OMAHA LEAD SITE

OPERABLE UNIT O1

INTERIM
RECORD OF DECISION

U. S. Environmental Protection Agency, Region 7
901 North 5th Street
Kansas City, Kansas 66101

December 15, 2004

INTERIM RECORD OF DECISION

DECLARATION

SITE NAME AND LOCATION

Omaha Lead Site OU1
Omaha, Nebraska

STATEMENT OF BASIS AND PURPOSE

This interim decision document presents the selected remedial action for lead-contaminated residential properties at the Omaha Lead Superfund Site. This decision was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record for the Omaha Lead Site (the site [or OLS]). The Administrative Record file is located at the following information repositories:

Omaha Public Library
W. Dale Clark Main Library
215 South 15th Street
Omaha, Nebraska
(402) 444-4800

Washington Branch Library
2816 Ames Avenue
Omaha, Nebraska
(402) 444-4849

South Omaha Library
2202 M. Street
Omaha, Nebraska
(402) 444-4850

EPA Region 7 Records Center
901 N. 5th Street
Kansas City, Kansas
(913) 551-7241
(800) 223-0425

The state of Nebraska has concurred with this selected remedy. State comments are presented and addressed in the attached Responsiveness Summary.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this interim Record of Decision (ROD), present a current threat to public health, welfare, or the environment. The site contains lead contamination in various environmental media resulting from historic lead smelting and refining operations.

DESCRIPTION OF THE SELECTED REMEDY

The U.S. Environmental Protection Agency (EPA) believes the selected interim remedy (Alternative 4 with an estimated cost of 77.4 million dollars) appropriately addresses the principal current and potential risks to human health and the environment. The remedy addresses human health risks by remediating residential soils impacted by lead contamination. The major components of the selected remedy include the following actions.

Excavation, backfilling, and revegetation of lead-contaminated residential soils in an estimated 5,600 residential-type properties exceeding 800 parts per million (ppm) and properties exceeding 400 ppm considered high child-impact areas or with a residing child exhibiting an elevated blood lead level;

- Participation in a comprehensive remedy with other organizations and agencies to characterize and address all identified sources of lead exposure at the site;

- Stabilization of exterior lead-based paint that threatens the long-term protectiveness achieved through excavation and replacement of lead-contaminated surface soils;

Removal of interior dust in instances where contaminated soils contribute to interior lead dust loadings;

Health education for the Omaha community and medical professionals to support public awareness, exposure prevention programs, in-home assessments, blood-lead screening programs, and diagnosis, treatment, and surveillance programs.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state laws that are legally applicable or relevant and appropriate requirements for the remedial action, and is cost-effective. The remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, but does not use treatment as a principal element because of the absence of demonstrated, effective treatment alternatives. After the implementation of this remedy, EPA anticipates that hazardous substances, pollutants, or contaminants will not remain on-site at remediated properties above levels that allow for unlimited use and unrestricted exposure, and therefore, EPA anticipates that a statutory review will not be required within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

Cecilia Tapia, Director
Superfund Division

12/15/04
Date

INTERIM RECORD OF DECISION

DECISION SUMMARY

OMAHA LEAD SITE
OPERABLE UNIT NUMBER 1

OMAHA, NEBRASKA

Prepared by:

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION VII
KANSAS CITY, KANSAS

December 15, 2004

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OMAHA LEAD SITE

RECORD OF DECISION

DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

The Omaha Lead Site (OLS [CERCLIS ID # NESFN0703481]) includes contaminated surface soils present at residential properties, child-care facilities, and other residential-type properties in the city of Omaha, Nebraska, that have been contaminated as a result of historic air emissions from lead smelting/refining operations. The total area of the site is approximately 20 square miles and encompasses the eastern portion of the greater metropolitan area in Omaha, Nebraska. The site is centered around downtown Omaha, Nebraska, where two former lead processing facilities operated. American Smelting and Refining Company, Inc., (ASARCO) operated a lead refinery at 500 Douglas Street in Omaha, Nebraska, for over 120 years. The Gould, Inc. (Gould) lead battery recycling plant was located at 555 Farnam Street. Both facilities released lead-containing particulates to the atmosphere from their smokestacks.

The U. S. Environmental Protection Agency (EPA) is the lead agency for this project. The Nebraska Department of Environmental Quality (NDEQ) serves as the support agency to EPA.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The ASARCO facility conducted lead refining operations at the 500 Douglas Street facility from the early 1870s until 1997. The ASARCO facility was located on approximately 23 acres on the west bank of the Missouri River in downtown Omaha. During the operational period, lead-contaminated particulates were emitted into the atmosphere through smokestacks and other processes. The pollutants were transported downwind in various directions and deposited on the ground surface.

The Douglas County Health Department (DCHD) performed monitoring of the ambient air quality around the ASARCO facility beginning in 1984. This air monitoring routinely measured ambient lead concentrations exceeding the 1.5 micrograms per cubic meter ($\mu g/m^3$) ambient standard for lead. The highest recorded quarterly average measured in air was 6.57 $\mu g/m^3$.

Aaron Ferer and Sons opened and operated a secondary lead smelter and lead battery recycling plant from the early 1950s until 1963. In 1963, the facility was purchased by Gould, who operated the facility until it closed in 1982.

The DCHD has compiled statistics on the results of blood lead screening of children less than seven years of age for more than 25 years. Blood lead screening of children living in zip codes located east of 45th Street have consistently exceeded the 10 microgram per deciliter (μg/dl) health-based threshold more frequently than children living elsewhere in the county.

In 1998, the Omaha City Council requested assistance from the EPA to address the high frequency of children found with elevated blood lead levels by the DCHD. At that time, the EPA began investigating the lead contamination in the Omaha area under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The EPA began sampling residential properties and properties that were used to provide licensed child-care services in March 1999. The general boundaries of residential properties comprising the site were estimated at the time of listing on the EPA National Priorities List (NPL) by establishing a perimeter surrounding the properties that had been determined at the time to exceed 1,200 parts per million (ppm) lead. The area enclosed by this perimeter was approximately 8,840 acres (13.8 square miles), with an estimated population of 65,863 (based upon 1990 Census information). Using Census figures for Douglas County of 2.52 residents per home, this represented approximately 26,000 residences potentially impacted. Twenty public schools were also located within this area.

Soil sampling of residential Omaha properties continued during the site Remedial Investigation (RI). Between March 1999 and January 2004, surface soil samples were collected from 15,012 residential properties. The site RI estimated that 16,000 residential properties may exceed 400 ppm lead, that 5,600 properties may exceed 800 ppm lead, and that 2,800 properties may exceed 1,200 ppm lead.

On the basis of sampling data collected during the OLS Remedial Investigation, the focus area of the site was expanded to include an area of approximately twenty square miles (12,800 acres) bounded by Ames Avenue to the north, L Street to the south, 45th Street to the west, and the Missouri River to the east. According to 2000 Census data, the focus area includes 37,554 housing units, including single family and multi-family dwellings. The 2000 Census population for the focus area is 86,958, including 9,395 children less than seven years of age. Figure 1 depicts the general boundaries of the site.

The OLS Remedial Investigation reported that approximately 34 percent of all the residential properties tested exceeded 400 ppm lead. This percentage increases to approximately 40 percent exceeding 400 ppm if only properties in the focus area were considered. Soils tested in Council Bluffs, Iowa, and Carter Lake, Iowa, have not been found to consistently exceed this concentration.

