooms have the same paint history. For fiber-reinforced encapsulants, a smaller 3-inch by 3-inch area may be used. After the surface has been prepared, the encapsulant is applied and cured according to the manufacturer's recommendations. After the encapsulant has cured, the patch is examined for adhesion and compatibility with the existing lead-based paint. There are a number of tests that may be employed to evaluate encapsulant adhesion, as described in Chapter 13, Section V.I.C of the HUD Guidelines, including the X-Cut Adhesion Method, the Patch Edge Method or the Soundness Method. The decision to proceed with an encapsulation response action and selection of the encapsulant may depend on the results of such a patch test.

Enclosure

Enclosure is the installation of a rigid, durable barrier that is mechanically attached to building components. Surfaces with lead-based paint are enclosed in order to prevent access and exposure and to provide a "dust-tight" system. Enclosure is normally implemented for large surfaces such as walls, ceilings, floors and siding. Enclosure systems will be installed following the procedures presented in Section V.G. of Regulation 19 and Chapter 12, Section III of the HUD Guidelines.

All unsound substrates and structural members that will support the enclosure will be repaired prior to constructing the enclosure. All lead-based painted surfaces to be enclosed will be labeled with warning signs ("Danger: Lead-Based Paint") every 2 feet, both vertically and horizontally. A drawing of the building's floor plan that shows where the lead-based paint has been enclosed will be prepared and included with the Property Documentation Report provided to the property owner. A copy of this drawing, covered with plastic, will be placed within the building in an easily accessible area such as a utility room or closet.

The following materials can be used to construct interior surface enclosures: wood paneling, gypsum drywall/fiberboard and certain types of laminated wall sheeting products. Wood paneling is commonly used for wall enclosures but cannot be used for ceiling enclosures. There should be no gaps in seams, around outlets, boxes and registers. All seams should be caulked. Drywall/fiberboard may be used for wall and ceiling enclosures. The drywall is usually glued directly onto the affected surface with construction adhesives and then mechanically fastened to the studs or structure behind the plaster. All joints will be taped and sealed with joint compound. In areas where moisture is a problem, moisture-resistant drywall should be installed. Wherever the drywall meets wood framing or any other finish material, the seams should be sealed with caulk or other sealant.

Lead-based painted floors should be enclosed with ½-inch-thick or thicker plywood (or other underlayment). The plywood is then covered with the desired floor covering. Wooden steps with lead-based paint should be completely covered with vinyl or rubber treads and risers. Painted pipes can be enclosed with the same kind of tape that is used to make plaster casts. The

wrapped tape should overlap itself so that it is not dependent on adhering to the painted surface. Frame covers may be used to enclose both wood and metal doors.

The following materials can be used to construct exterior surface enclosures: vinyl or aluminum siding, board products made of synthetic fiberboard or wood composites, natural or synthetic brick and stone veneers and stucco. Vinyl or aluminum siding may be used to enclose exterior painted surfaces. Any defective substrates must be repaired or replaced prior to attaching siding. Siding may not provide an airtight enclosure; to ensure that dust doesn't "leak" through enclosure systems, a breathable cloth material such as Tyvek (or an equivalent material) can be installed prior to placing siding. Aluminum coil stock can be used to cover soffits, fascia, decorative crown molding, door and window frames, parapets and other moldings.

All enclosures should be designed to be dust-tight for at least 20 years. All crevices, holes, seams, edges, joints and cracks shall be caulked. The underside of all enclosures shall be back-caulked to further prevent leaded dust and lead residues from escaping the abated surface.

Friction and Impact Surface Treatment

Friction surfaces are those surfaces usually subjected to abrasion, which creates the potential to generate dust from lead-based painted surfaces. Common friction surfaces include parts of a window that are rubbed when the window is opened and closed, tight-fitting doors, cabinet doors, drawers, stairway treads, and railings. Floors may also be considered friction surfaces, however, the methods described in this section typically apply only to the components listed above.

Impact surfaces are those that protrude outward and tend to be bumped and banged. The most common impact surfaces are doors, doorjambes, door trim, door stops, outside corners of walls, baseboards, shoe moldings, stair risers and chair-rail moldings.