To date, the EPA has sampled approximately 24,000 residential properties in or near the area of interest at the site. Additional sampling is ongoing to complete the characterization of residential properties at the site.

The focus area for the site investigation is bounded by 45th Street to the west, the Missouri River to the east (excluding the Omaha central business district), Ames Avenue to the north, and L Street to the south. These boundaries define a general area where the majority of the impacted properties are located. The actual site, however, includes any residential-type property that has become lead-contaminated as a result of historic industrial emissions. The site is defined on a property-to-property basis, and is not defined by a discrete boundary.

Due to the high concentrations of lead detected in yard soils, the EPA initiated a removal action to address lead-contaminated soils that exceed criteria for a time-critical removal action in 1999. This removal response is ongoing. The removal response involves the excavation and replacement of lead-contaminated soil where action levels identified in the Action Memorandum are exceeded. These response actions are currently conducted if:

A child seven years of age or younger (0 to 84 months) residing at the property is identified with an elevated blood level exceeding 10 μg/dl and any non-foundation sample collected from the property exceeds 400 ppm;

A property is a child-care facility, and any non-foundation sample collected from the property exceeds 400 ppm; or

Any non-foundation sample exceeds 1,200 ppm at any residential or residential-type property.

During implementation of the Remedial Action, response actions will continue to be prioritized for these categories of residences.

The EPA issued a general notice letter under CERCLA authority on August 4, 1999, to ASARCO, Incorporated (ASARCO) asking ASARCO to perform a time-critical removal action to address lead-contaminated soils at child care facilities and residences at the site. In a response dated August 13, 1999, ASARCO stated it was not interested in performing the removal action. On August 30, 1999, the EPA issued a Unilateral Administrative Order (UAO) (Docket Number-CERCLA-7-99-0029), ordering ASARCO to perform the necessary removal action. ASARCO responded on September 7, 1999, stating they would not comply with the UAO. The EPA proceeded with a fund-lead removal action to address the threat associated with the lead contamination in the residential soils, which is ongoing. The EPA subsequently identified three additional PRPs, Union Pacific Railroad Company, Gould Electronics, Inc., and Aaron Ferer & Sons Corporation.

The EPA has coordinated with these four PRPs during the implementation of response actions at the site. General notice letters were issued on June 4, 2002, to initiate discussions on the performance of the Remedial Investigation/Feasibility Study (RI/FS). The four parties were not interested in performing the RI/FS so EPA proceeded using fund monies. Special notice letters have not been issued to any of the identified PRPs to date.

The site was proposed for the NPL on February 26, 2002. The NPL listing became final for the site on April 30, 2003.

COMMUNITY PARTICIPATION

The EPA has worked extensively with the Omaha community through a variety of communication vehicles, including but not limited to, local and national newspapers, radio and television stations, mail, telephone, public meetings, door-to-door visits, school presentations, city council meetings, the EPA's website, and posted flyers.

The EPA has been performing outreach to Omaha citizens, elected officials, school officials, health officials, the media, non-profit groups, and others since becoming involved in the project in 1998 in an effort to convey information about the hazards of lead poisoning and particularly how lead affects the health of children. The EPA has participated in numerous formal and informal meetings to explain the EPA's role and commitment in Omaha, convey information about the Superfund process, and provide general information about the site and lead contamination. The EPA responds to inquiries on a daily basis regarding the site and individual property owners' sampling results.

In January 2004, a Community Advisory Group (CAG) was formed for the site. The CAGs are committees, task forces, or boards made up of residents affected by a Superfund site. They provide a public forum where representatives of diverse community interests can present and discuss their needs and concerns related to the site and site the clean-up process. CAGs are a community initiative which functions independently of EPA, providing a constructive avenue for addressing and understanding historical information, cultural concerns, and communication approaches tailored to the site. Union Pacific Railroad Company, an Omaha-based company, supports the CAG by providing the services of a technical consultant.

Since January 2004, the EPA has participated in more than thirty-five outreach efforts in Omaha. These include conducting availability sessions, attending CAG meetings, speaking to local groups, giving presentations, and making appearances at schools, city council meetings, the Mayor's office, the Governor's Advisory Council on Lead Safe Neighborhoods in Omaha, and local non-profit organization meetings. The EPA has participated in several sessions directed at providing information regarding contracting opportunities to local businesses. The EPA maintains a toll-free telephone number for citizen convenience, and since the summer of 2003, has received and responded to more than 4,100 phone calls about the site.

In addition to the site document repository located at the EPA Regional Office in Kansas City, Kansas; three local repositories were established to afford citizens an opportunity to review EPA documents. Documents are available at each repository in hard copy and in CD-ROM format. The EPA has released numerous English and Spanish-translated fact sheets and press releases over the course of the project.

On July 16, 2004, the EPA released the Omaha Lead Site Proposed Plan for a 30-day public comment period. The Proposed Plan describes the Agency's Preferred Alternative for clean-up at the site. Two public meetings were announced with the release of the Proposed Plan and conducted on August 10, 2004, in both the North Omaha and South Omaha communities within the focus area of the site. Three separate extensions of this comment period were granted in response to requests from community members. Additional EPA availability sessions were scheduled and conducted on October 20, 21, and 26, 2004. The comment period for the site Proposed Plan closed on November 1, 2004. Comments received are summarized in a Responsiveness Summary, which is attached to this ROD.

The EPA will continue to work with the community in an effort to provide enhanced communication and education on lead prevention through outreach, public meetings, attendance at local gatherings, and mailings.

SCOPE AND ROLE OF RESPONSE ACTION

The remedy described in this ROD addresses soils that have been contaminated with lead by industries located in downtown Omaha, Nebraska. Releases of large amounts of lead-contaminated particulate matter to the atmosphere resulted in the contamination of surface soil at thousands of residential properties. Residential properties addressed by this remedy include those with high accessibility to sensitive populations (children seven years of age and younger [0 to 84 months] and pregnant or nursing women). These types of properties include single and multi-family dwellings, apartment complexes, child-care facilities, vacant lots in residential areas, schools, churches, community centers, parks, greenways, and any other areas where children may be exposed to site-related contaminated media. Residential yards contaminated solely from other sources, such as lead-based paint, cannot be remediated under CERCLA authority pursuant to 42 U.S.C §9604 and will not be addressed by this cleanup action.

The OLS Remedial Investigation estimated that as many as 16,000 residential properties may be contaminated with lead at concentrations exceeding the screening level of 400 ppm established by the Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7-50. Under any remedial strategy, a number of years will be required to address this tremendous number of individual properties. The long-term nature of the site response provides an opportunity to select an interim remedy to address the highest priority properties while additional evaluation is performed to support a final remedy for the more low contaminated properties. This ROD describes the interim approach selected by EPA to address an estimated 5,600 properties meeting response criteria at the site. This interim approach allows for excavation and soil replacement to continue at the most highly contaminated properties and properties with a high potential for child exposure while additional work is performed to generate data and information to support a final ROD for the site. The remedy described in this ROD will be consistent with the final remedial action selected for the site.

The interim ROD provides for several enhancements to the current site cleanup strategy. The interim remedy allows future response work to be performed under *remedial* authority,

which potentially enables the EPA to increase the rate of property remediation beyond the current rate conducted under *removal* response authority. Properties identified with time-critical conditions, including residences with elevated blood-lead levels in children and high child-impact areas, will continue to receive prioritized response throughout the interim remedy.

The interim remedy also includes response elements that are not included in the removal response currently underway at the site. Consistent with the EPA Superfund Lead-Contaminated Residential Sites Handbook (Lead Handbook), the interim remedy will address additional exposure sources that are related to soil remediation. The interim remedy will provide for stabilization of loose or flaking exterior lead-based paint prior to remediation of soils at residential properties to prevent remediated properties from becoming recontaminated. Consistent with OSWER policy, the interim remedy also provides for high-efficiency dust removal from the interiors of residences located on remediated residential properties. Removal of contaminated soils will significantly reduce the potential for interior dust to return to current elevated levels.

During implementation of the interim remedy, the EPA will work with other site stakeholders to develop and implement a study to gather additional media-and exposure-related data to better characterize the risks at properties contaminated at low to moderate levels. Also, during implementation of the interim remedial action, the EPA will perform treatability studies to evaluate the potential for various treatment technologies to reduce risks to acceptable levels at low to moderately contaminated properties at the site. The additional risk characterization and treatability studies will generate data to support a final ROD.

Comprehensive Plan

The EPA is aware that lead in the environment at the site originates from many sources. In addition to the identified soil exposure pathway, other important sources of lead exposure include interior and exterior lead-based paint, lead-contaminated interior dust, and tap water. Generally, sources other than contaminated soil can not be remediated by the EPA in the course of residential lead cleanups. CERCLA and the National Contingency Plan (NCP) limit Superfund authority to address interior lead-based paint. For example, CERCLA Section 104(a) (3) (B) limits the EPA's authority to respond to releases within residential structures as follows:

> "Limitations on Response: The President (EPA) shall not provide for removal or remedial action under this section in response to a release or threat of release...from products which are part of the structure of, and result in exposure within, residential buildings or business or community structures..."

The above-cited section of CERCLA generally limits the EPA's authority to respond to lead-based paint inside a structure or house. However, the EPA does have authority to address loose and flaking exterior lead-based paint as a component of a response action to prevent recontamination of soils that have been remediated.

The OSWER policy recommends against using money from the Superfund Trust Fund to address interior lead-based paint exposures, and recommends that actions to address or abate interior lead-based paint risks be addressed by others such as the U.S. Department of Housing and Urban Development (HUD), local governments, health authorities, PRPs, private organizations, or individual homeowners. The OSWER policy also recommends against using Superfund trust money to remove interior dust solely from lead-based paint or to replace lead plumbing within residential dwellings, and recommends that the regions seek partners to address these other lead exposure risks.

The EPA acknowledges the importance of addressing these other exposures in realizing an overall solution to the lead problems at residential Superfund sites. The EPA will participate with other organizations such as HUD, the Agency for Toxic Substances and Disease Registry (ATSDR), state environmental departments, state and local health departments, private organizations, PRPs, and individual residents to develop and implement a comprehensive lead risk reduction strategy for the site.

The EPA clearly understands that the community desires a comprehensive remedy to address all potential sources of lead. The EPA supports a comprehensive remedy. Although the EPA Superfund authority does not allow the EPA to perform all of the actions necessary to address every source of lead exposure, the EPA remedy can provide for many elements of a comprehensive lead-reduction program. The EPA can provide assessments of these other lead hazards to homeowners as part of the site characterization and can provide funds to support health education efforts to reduce the risk of lead exposure in general. Consistent with OSWER policy, the EPA will not increase the risk-based soil cleanup levels as a result of any actions taken to address these other sources of exposure.

Treatability Study

The EPA is interested in the possible treatment of lead contamination in residential properties that are contaminated at low to moderate levels (less than approximately 800 ppm). Treatability studies conducted by the EPA at other sites indicates that phosphate treatment may be capable of lowering the bioavailability of lead in soil by as much as fifty percent or more, thereby reducing risks resulting from lead exposure. After treatment, lead remains present in the soil, but is transformed into a form that is less toxic. In the less-toxic form, lead concentrations up to approximately 800 ppm may be protective in residential soils. Before phosphate treatment, or any type of soil treatment is considered for the site, a site-specific treatability study is required to assess the impact of potential treatment on actual contaminated soils at the site.

Treatment generally involves stabilizing metals in the soil by adding reagents such as phosphate into the soil to a depth of 6 to 10 inches. For phosphate treatment, it is anticipated that the reagent, in the form of phosphoric acid, would be roto-tilled into the soil, and allowed to transform lead contamination for several days. A neutralizing agent such as lime is then added to the treated soils to raise the pH, and a grass lawn is re-established.

The treatability study consists of an initial bench scale test to determine the effect that the treatment technology has on the bioavailability of lead in site soils under laboratory conditions. If initial findings are positive, the second phase of the study involves actual field testing and additional bioavailability studies. The field testing involves a long-term monitoring program to assess the effectiveness of the treatment. The long-term monitoring program includes soil chemistry monitoring to assess the effects of natural weathering and the long-term stability of the lead minerals formed during treatment. The EPA's experience with phosphate treatment studies at other sites indicates that the effect of phosphate addition to soil should be assessed for up to three years or more.

The 400-800 ppm potential effective treatment range was identified for further investigation in the OLS Proposed Plan and in this Interim Record of Decision. The actual effective treatment range will be further assessed during the treatability study.

The treatability study will be conducted concurrent with the selected remedial action to determine the effectiveness of treatment technologies to stabilize lead in contaminated soils at the site. A final decision to proceed with treatment of contaminated soils at the site can only be made by the EPA after providing an opportunity for public comment and review of a treatability study that successfully demonstrates the safety and long-term effectiveness of any proposed treatment alternative.

Selected Remedy

The remedy selected in this Interim ROD differs in one aspect from the Preferred Alternative presented in the OLS Proposed Plan. The Preferred Alternative presented in the OLS Proposed Plan involved excavation of 5,600 properties where human health risks were highest. The selected remedy in this Interim ROD was presented as Alternative 4 in the OLS Feasibility Study, and specifies criteria for performing a response action instead of specifying the total number of properties that would be cleaned up under the interim remedy. Although the estimated number of properties to be excavated pursuant to this Record of Decision remains 5,600, the properties that will actually be remediated are those that exceed the specified criteria. This modification does not result in a significant change in the scope of the selected remedy from the Preferred Alternative in the OLS Proposed Plan, and is intended to clarify the properties that will be remediated under this Interim ROD.

SITE CHARACTERISTICS

Lead processing at the eastern edge of downtown Omaha was conducted for more than 120 years. During this period of operation, lead-contaminated airborne particulates were emitted from industrial facilities and deposited on residential properties in eastern Omaha. The site is defined as the individual residential properties that became contaminated with lead above health-based levels as a result of these historic emissions. Every residential property in the area of concern is tested individually and sampling results determine if the property is included as part of the site.

In general, concentrations of lead in soil are greatest near the former location of the former lead processing industries. Concentrations of lead decrease with increasing distance from the former facilities. Figure 2 depicts the residential properties impacted by historic lead emissions at the site. The area includes some of the oldest neighborhoods in the Omaha area. This area is diversely populated with a variety of ethnic and income groups.

The lead contamination at the site is generally located in surface soils of affected residential properties. There is considerable variability in lead concentrations found in surface soils, both from property to property and within each individual property. Airborne deposition of contaminated particulates would be affected by meteorology and the locations of structures or other large objects. Modification of residential yards resulting from filling, grading, or other activities can either cover or dilute surface lead contamination. Erosion of surface soils during rain events can relocate lead-contaminated soils. Flood events can cover surface contamination with silt or transport contaminated material downstream. It is likely that a combination of factors has resulted in the observed distribution of contamination at the site.