Subject to the preferences of the property owner and an evaluation of cost, the most effective option may be to remove and replace the friction or impact component or to perform a paint removal. If the components or paint are removed, the procedures described below in Section 5.6.3.3 will be followed. However in some cases, friction or impact surfaces may be covered/enclosed, or otherwise treated, to adequately eliminate or control potential dust generation caused by abrasion. For window systems, it is possible to install replacement window channels or slides made of aluminum, vinyl and polyvinyl chloride (PVC). These components will be back-caulked and nailed into place to provide an adequate seal. For door systems, where the door rubs or sticks, the simplest solution is to remove the door and plane down all friction points using appropriate dust-control methods (e.g., wet methods or HEPA-filter-equipped tools). Installation of rubber tread guards, carpet or tile is recommended to lessen the friction on stair treads, provided that the lead-based paint is in good condition or is adequately sealed or encapsulated.

5.6.3.3 Paint Removal and Replacement

This section describes the general procedures and references relevant specific regulations and guidelines for removal and replacement actions, including paint removal and painted component removal.

Paint Removal

Paint removal involves separating the lead-based paint from the substrate using heat guns, chemicals or certain contained abrasive measures. Paint removal must be conducted using appropriate methods and control technologies, as described in Section V.B. of Regulation 19 and Chapter 12, Section IV of the HUD Guidelines, to contain particulate matter and dust which may be generated.

Removing lead-based paint with a heat gun works well on wood surfaces but will usually damage drywall and plaster surfaces. Heat guns should be operated at a maximum heat setting of 1,100 degrees Fahrenheit. For most heat guns, the optimal distance from the end of the heat gun to the working surface is 3 to 6 inches. Heat should be applied to just soften the paint, not allowing the paint film to scorch or smoke. At the very first sign of paint softening, blistering or bubbling, the use of the heat gun will be discontinued and the loose paint will be scraped off the surface. When performing lead-based paint removal with a heat gun, a fully charged, ABC-type, 20-pound fire extinguisher must be available within 100 feet of the work area. Abatement personnel are required to wear powered air-purifying respirators with HEPA-filtered cartridges and organic-vapor cartridges when performing abatement activities with a heat gun.

Paint may be removed from most surfaces by wet scraping. Wet scraping can be accomplished by using a spray bottle or sponge attached to a paint scraper. The surface may also be misted with water and scraped with a putty knife or similar instrument. Wet scraping is generally used to remove flaking paint prior to paint-film stabilization or encapsulation. Wet scraping will not be performed around live electrical circuits/outlets. If electrical outlets are present within a building component to be removed, the circuits must be turned off and disconnected prior to wet-misting. Dry scraping of lead-based paint is allowed only when working with heat guns.

HEPA sanding uses traditional electric sanders (disc, orbital or vibrating sanders) equipped with a specially designed containment system that is placed under a partial vacuum. All exhaust air is passed through a HEPA filter to reduce the amount of airborne lead dust and particulates.

As discussed previously, chemical stripping methods shall only be used to remove lead-based paint from highly decorative or ornate components or surfaces that are otherwise difficult to abate by any other method. If chemical removal is the desired action, on-site or off-site paint stripping may be performed.

General procedures for using chemical removers are as follows. The paint remover is applied with a spatula, trowel or brush and allowed to sit for the required period of time following all manufacturers' directions. The remover should not be allowed to dry out during this process. After waiting the required period of time, the softened paint is removed with a

scraper or putty knife and deposited into a watertight and corrosion-proof container. The waste will be disposed of in accordance with Section 6.2 of this work plan. The stripped surface is then thoroughly cleaned to remove lead and paint-remover residues. The treated surfaces must then undergo a neutralization process (this must be accomplished immediately for wood surfaces before they dry out). After the neutralization process, the damp surface is cleaned with a high-phosphate detergent or cleaner and followed up with a clean water rinse. If the rinse water exhibits a pH greater than 8, the neutralization process should be repeated. After neutralization is achieved, the surface may be repainted. Surfaces that have undergone the removal process should be repainted using latex paint only. Cleanup and clearance sampling are performed after removal activities. When using chemical paint removers: (1) products that contain methylene chloride will be avoided and (2) a portable eyewash station capable of providing a 15-minute flow will be available on site. Personal protective equipment required for this method includes chemically resistant clothing; long neoprene, nitrile, rubber or PVC gloves; and face shields.

Off-site stripping may be performed, provided that the off-site stripper is qualified to handle lead-based paint. For off-site stripping, the component will be removed and tagged to indicate its original location within the house, wrapped in 6-mil plastic and sent to the off-site stripping location. The treated item should be cleaned using a HEPA vacuum, washed with a phosphate-containing detergent, allowed to dry and cleaned again with the HEPA vacuum prior to replacement.

Removal and Replacement of a Building Component

Component replacement may involve the removal of items such as doors, windows, trim, baseboards, chair-rail molding, exterior fascia, soffits, shutters, crown moldings and other components that represent lead-based-paint hazards. All replacement components shall be free of lead-based paint.

The building component to be removed will be misted with water to minimize the amount of lead dust generated during removal activities. Frequent vacuuming with a HEPA-filter-equipped vacuum cleaner is recommended during the removal process.

After removal, the component will be wrapped in 6-mil plastic and sealed with tape. Smaller debris generated by replacement activities will be wet-misted and placed into 6-mil plastic bags and sealed with tape. Waste management and disposal will be performed as outlined in Section 6.2, Lead-Based Paint, Dust and Associated Debris.

5.6.4 Interior Paint Clearance Sampling

As discussed previously, all interior paint response actions will be followed by dust abatement as described in Section 5.5.4 to meet the cleaning requirements of Section V.H. of Regulation 19. Both a visual clearance inspection and clearance sampling will be performed following response actions for interior paint and subsequent dust abatement. The final visual inspection will be performed to confirm the completion of paint abatement and subsequent cleaning activities and to confirm that work was conducted as specified in the Response Action

Plan. A certified inspector or risk assessor for lead-based paint activities will perform the inspection. The work area and adjacent areas used for access to the work area will be inspected to identify the remains of any deteriorated paint, visible dust and/or debris. If problems are noted during the visual inspection, clearance sampling will be postponed until additional cleaning has been performed.

Because component and paint removal and replacement and/or encapsulation activities can create dust containing lead-based paint, dust samples will be used for clearance sampling after paint actions. The clearance samples will be collected using the same wipe methods as used for clearance sampling following dust control and abatement actions, as described in Section 5.5.4 and in the SOP for Dust Clearance Sampling (Appendix A). One wipe sample will be collected from the floor and one from a windowsill, if present, in each room of the work area. If any paint sealants were used as part of the response action, then the clearance samples will be collected at least one hour after the sealant has dried. All clearance samples will be submitted to an NLLAP-recognized laboratory for analysis of lead.

Each wipe sample must meet the following clearance levels for lead in order for work to be considered complete: floor samples less than $100 \mu\text{g}/\text{ft}^2$ and window samples less than $500 \mu\text{g}/\text{ft}^2$. If the results of the clearance sampling exceed these levels, dust abatement procedures will be repeated and clearance samples will be collected again.

5.6.5 Exterior Paint Clearance Sampling

Following exterior paint abatement actions, both visual inspection and clearance sampling will be performed. Clearance samples will include dust wipe samples and soil samples which will be collected in accordance with the SOPs for Clearance Dust Sampling and Clearance Soil Sampling (Appendix A), respectively.

The clearance dust samples will be collected using the wipe method. A minimum of two clearance samples will be collected from the work area. One sample will be collected from an exterior windowsill and one from a hard surface such as a patio, walkway, or deck, if present, within the work area. The wipe samples will be submitted to an NLLAP-recognized laboratory for lead analysis.

Each wipe sample must meet the following clearance levels for lead in order for work to be considered complete: exterior window sill samples less than $500 \mu\text{g}/\text{ft}^2$ and exterior surface samples less than $800 \mu\text{g}/\text{ft}^2$. If the result for a clearance sample exceeds these levels, additional cleaning will be performed and clearance samples will be collected again.

Clearance soil samples will also be collected. Whenever an exterior paint response action is taken, soil samples will be collected both prior to and following that action to confirm that the response action does not result in higher lead concentrations in soil around the work area. Both the pre-abatement and post-abatement soil samples will be taken using procedures

that are consistent with Colorado's Regulation 19, as described in Section V.J.1.e.(2) and the SOP for Clearance Soil Sampling (Appendix A).