The focus area where the majority of impacted residential properties have been identified is bounded by Ames Avenue to the north, L Street to the south, 45th Street to the west, and the Missouri River to the east, excluding the Omaha central business district. These boundaries identify the focus area for the investigation of the site, but do not define the extent of the site. The extent of the site will ultimately be determined once all residential properties of potential concern have been characterized and compared to a final cleanup level that will be established in a final ROD for the site.

Human health risk at the site, addressed by the EPA under CERCLA authority, is caused by the presence of lead in surficial residential soils resulting from historic industrial emissions. In August 2003, the EPA released the "Superfund Lead-Contaminated Residential Sites Handbook" (EPA Residential Sites Handbook). This policy document, and previous drafts, establishes an approach to the characterization and remediation of lead-contaminated residential soils under CERCLA response authority. The Agency's response to the site to date has been consistent with the EPA Residential Sites Handbook, and the actions described in this ROD are consistent with the approach established in this policy document.

Soil sampling of residential properties continues to be performed in accordance with the EPA Residential Sites Handbook. The approach typically involves dividing a residential property into four quadrants and collecting a five-aliquot surface soil sample from each quadrant. An additional multi-aliquot sample is collected from the drip zone of the house, within six to thirty inches of the foundation, when assessable. Separate multi-aliquot samples are collected from gardens and child play areas, when present. Samples are generally analyzed locally using X-ray fluorescence (XRF) instrumentation. A percentage of samples are sent off-site for laboratory confirmation analysis.

In addition to soil sampling, 159 residences were sampled during the OLS Remedial Investigation for interior dust to support the OLS Human Health Risk Assessment conducted by the EPA and the Nebraska Health and Human Services System. Both wipe samples and vacuum samples were collected as part of this effort. A demographic survey was also administered by the University of Nebraska, Omaha, for each of the 159 households sampled. Demographic information collected included the number of residents, age and sex of children, and length of time in residence.

The EPA recognizes that there may be additional sources of lead exposure to residents at the site. These other sources, which could include interior and exterior lead-based paint and drinking water, are generally outside the scope of CERCLA response authority. The focus of the EPA sampling efforts to date has been to assess and respond to the presence of lead-contaminated surface soils related to historic industrial emissions at the site. Sampling and response to date has been performed in accordance with procedures established in the EPA Residential Sites Handbook. The handbook does allow for characterization of potential sources of lead exposure in addition to soil and interior dust. In accordance with the EPA Residential Sites Handbook, the selected remedy in this ROD includes an expanded sampling program to characterize other potential lead exposure sources in addition to soil and interior dust.

CURRENT AND POTENTIAL FUTURE LAND USE AND RESOURCE USES

Land use at the site is residential, since the site is defined to include only residential and residential-type properties. The site is located entirely within the city limits of Omaha, Nebraska, where local zoning ordinances control land use. The continued residential use of property can be reasonably assumed for the majority of the thousands of properties that comprise the site through local zoning control. It is likely that at some point in the future interest will arise in converting some of the current residential properties to non-residential use. Future non-residential use of remediated properties will remain protective of human health since the Remedial Action will provide for unrestricted future use.

Also located within the general area of affected residential properties are numerous non-residential properties, including the Omaha central business district. Non-residential properties are excluded from the site definition. Interest may arise in the future in converting some of the current non-residential property to residential use, particularly for multi-unit dwellings. Institutional controls for the impacted non-residential properties are prudent to assure that land use does not convert to residential without appropriate soil testing and soil response action, as required. Institutional controls to safeguard the conversion of non-residential properties to residential use will be addressed by a final remedial action for the site in a subsequent ROD.

Surface water and ground water are not affected by lead-contaminated soils at the impacted residential properties that comprise the site. Residential households located within the area of concern in Omaha receive their drinking water from the municipal water supply and are generally not served by individual ground water wells. Lead-contaminated surficial soils in

residential areas are not believed to represent a significant threat to local ground water conditions. Ground water is not addressed by this ROD due to the limited number of potential receptors and the lack of impact on ground water quality.

The most prominent surface water feature potentially affected by site contaminants is the Missouri River immediately east of the site. Public health is not threatened by potential site impacts on surface water quality in the Missouri River. There are no identified drinking water intakes within fifteen miles of the site. Sampling results of water and sediment in the Missouri River immediately adjacent to the ASARCO and Gould facilities did not detect elevated levels of lead contamination. Furthermore, the dilution provided by the tremendous flow of the Missouri River would reduce any potential release of transported site contaminants to non-detectable levels.

Future use of surface water and ground water resources should not be affected by lead-contaminated soils at the site or the remedial action described in this ROD.

SUMMARY OF SITE RISKS

A Human Health Risk Assessment was developed for the site using site-specific information collected during the OLS Remedial Investigation, where available. Lead was identified in the risk assessment as the primary contaminant of concern. Arsenic was also identified as a potential contaminant of concern, but was eliminated after considering its relatively low overall risk to residents and lack of connection to the release from the industrial sources being addressed by this Superfund action.

The risk assessment for lead focused on young children under the age of seven (0 to 84 months) who are site residents. Young children are most susceptible to lead exposure because they have higher contact rates with soil or dust, absorb lead more readily than adults, and are more sensitive to the adverse effects of lead than are older children and adults. The effect of greatest concern in children is impairment of the nervous system, including learning deficits, lowered intelligence, and adverse effects on behavior.

The Integrated Exposure Uptake Biokinetic (IEUBK) model for lead in children was used to evaluate the risks posed to young children (0 to 84 months) as a result of the lead contamination at the site. Because lead does not have a nationally-approved reference dose (RfD), cancer slope factor, or other accepted toxicological factor which can be used to assess risk, standard risk assessment methods cannot be used to evaluate the health risks associated with lead contamination. The IEUBK model uses either site-specific inputs (if available) or default inputs to estimate the probability that a child's blood-lead level might exceed a health-based standard of 10 micrograms per deciliter (µg/dl), as recommended by the Centers for Disease Control and Prevention. The EPA's health protection goal is that there should be no more than a 5 percent chance of exceeding a blood lead level of 10 µg/dl in a given child or group of similarly-exposed children. If only default values are used as inputs to the IEUBK model, the

model predicts that a child would have less than a 5 percent probability of having a blood lead level at or above 10 μg/dl if the soil in that child's environment does not exceed 400 ppm.

The risk assessment for the site included bioavailability measurements from a swine study that were substituted for the default value in the IEUBK model. In addition, site-specific airborne lead level information was substituted for the model default value on the basis of actual air monitoring results collected by the Douglas County Health Department. The IEUBK model was used to predict a geometric mean blood lead concentration for a hypothetical young child at 12,366 residential properties, as well as the probability or chance that a given child might have a blood lead concentration in excess of 10 μg/dl. Using available site-specific information, the IEUBK model predicted EPA's health protection goal would not be achieved for young children residing at 4,279 of the 12,366 homes evaluated at the site (34 percent).