At least one pre-abatement soil sample will be collected from the planned work area by obtaining a composite sample consisting of at least 5 and no more than 10 subsamples collected along the building perimeter/dripline within the designated work area. The lead concentration in the pre-abatement soil sample will be used as the basis for comparison with the post-abatement samples. The post-abatement samples will be collected following completion of all paint abatement and associated clean-up activities. At least two post-abatement soil samples will be collected from within the designated work area by obtaining composite samples of at least 5 and no more than 10 subsamples collected along the building perimeter/dripline. Both pre- and post-abatement samples will be analyzed for lead by an NLLAP-recognized laboratory.

The exterior abatement work will be considered complete when the lead concentration of the post-abatement soil is less than or equal to the lead concentration of the pre-abatement soil. If the soil clearance level is not met, then a response action to address the residual lead level in soil may be required. Any response action taken to address residual lead levels in dripline/foundation soils will be in accordance with Section V.F. of Regulation 19.

5.6.6 Soil Response Actions Related to Exterior Paint Action

If the results of soil sampling performed following an exterior paint response action indicate an increased soil-lead concentration, soil abatement will be performed in accordance with Section V.F of Regulation 19.

5.7 Maintenance and Follow Up

At the completion of response actions, property owners and current residents will be provided with instructions for maintaining components of the remedy such as sod areas, landscaping, paint encapsulants, etc. The maintenance activities associated with each response action will be fully explained to the property owner (and resident, when appropriate) during discussion of recommended actions and upon completion of the selected action. The oversight representative for CDPHE will return approximately 1 year after remediation to evaluate the condition of any lawn, landscaping, concrete, asphalt or architectural/structural components placed or treated during the original response action(s). Remedies may also be re-evaluated as part of EPA's Five Year Reviews of the California Gulch Superfund Site.

If this inspection reveals that placement of sod or grass was not successful (i.e., plant materials did not survive) due to circumstances beyond the control of the property owner or resident, the program will have them replaced. If such placement was not successful due to neglect (e.g., lack of water) or as a result of damage caused by any other person (e.g., vehicle

traffic), the program will not repair the damage or be held responsible. Any drainage problems and associated property damage that resulted from remediation activities will also be corrected at this time. If any concrete or asphalt component placed during a response action exhibits excessive cracking or requires repair due to inadequate quality control procedures during placement, the program will repair or replace the defective areas. The program will also repair or replace damaged architectural or structural components if it is determined that they were not properly installed or treated during the response action.

5.8 Temporary Work Stoppages

If conditions are encountered which are beyond the control of the remediation contractor that delay or prevent the implementation of response actions, the contractor will stop work and immediately inform CDPHE who will, in turn, inform the property owner. These conditions include:

- Artesian wells or other subsurface flow phenomena;
- Residential building or structural impairments;
- Unknown utilities or subsurface features such as abandoned septic systems or utility lines;
- Any significant archaeological findings; and
- Any unforeseen conditions within the home, which may affect the completion of a paint response action such as building code violations or unsound structural conditions.

These conditions will be evaluated and those within the control of CDPHE will be remedied as soon as possible to allow activities to resume at the property. Structural conditions or obvious building code violations discovered during remediation will be the responsibility of the individual property owner to resolve prior to resuming remediation.

5.9 Decontamination

Heavy equipment and tools used in the remediation process will be decontaminated prior to leaving the work area site. Decontamination will first involve a brush down of remediation equipment in the yard to remove visible accumulation from body and tires. Use of water will be avoided whenever possible. Water will be used if visible contamination is evident after dry brushing and prior to moving equipment from the site for any reason. In these cases, equipment will be washed while on the premises to minimize the migration of mud and water to the streets.

Workers will be required to decontaminate daily or whenever leaving a site where soil removal activities are being performed. Personal decontamination protocols will be included in the site Health and Safety Plan and instituted by the remediation contractor's site manager. Streets, rights-of-way and access routes shall be cleaned of noticeable accumulations of soil, dust, or debris that are attributable to yard remediation activities.

5.11 Site Inspection

Once the response action(s) and any associated repairs are completed and all disputes associated with the actions are resolved, CDPHE will inspect the site with the property owners. At this inspection, the Soil Remediation Site Plan will be finalized and the property owners/residents will be asked for their sign-off, attesting that the work was performed as agreed. For soil response actions, the final signed Site Plan (as-built) will be included as an attachment to the Property Documentation Report.

6.0 WASTE MANAGEMENT AND DISPOSAL

Waste materials generated during implementation of the LCCHP Phase 2, whether hazardous or non-hazardous, will be disposed of in accordance with all Federal, State and local regulations and guidelines. The types of waste materials generated may include excavated contaminated soil, lead-based paint debris and other construction, demolition and investigation-derived wastes.

6.1 Residential Soil Repository

Soil, landscape materials and vegetation removed from residential yards and properties shown to contain lead at concentrations greater than 3500 mg/Kg (based on the results of investigative sampling) will be consolidated in the residential soil repository. The details of the residential soil repository will be contained in a separate repository plan document.

6.2 Lead-Based Paint, Dust and Associated Debris

Current USEPA policy (USEPA, 2000) allows for management and disposal of lead-based paint debris generated by residents and contractors as "household waste". Under 40 CFR 261.4(b)(1) household wastes are excluded from the hazardous waste management requirements of the Resource Conservation and Recovery Act (RCRA) and can be disposed in a municipal solid-waste landfill. Wastes generated by the LCCHP Phase 2 containing lead-based paint and other wastes associated with lead-based paint activities, including disposable cleaning equipment, containment materials and personal protective clothing, will be disposed as household wastes. These types of wastes will be managed prior to disposal as follows:

- Wooden components coated wholly or in part by lead-based paint will be wrapped in 6-mil polyethylene sheeting and sealed prior to removing the waste from the containment or work area.
- Other wastes will be managed using safe work practices for lead-based paint debris.

Lead-based paint debris and associated materials generated by the LCCHP Phase 2 will be disposed in the Lake County solid-waste landfill.

Wastes generated as part of a dust response action are also considered household wastes and may be disposed of in a municipal solid-waste landfill. These wastes may include HEPA-vacuum waste, plastic sheeting, tape and other materials used for containment during response actions, wash water, rags, sponges, mops, disposable work clothes and respirator filter cartridges.

7.0 DATA MANAGEMENT

Data collected by the blood lead monitoring and environmental testing programs are used to evaluate the performance of the program. Blood lead and environmental testing data will remain accessible beyond active implementation of the LCCHP Phase 2. Both hard-copy record keeping and electronic data management systems will be operated and maintained as part of the LCCHP Phase 2. Data management will require coordination with the Lake County Public Health Agency, Lake County Building/Land Use Department and Assessor's Office. CDPHE will have primary responsibility for maintenance of records describing the results of environmental investigations and response actions at individual properties, with copies being maintained at the Lake County Building and Land Use Department. Lake County maintains information regarding property ownership through the Lake County Assessor's Office. The Lake County Public Health Agency maintains blood lead data and will be responsible for maintaining the existing LCCHP database to facilitate linkage of property and blood lead data. The Lake County Land Use Department maintains their own records regarding property descriptions and area zoning but relies on records maintained by CDPHE for information regarding environmental sampling and remediation status of individual properties.

The electronic database is the primary tool for tracking properties and their remediation status and serves the following data management needs for the program:

- store blood lead data for numerous children and for multiple test results;
- store environmental test results for individual properties;
- link paired blood-lead and environmental test results for individual residents;
- maintain integrity of existing and future data;
- protect confidentiality of blood lead data;
- allow generation of output reports in usable formats;
- integrate Assessor's Office information for individual properties;
- provide for accurate and efficient import or input of data;
- allow flexibility in data export and retrieval; and
- provide readily accessible data for reference by Land Use Department.
- provide readily accessible data to CDPHE and EPA for program oversight purposes.

The primary function of the electronic database will be to efficiently store data collected by the LCCHP Phase 2 and to maintain that data in a readily accessible and usable format. The electronic database will include the following minimum information, by property: address and ownership, area designation within the Site, dates and results of all environmental testing, decisions regarding the need for remediation and dates of those decisions, response actions taken and dates completed. For all families participating in the LCCHP Phase 2, electronic data will also include, at a minimum: family name and residence, number and ages of children in family; date of entry into program and any blood lead test results and dates of tests for each participant.