The IEUBK model was also run using site-specific data to predict a lead soil level that will be protective of children and other residents. By using absolute bioavailability values for lead of 51 and 37 percent, as measured by the swine study, EPA's IEUBK model predicts that a young child residing in the site will have more than a 5 percent chance of having a blood-lead concentration of 10 µg/dl or greater if the soil lead concentrations are above a range of 238 ppm to 329 ppm, respectively. Additional soil samples collected from the site and analyzed for *in vitro* bioaccessibility from the site indicate that the site-wide average absolute bioavailability is approximately 40 percent. Using 40 percent bioavailability, the IEUBK model predicts that a child would have more than a 5 percent probability of exceeding 10 µg/dl at soil lead concentrations exceeding approximately 300 ppm.

Final cleanup levels for lead in residential soil at Superfund sites generally are based on the IEUBK model results and the nine criteria analysis in accordance with the NCP. The EPA generally selects a residential soil lead cleanup level which is within the range of 400 ppm to 1,200 ppm. As described above, the IEUBK modeling results for the site recommends a soil lead concentration of about 300 ppm to reach the Remedial Action Objective that a child has less than a 5 percent probability of having a blood lead level exceeding 10 µg/dl. The IEUBK model input parameter that significantly influenced this recommended cleanup level is the relatively high bioavailability of the lead in the site soils. The site-specific bioavailability parameter (approximately 40 percent) is based on both *in vivo* and numerous *in vitro* measurements and was inserted into the model instead of the default value of 30 percent.

Based on the uncertainties in some parameters used in the IEUBK modeling effort, as described in the HHRA, and a general analysis performed to compare model predictions based on site soil concentrations with the existing blood-lead data in the community, the EPA is selecting an interim risk management cleanup level for lead in residential soils at the site of 400 ppm. This cleanup level is at the lower end of the 400 ppm to 1,200 ppm range generally considered protective for residential cleanups. The cleanup of soils at or above 400 ppm combined with a variety of other risk reduction activities identified in the following sections is anticipated to reduce child blood-lead levels to meet the Remedial Action Objective and provide a protective remedy for the community. These additional activities include health education, additional

blood-lead screening, in-home evaluations of potential sources of exposure for blood-lead elevations, cleaning of home interiors contaminated through tracking of soils, and addressing loose and flaking exterior lead-based paint to protect the remedy effectiveness. However, the IEUBK model identified a potential risk to young children at a soil lead level in the range of 300 ppm, and the EPA will collect additional environmental and health data during implementation of the interim remedy to further refine the site risk assessment and better characterize risks associated with low to moderately-contaminated soils at the site.

Additional data gathering and risk assessment is necessary to better characterize actual risks associated with properties contaminated with lead at relatively low levels. This ROD will allow the collection of additional media- and exposure-related data to support the final remedy selection while the interim remedy is implemented at the site. The interim remedy will continue to provide protection to exposed and potentially-exposed children through uninterrupted soil excavation and replacement while additional information is developed to support the final remedy selection for the site. The interim response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Consistent with agency policy established in the EPA Residential Sites Handbook, a single Remedial Action Objective has been established for Operable Unit 1 at the site. The Remedial Action Objective is to reduce the risk of exposure of young children to lead such that an individual child, or group of similarly exposed children, have no greater than a 5 percent chance of having a blood-lead concentration exceeding 10 μg/dl. The pre-established soil remediation level of 400 ppm will be utilized during this interim remedial action.

DESCRIPTION OF ALTERNATIVES

Description of Remedy Components

Four alternatives were developed in the feasibility study to meet the identified Remedial Action Objective. The alternatives were developed to specifically address residential soil contamination resulting from lead processing operations and include:

Alternative 1

No Action

The EPA is required by the NCP, 40 C.F.R. § 300.430(e)(6) to evaluate the No Action Alternative. The No Action Alternative may be appropriate at some sites where a removal action has already occurred that has reduced risks to human health and the environment.

Although a time-critical removal action is occurring at the site, residual risks to human health remain, as documented in the OLS Human Health Risk Assessment. Under the No Action Alternative, the time-critical removals would cease upon completion of yards exceeding 1,200 ppm lead. The concentrations of metals in residential yard soils would remain at levels that present an unacceptable risk to human health, particularly for young children residing at the site. The No Action Alternative is therefore not protective of human health and will not be considered further.

Alternative 2

- Excavation and replacement of soils exceeding 400 ppm
- Exterior Lead-Based Paint Stabilization
- High-efficiency Interior Cleaning
- Health Education
- Institutional Controls

Under this alternative, residential properties with at least one non-foundation sample greater than 400 ppm lead will have all areas exceeding 400 ppm excavated and disposed. The OLS Remedial Investigation estimates that approximately 16,000 properties at the site contain soils that exceed 400 ppm lead. Excavation would continue until lead concentration at the exposed surface of the excavation is less than 400 ppm in the initial one foot below the surface, or less than 1,200 ppm at depths greater than one foot. Excavated soil would be disposed either in a soil repository constructed offsite, used as beneficial fill in an industrial land use project, or transported to a sanitary landfill and used as fill and daily cover. Residential properties where only the drip zone soil exceeds 400 ppm lead would not be addressed under this action.

Prior to excavation, this alternative includes stabilization of loose or flaking exterior lead-based paint. This alternative also includes high-efficiency removal of interior dust following removal of contaminated soils. A public health education program would be implemented to address short-term risk prior to excavation, and residual risk associated with soil contamination below 400 ppm and other non-soil sources of lead. Institutional controls would be developed for an offsite soil repository, and to prevent non-residential properties from converting to residential without appropriate soil testing and response, if required.

Alternative 3

Phosphate Stabilization of soils at levels 400 ppm to 800 ppm, or within effective treatment range
Excavation of soils exceeding 800 ppm, or effective treatment range, at any residential-type property
Exterior Lead-Based Paint Stabilization
High-efficiency Interior Cleaning
Health Education
Institutional Controls

This alternative involves a combination of excavation and treatment of residential soils determined to contain lead concentrations above 400 ppm. Phosphate stabilization would be conducted on soils with lead concentrations above 400 ppm, but less than the level determined by treatability studies to be effectively stabilized. Residential yards above the effective stabilization level for lead would be excavated as described in Alternative 2. Preliminary results have shown phosphate treatment to reduce the bioavailability of lead by as much as 50 percent. For alternative development and costing purposes, the OLS Feasibility Study assumed that phosphate treatment could be applied to soils contaminated at levels less than 800 ppm lead. The 800 ppm action level would be subject to change, based on the final results of a phosphate treatability study.

This alternative involves excavation of lead-contaminated soils greater than 800 ppm, or the effective treatment range of phosphate treatment demonstrated in a successful treatability study. Excavation would continue until lead concentration at the exposed surface of the excavation is less than 400 ppm in the initial one foot below the surface, or less than 1,200 ppm at depths greater than one foot. Excavated soil would be disposed either in a soil repository constructed offsite, used as beneficial fill in an industrial land use project, or transported to a sanitary landfill and used as fill and daily cover. Residential properties where only the drip zone soil exceeds 400 ppm lead would not be addressed under this action.

This alternative includes all other activities described in Alternative 2, including stabilization of loose or flaking exterior lead-based paint, interior high-efficiency cleaning, health education, and institutional controls. This alternative would require a phosphate treatability study to demonstrate the safety, long-term protectiveness, and upper effective treatment limit before phosphate stabilization could be implemented.