The property files will include all of the information stored electronically but will also manage other records such as laboratory data reports and quality assurance documentation; relevant correspondence with property owners, residents and regulatory agencies; family questionnaires; photographs of the property; field notes, design drawings; Site Plans; Response Action Plans; and final Property Documentation Reports. A file structure for each property is provided in Table 8-1. The hard-copy property files will be maintained for the life span of the LCCHP Phase 2 and will either be stored in perpetuity thereafter or otherwise recorded, with appropriate technology (e.g., microfilm, scan to CD, etc.), for long-term storage. Archived files for properties where remediation work has been completed may be moved to a Lake County records center.

The LCCHP Phase 2 database is used to store and track all property, environmental, family and blood lead data collected. The electronic database may be modified or improved as necessary at any time during implementation of the LCCHP Phase 2, subject to review and concurrence by CDPHE and EPA. Electronic data will be updated and maintained for the life span of the LCCHP Phase 2. Database maintenance will include routine backup and systematic error checking, as described in Appendix F.

The database currently works from a Microsoft Access[®] file whose structure is described in detail in Appendix F. The Lake County Public Health Agency maintains the blood lead database that includes information about individual families and children. Lake County will continue to maintain the existing database that includes property ownership records and links residents to properties. This design ensures the confidentiality of un-released blood lead tests but maximizes the amount of electronic information available for use by the Health Department and Lake County.

7.1 Data Import/Entry

New information will be entered into the database on an ongoing basis using a combination of methods. Property address and ownership information will be obtained in electronic format from the Lake County Assessor's Office and transmitted electronically for import to the database. New blood lead test results, environmental sampling results and questionnaire responses will generally be input by hand using a series of data entry screens. The data entry screens are designed to facilitate efficient, accurate and consistent data entry and

include pull-down lists of valid entries for many of the data fields. All manual data entries will be reviewed and checked to ensure accuracy. Quality control procedures for data entry, review and corrections will be established by Lake County Public Health Agency for their internal use. Entries that have been checked will be distinguished from those that have not, and only those entries that have been reviewed and verified will be considered usable by the LCCHP Phase 2.

7.2 Data Export and Transfer

Data stored in the electronic database may be retrieved using pre-designed retrieval forms and reports or through custom queries and reports developed by a data user. Using the data retrieval forms developed for the database, a user may generate reports for specific properties, such as the Property Summary Table, or specific time frames, such as annual Blood Lead Data reports.

Although two separate databases are maintained in two separate locations, the database has been designed to allow electronic transfer of information from one database to the other. The transfer functions of the database have been preprogrammed to allow for exchange of non-confidential data, such as property and family information, while preserving the confidentiality of unreleased blood lead test results. Confidential data are tracked by the database and automated retrieval and transfer functions are designed to maintain confidentiality, as necessary for the various data users.

7.3 Database Reports

A number of reports will be routinely generated from the electronic database to assist in reviewing results, managing various LCCHP Phase 2 elements and tracking progress at individual properties or for individual participants. For each property with environmental investigation results, a Property Summary Table report will be generated. The Property Summary Table will be used to report environmental testing results property owner and residents. A hard copy of the table will be included in the property file maintained by Lake County.

The database will also be used to periodically generate the Master Summary Table. This summary report provides information about the investigation and remediation status at each participating property. The Master Summary Table is primarily a tool for the LCCHP Phase 2 Work Group to use in tracking remediation progress and may also be used by the Lake County Land Use Department in identifying properties investigated and/or remediated through the LCCHP Phase 2 (or the preceding LCCHP).

The Lake County Public Health Agency will be able to generate a series of reports to summarize blood lead test results for the Site, periodically review results from various areas within the Site and track retest schedules and results for children who require ongoing monitoring. The Lake County Public Health Agency will also use the report generator to

compile summary statistics that describe population blood lead levels for specified time frames or areas of the site. Summary statistics will be available to Lake County, EPA, and CDPHE for use in evaluating the performance of the LCCHP Phase 2. In addition, the database will be made available to CDPHE for periodic program review and oversight. CDPHE will make a written request to Lake County for any database updates, accompanied by a signed confidentiality statement for blood lead data. The database will also be available to EPA during its five-year review process, subject to appropriate confidentiality protections.

8.0 PROGRAM REVIEW AND EVALUATION

The LCCHP Phase 2 is transitioning to an operation and maintenance program. During the next scheduled five-year review, currently scheduled for September 2012, the parties will evaluate the need to modify to LCCHP Phase 2. The community education, blood lead testing, and clinical management portions of the program will be operated by the County, with the environmental testing and remediation components of the program being performed by CDPHE.

At any time, the parties can agree for the County to assume this portion of the program and become completely responsible for the operation of the LCCHP Phase 2 program.

During program operation, coordination among the parties will consist of quarterly Work Group meetings or conference calls, to be attended by EPA, CDPHE, and Lake County Public Health Agency staff. The Work Group will also hold annual meetings to review and evaluate the annual report described in Section 8.1 of this work plan. The Work Group may decide to meet less frequently or on as-needed basis. The intent of the Work Group meetings is to provide an informal setting for exchange of program information, status of participation and outreach efforts, problems encountered, and proposed changes in program protocols.

To assist program review and help monitor the effectiveness of the LCCHP Phase 2, CDPHE, Lake County and EPA may evaluate and provide data summaries for consideration by the Work Group for the following:

- Participation of area residents in the blood lead monitoring and environmental testing programs.
- Efforts to collect paired blood lead and environmental lead data, whenever possible for elevated blood levels.
- Documented quality assurance plans and procedures to ensure that blood lead and environmental data are collected and analyzed in the proper manner, and that the data are accurately entered into an ongoing database suitable for scientific evaluation.
- Annual reporting of summary statistics for participation, remediation status and blood lead levels in young children.
- The implementation and effectiveness of community outreach efforts.
- Periodic updates of the program database, including paired environmental and blood lead data.
- Blood lead test results and trends over time.
- Supplemental statistical analysis and program evaluation, as provided by CDPHE or EPA.

EPA will also conduct five-year reviews, as mandated by CERCLA, to ensure that the remedy is protective of human health and the environment. The next five-year review is scheduled for September of 2012 and will include the results of a statistical analysis to determine if the remedy performance standards are being maintained. Following the next five-year review, the LCCHP will be reviewed and evaluated at intervals as CDPHE and EPA may find necessary. Five-year and other program reviews will include, with input from Lake County, an evaluation of the need to continue the program in its current form.

The program will remain in place as long as wastes are left in place or until an alternate mechanism is created to serve as the institutional control required by the OU 9 ROD, or until EPA, CDPHE and Lake County agree that operation of the LCCHP Phase 2 program is no longer necessary.

8.1 Annual Reports

Annual reports will be prepared by the work group for calendar years 2008 through 2012 to describe the LCCHP Phase 2 activities over the year and to evaluate the performance of the program. The annual reports will include information as described in the following outline, with additional detail to be developed in subsequent Work Group meetings. Responsibilities for the annual report will be shared by Lake County, CDPHE, and other entities as outlined below:

- I. Introduction
- II. Summary of Activities Undertaken During the Reporting Period
 - Quarterly Work Group Meetings (Lake County)
- III. Educational Outreach (Lake County)
- IV. LCCHP Phase II Incentive Program (Lake County)
- V. Blood Lead Case Management (Lake County)
- VI. Environmental Characterization (CDPHE)
- VII. Environmental Remediation (CDPHE)
- VIII. Soil Repository (Lake County)
- IX. Cultural and Historic Resource Evaluations (CDPHE)
- X. Data Management (Lake County provides raw data) (County/CDPHE)
- XI. Summary of Community Education Program (Lake County)
- XII. Blood Lead Monitoring Program Participants
- XIII. Summary of Blood Lead Monitoring Results (Lake County)

- XIV. Summary of Environmental Testing (CDPHE)
- XV. Summary of Environmental Remediation Undertaken (CDPHE)
- XVI. Current and Historical Trends in Blood Lead Concentrations (CDPHE)
- XVII. Progress in Achieving Interim O&M Performance Standards (CDPHE)
- XVIII. Issues Encountered (Lake County Health, CDPHE, BOCC, or Work Group)
- XIX. Recommendations (Lake County Health, CDPHE, BOCC, or Work Group)
- XX. Actions Forthcoming in the Next Year (Lake County Health, CDPHE, BOCC, or Work Group)

Appendix A – Educational Materials

Appendix B - Property Documentation Reports

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**WORK PLAN
FOR THE
LAKE COUNTY
COMMUNITY HEALTH PROGRAM
PHASE 2**

February, 2009

**LAKE COUNTY BOARD OF COUNTY COMMISSIONERS
LAKE COUNTY PUBLIC HEALTH AGENCY
COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY REGION VIII**