Alternative 4

Interim remedy
Excavation of soils exceeding 800 ppm at any residential-type property
Excavation of soils exceeding 400 ppm in high child-impact areas
Excavation of soils exceeding 400 ppm at properties with a child exhibiting an elevated blood-lead level
Exterior Lead-Based Paint Stabilization
High-efficiency Interior Cleaning
Health Education

Alternative 4 involves excavation and replacement of soils from residential properties exceeding 800 ppm. Similar to Alternative 2, excavation would continue until lead concentration at the exposed surface of the excavation is less than 400 ppm in the initial one foot below the surface, or less than 1,200 ppm at depths greater than one foot. As part of this interim action, the EPA will continue to excavate soils exceeding 400 ppm lead at high child impact areas and homes where a child resides with an elevated blood-lead concentration. Excavation would continue until lead concentration at the exposed surface of the excavation is less than 400 ppm in the initial one foot below the surface, or less than 1,200 ppm at depths greater than one foot. Excavated soil

would be disposed either in a soil repository constructed offsite, used as beneficial fill in an industrial land use project, or transported to a sanitary landfill and used as fill and daily cover. Residential properties where only the drip zone soil exceeds 400 ppm lead would not be addressed under this action.

This alternative leaves open the decision to use phosphate treatment for lower levels of contamination until a treatability study has been completed. This interim approach would require the EPA to propose a final remedy and seek public comment after completion of the treatability study. This alternative includes the additional elements of Alternatives 2 and 3 including stabilization of loose or flaking exterior lead-based paint, interior cleaning, and health education. Institutional controls would potentially be required only to control land use for construction and operation of a soil repository. The need for additional institutional controls would be further evaluated during the final remedy selection process for the site.

OLS Proposed Plan Preferred Alternative

Interim remedy
Excavation of contaminated soils at 5,600 properties where human health risks are greatest
Health Education
Exterior Lead-Based Paint Stabilization
High-efficiency Interior Cleaning
Institutional Controls

The EPA issued the Proposed Plan for the site on July 16, 2004. The OLS Proposed Plan identified a preferred alternative very similar to Alternative 4. Instead of specifying interim cleanup levels as with Alternative 4, the Preferred Alternative specified the number of properties to be cleaned up under the interim ROD. The number of properties to be cleaned up under the preferred alternative was based on the number of properties estimated to exceed the potential effective treatment range for phosphate stabilization. Past studies have indicated that phosphate stabilization may be effective for soils contaminated up to 800 ppm. The number of properties to be cleaned up under the preferred alternative is based upon data from the Remedial Investigation that indicates approximately 5,600 residential properties exceed 800 ppm.

As part of the OLS Proposed Plan preferred alternative, a treatability study would be performed during implementation of the interim remedy to evaluate the potential effectiveness of phosphate stabilization. The treatability study would evaluate phosphate stabilization to treat soils contaminated at levels up to 800 ppm. Treatment may reduce bioavailability of lead in site soils by as much as 50 percent, and may be considered for soils contaminated at levels less than 800 ppm. Reducing the bioavailability of soils contaminated up to 800 ppm could effectively reduce residual risks to levels associated with lead concentrations less than 400 ppm, The treatability study would take as long as three years or more to complete.

Under the OLS Proposed Plan preferred alternative, the excavation of yards presenting the highest human health risk would continue. The preferred alternative involved excavation and soil replacement at 5,600 properties prioritized primarily on the basis human health risk. The adjustment to Alternative 4, to allow for a specified number of properties instead of designating an action level, was intended to provide for greater economy achieved through construction efficiencies.

Common Elements and Distinguishing Features of Each Alternative

With the exception of the no-action alternative, each alternative includes the common element of health education. Institutional controls, which are elements of Alternatives 2 and 3, are deferred under Alternative 4 and the OLS Proposed Plan preferred alternative until a final remedy for the site is selected. All action alternatives are similar in their attainment of key applicable or relevant and appropriate requirements (ARARs). The key distinguishing features of the action alternatives relate to the number of yards to be excavated and the potential use of phosphate stabilization to treat contaminated soils at properties where soils are not excavated and replaced.

Alternative 2 involves the excavation of all properties exceeding 400 ppm. This alternative represents a final remedy for an estimated 16,000 properties that would be excavated and restored. This alternative involves excavation of the greatest number of properties of any of the alternatives and does not rely upon treatment in any way to potentially address any of the contaminated site properties.

Alternative 3 includes a combination of excavation and treatment to achieve remedial action objectives. This alternative also constitutes a final remedy for the estimated 16,000 affected properties at the site contaminated at levels above 400 ppm. Excavation and replacement of contaminated soils would be performed for an estimated 5,600 residential properties that exceed 800 ppm, which is the anticipated treatment limit for phosphate stabilization. Concurrent with the excavation of these 5,600 properties, a treatability study would be performed to demonstrate the effectiveness of phosphate stabilization to treat soils contaminated at levels up to 800 ppm. Following a successful treatability study that confirms the effectiveness of phosphate stabilization, the remaining 10,400 yards estimated to be contaminated at levels from 400 up to 800 ppm would be treated using this technology. No additional remedy selection process would be conducted once the treatability study demonstrated the effectiveness of phosphate stabilization.

Unlike Alternatives 2 and 3, Alternative 4 does not represent a final remedy for the site. Alternative 4 was developed as an interim remedy that would provide for continued excavation of properties exceeding 800 ppm and other specified residential properties where health risks are greatest while a treatability study for phosphate stabilization is conducted and additional risk characterization is performed. This interim remedial action would provide for a final remedy at an estimated 5,600 properties.

An additional remedy selection process would be conducted to select a final remedy for properties not remediated under Alternative 4. Two important distinguishing features of this alternative are the interim approach, allowing additional risk characterization and treatability studies to be conducted, and the opportunity for additional public participation in the final remedy selection for properties not addressed by the interim action. Both the remedy and the action level for properties not addressed by the interim ROD would be determined in a final ROD issued after additional public involvement.

The Preferred Alternative presented in the OLS Proposed Plan is similar to Alternative 4 developed in the OLS Feasibility Study. Like Alternative 4, the Preferred Alternative is an interim remedy that provides for continued response at properties with the highest human health risk while a treatability study and additional risk characterization are performed. The feature distinguishing the Preferred Alternative from Alternative 4 is that a specified number of properties would be addressed rather than only those determined to exceed the specified response criteria. Under the OLS Proposed Plan preferred alternative, contaminated soils at 5,600 properties would be excavated and replaced, which corresponds to the number of properties that are estimated to exceed 800 ppm. Similar to Alternative 4, the final remedy for the remaining contaminated properties not remediated under the interim ROD would be selected in a future final ROD after public involvement and consideration of treatability study results, additional risk characterization, and other developed information.

The primary distinction between alternatives involves the reliance upon a proven, conventional approach to remediation involving the excavation and replacement of contaminated soils versus consideration of a promising, yet unproven technology to reduce risks in existing soils to acceptable levels. Phosphate stabilization has been demonstrated to reduce bioavailability by as much as fifty percent, thereby reducing risks associated with contaminated soils, but the effectiveness of this technology under conditions at the site remains uncertain. Soil type and chemistry can be expected to impact the effectiveness of this type of technology. For this reason, a treatability study that successfully demonstrates the effectiveness and long-term protectiveness of this technology applied to site soils is required before phosphate stabilization, or any non-demonstrated technology, could be considered at the site. The protectiveness and long-term reliability of soil excavation and replacement, by comparison, are more assured.

Significant differences also exist between excavation and treatment with regard to management of untreated waste and treatment residuals. Excavation and replacement of contaminated soil requires final management of untreated waste in a disposal cell or possible use as beneficial fill. If treatment proves successful and treatment is applied to contaminated properties, treated materials would remain at the surface in treated areas. Residual risks associated with direct contact with the treated soil would be reduced through the treatment process to acceptable levels.

The residual health hazard associated with excavated soil would be controlled through engineering controls by any of the final management options. Excavated soils placed in a solid

waste landfill or a soil repository constructed for this purpose would be isolated from potential exposure as a result of placement inside the landfill or repository. Placement of excavated materials at the surface of a landfill or repository may remain protective of human health in certain instances where future residential land use is prevented.

Efforts to date have been unsuccessful in identifying a beneficial use for the excavated materials that has the support of government jurisdictions at the local, state, and federal levels. If a beneficial use of the material can not be arranged, the excavated soils must be disposed of in an engineered repository or in an existing solid waste landfill.

The construction of a repository or disposal in an existing solid waste landfill has a significant monetary cost. The OLS Feasibility Study estimated the cost of a soil repository designed to manage 960,000 cubic yards of excavated contaminated soil at $1.6 million, or approximately $1 per ton (assuming 1.5 tons per cubic yard), excluding transport and land acquisition. Excavated materials are currently being hauled to a solid waste landfill for use as daily cover at a cost of approximately $15 per ton. Use of the material as beneficial fill avoids costs associated with repository construction or disposal fees, but still involves transportation costs that could potentially be offset by the value of the material as fill.

Excavation and replacement of contaminated soils is the conventional approach to lead-contaminated soil remediation and uses readily available equipment and standardized procedures. Removal and replacement of lead-contaminated soils is easily implementable and provides immediate protection and permanence by removing hazardous soils to prevent potential human exposure.

Treatment of lead-contaminated residential soils has not been applied on a full-scale basis at sites similar to the site. Before treatment could be considered for the site, a treatability study would be required that successfully demonstrates the safety and long-term effectiveness of the treatment technology. The design and implementation of such a treatability study could take up to three years or more to complete. Treatment of yards using a treatment technology would be delayed until completion of a successful treatability study. If the treatability study did not demonstrate the effectiveness and permanence of the evaluated treatment technology, an alternate remedy would be required which could result in further delays.

A treatability study designed to demonstrate the protectiveness of any treatment technology must evaluate both short-term and long-term risks. The treatability study must successfully demonstrate that unacceptable risks are not created at any time during the treatment process or thereafter. Some treatment processes may require several days or more after addition of reagents for the intended reaction or transformation to occur. Since many technologies involve *in-situ* treatment of soil in residential areas, it is particularly important that the treatment process itself does not create a hazard to children or residents living at or near the affected properties. The end-products of the treatment process must also not pose an unacceptable short- or long-term risk to residents at or near treated properties.

Soil treatment could offer potential advantages in implementation relative to excavation and treatment. Soil excavation and replacement requires heavy equipment that must be transported in and out of residential neighborhoods. Residential properties often do not provide ready access for the types of equipment used to remove and replace soil, and much of the work must be performed by hand. Excavated soils, clean backfill material, and sod must likewise be transported by truck to or from each affected property. Considerable damage can occur to residential properties through the use of heavy construction equipment even when care is taken to protect property features. Soil treatment typically utilizes smaller, more manageable equipment that is less likely to damage residential properties.

The use of soil treatment could result in significant capital cost savings compared to soil excavation and replacement. The OLS Feasibility Study estimates the net cost of yard excavation and replacement at $11,000 per property, compared to $3,000 per property for phosphate treatment. An $8,000 savings per yard would result in potential total cost savings of more than $80 million for the estimated 10,400 properties contaminated at levels between 400 ppm and 800 ppm at the site.

If proven successful, soil treatment would potentially eliminate future operation and maintenance costs since there would be no future action required to provide long-term protection of the remedy. Although excavation and soil replacement would also avoid operation and maintenance costs for remediated properties, some long-term costs may be associated with operation and maintenance of the soil repository or landfill. The site estimates an annual cost of $5,000 for operation and maintenance of a soil repository. The present value of these long-term operation and maintenance costs using a 7 percent discount rate over a period of twenty years is approximately $71,000, not adjusted for inflation. Operation and maintenance costs could continue to be incurred in perpetuity. These long-term costs could potentially be avoided if beneficial use of excavated soils could be identified and implemented.

The use of phosphate stabilization or other type of soil treatment would constitute an innovative remedy for contaminated soils at the site. The CERCLA also establishes a statutory preference for remedies involving treatment that reduce the toxicity, mobility, or volume of hazardous substances.

Expected Outcomes of Each Alternative

Both excavation of contaminated soils and implementation of a successfully-demonstrated treatment technology would allow for unrestricted future use of remediated properties. Residential use of these properties could continue under either approach. Both excavation and replacement of contaminated soils and soil treatment are readily implementable, although soil treatment could only occur after a successful treatability study demonstrating the effectiveness and permanence of the treatment technology.

The time frame to achieve cleanup goals would be similar for both approaches. Excavation, soil replacement, and resodding of a single property is typically performed in a period

of approximately one to two weeks. Likewise, soil treatment could take from several days to a week for the soil additions to have their intended effects, after which soil neutralization and resodding could be performed. Hydroseeding would take considerably longer to establish a vegetated surface relative to sodding, and can require considerably more daily care, depending on the season.

Any approach to the site properties will take years to implement due to the number of properties involved. Response actions should be prioritized for the residences with the highest human health threats. Since treatment is under consideration for only the low and low-contaminated soils, soil excavation and replacement could proceed at the more highly contaminated properties while a treatability study is concurrently performed. An interim remedial strategy allows for further assessment of potential treatment technologies and site risks to be performed while properties posing the highest human health risks are remediated through the well-demonstrated approach of excavation and soil replacement. A final remedy selection process for the low to moderately-contaminated properties could then proceed with an increased understanding of site risks and the effectiveness and permanence of potential treatment technologies.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP requires the EPA to evaluate selected remedial alternatives considering nine criteria. The nine criteria are grouped into two threshold criteria, five balancing criteria, and two modifying criteria. The two threshold criteria are overall protection of human health and the environment and compliance with ARARs. Generally, alternatives must satisfy the two threshold criteria or they are rejected without further considering the remaining criteria. The five balancing criteria include long-term effectiveness and permanence; reduction in toxicity, mobility, and volume achieved through treatment; implementability, short-term effectiveness, and cost. The two modifying criteria consist of state and community acceptance.

Because of the similarity between Alternative 4 developed in the OLS Feasibility Study and the OLS Proposed Plan preferred alternative, these two alternatives are evaluated together as Alternative 4 in this section. Other alternatives remain as they appear in the OLS Feasibility Study.

Threshold Criteria

Overall Protection of Human Health and the Environment

This criterion is used to determine if each alternative is protective of human health and the environment and is assessed based on a composite of factors, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs. This criterion describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

The No Action Alternative would have no effect on existing conditions at the site. The no-action alternative does not address any of the identified risks for human health and is not considered protective of human health and the environment.

The excavation components of Alternatives 2, 3, and 4 provide protection by removing contaminated soils from the exposure pathway and replacement with clean soil. The excavation activities permanently eliminate risk of exposure through direct contact with remediated lead-contaminated soils. Since EPA anticipates that excavation and soil replacement will allow for unrestricted future use of remediated areas under each of the excavation alternatives, institutional controls are not anticipated to be necessary to provide overall protection.

Alternative 3 potentially provides protection of human health by reducing the toxicity of lead through *in situ* treatment of soils contaminated at levels between 400 ppm and 800. Soil treatment is intended to reduce the bioavailability of lead in contaminated soils, thereby reducing toxicity of the lead and controlling site risks. However, the use of soil treatment must be supported by a treatability study that demonstrates the safety and effectiveness of the treatment technology for lead-contaminated soils at the site. The protectiveness of soil treatment is less assured at this time compared to conventional soil excavation and replacement.

Alternative 4 is protective for the areas where soil excavation and replacement is conducted, but must be followed by a final action to provide protection at remaining contaminated properties that are not addressed by the interim remedy.

Exposure to lead in house dust would be reduced under all alternatives through interior cleaning. Health education programs would provide further, ongoing risk reduction for all Alternatives evaluated. Future risk from residential development in non-remediated areas would be addressed through the implementation of institutional controls under Alternatives 2 and 3 only.

Compliance with ARARs

Section 121(d) of CERCLA and the NCP at §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and state requirements, standards, criteria, and limitations which are collectively referred to as ARARs, unless such ARARs are waived under CERCLA §121(d)(4). An evaluation of ARARs for each alternative is presented in the feasibility study. Alternatives 2, 3, and 4 meet all identified federal and state ARARs. The No Action Alternative does not fail to meet identified ARARs.

Balancing Criteria

Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once

cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 3 effectively reduces risks through a combination of treatment and excavation, while Alternatives 2 and 4 achieves risk reduction through excavation only. The residual risk is potentially greater with Alternative 3 because the treatment component of this remedy leaves some form of lead contamination in low to moderately contaminated yards. Excavation and soil replacement permanently removes contaminated soils from remediated areas.

Alternatives 2 and 3 reduce residual risks for all properties through treatment or soil excavation and replacement of soils contaminated at or above 400 ppm. Alternative 4 only addresses residential yards with soil-lead levels over 800 ppm and other designated priority properties. Alternative 4 must be followed by a final action to address long-term risks for areas not remediated by the interim remedy. The No Action alternative provides no long-term protection of public health and the environment.

Alternatives 2 and 3 provide institutional controls to reduce risks from a soil repository and to control the risk associated with potential future development in residential areas. Alternatives 2 and 3 also include the use of institutional controls to address residual risks at non-remediated properties Alternative 4 relies upon institutional controls only to control long-term risks associated with a potential soil repository or areas where a clean soil cover is installed.

In general, permanence of the different alternatives for remediated properties is similar. Alternative 2 provides permanence through complete removal and containment of contaminated soils at or above 400 ppm lead concentrations. Alternative 3 provides permanence through a combination of soil treatment and removal and replacement of excavated soils. Alternative 4 provides permanence for remediated areas through excavation and replacement of contaminated soils.

Reduction of Toxicity, Mobility or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy. This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the contaminants.

The No Action Alternative involves no treatment and would not reduce toxicity, mobility, or volume of site contaminants. Alternatives 2 and 4 and the excavation component of Alternative 3 do not involve treatment, but would significantly reduce the potential mobility of the contaminated surface soils through excavation and placement in a soil repository or secure landfill. Mobility of excavated materials placed in a soil repository or landfill is greatly reduced due to the engineering features designed to contain the contaminated soils.

Alternative 3 is the only alternative that involves treatment, and would reduce the toxicity and mobility of contaminants through phosphate stabilization of soils with lead concentrations between 400 ppm and 800 ppm lead. Alternative 3 uses treatment as a principle element of the cleanup, which is preferable under the CERCLA statute and the NCP. Phosphate stabilization transforms the lead in contaminated soils into a form that is less leachable and less bioavailable. The reduced leachability reduces the mobility of the lead in the environment. The reduced bioavailability lowers the toxicity of site contaminants to exposed individuals.

Excavation and replacement of contaminated soils further reduces the mobility of residual contamination at the site by providing a clean soil barrier above the exposed surface of the excavation. This barrier provides physical protection against transport of residual contaminants through erosion or other forces. Soils treated in Alternative 3 remain at the surface and are not afforded this same protection against potential transport.

Short-Term Effectiveness

This criterion addresses the period of time needed to implement the remedy, and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until the clean up is completed and the final level of protection has been achieved.

Excavation and yard replacement under Alternatives 2, 3, and 4 all proceed on a property-by-property basis. The amount of time required to complete excavation and soil replacement at any particular property largely depends on scheduling of various service providers and weather conditions. Typically, contaminated soils can be excavated and removed in one to two days. Backfilling of excavated areas can typically be completed in one day or less. Sodding can be accomplished in several hours. Excavation, backfilling, and sodding can generally be completed within one to two weeks at each property. With multiple crews providing various services, work can progress at a number of properties simultaneously.

The time required to achieve cleanup levels through soil treatment can only be determined through a successful treatability study that demonstrates the effectiveness of a treatment technology on site soils. Typically, reagents are tilled into the soil and allowed to remain in place for a period of several days to a week or more until cleanup goals are achieved. Treated soils are then neutralized, if necessary, and resodded. Similar to excavation and soil replacement, the time required to implement a soil treatment remedy may vary from one to two weeks per property. Soil treatment could proceed at multiple properties simultaneously.

The overall time required to implement each alternative is dependent upon the number of work crews that are deployed to remediate properties simultaneously. With adequate resources at full deployment, it is anticipated that multiple crews could remediate from 1,000 to 2,000 properties per year, using either treatment or soil excavation and replacement. At this rate remediation of the estimated 16,000 properties to be addressed under Alternatives 2 and 3 could

be completed in eight to sixteen years. At this rate, remediation of an estimated 5,600 properties under Alternative 4 could be completed in approximately three to five years.

All action alternatives involve short-term risks to site workers and community members related to the excavation and transport of contaminated soils, clean backfill, and sod along public roadways. Since the most material is excavated and transported under Alternative 2, risks associated with the use of heavy construction equipment and transportation are greatest for this alternative. Alternatives 3 and 4 involve the same amount of excavation and transportation, so the short-term risks associated with excavation and transportation would be similar for these alternatives.

Alternative 3 would present an additional risk to site workers handling phosphoric acid or other potentially hazardous reagents during soil treatment activities. Alternative 4 would take the least amount of time to implement overall, but is considered an interim action, and would require a follow up final action to address remaining properties. The No Action Alternative imposes no risk on remedial action workers, but exposure would continue at current levels.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as the availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

All evaluated alternatives are readily implementable, once access is granted to enter properties to perform remediation. Excavation is a proven and easily implemented technology. Excavation and replacement of contaminated soils is performed using conventional earthmoving equipment and hand tools, and can be readily performed by trained operators and laborers. Similar operations have been underway in the Omaha area under the EPA emergency response authority, and coordination between local, state, and federal governments is established.

The treatment portion of Alternative 3 requires additional studies to evaluate the effectiveness of phosphate stabilization. If successfully demonstrated, the procedures for soil treatment are likewise anticipated to be straightforward and readily implementable.

Institutional controls are a component of Alternatives 2, 3, and potentially Alternative 4. Coordination between government entities is required to develop and implement institutional controls that will be both acceptable and effective. Existing authorities under local or state jurisdiction may be utilized to impose institutional controls that will achieve long-term control over future property use. Development of additional controls may be necessary to supplement or supplant existing authorities. Implementation of institutional controls under alternatives 2, 3, and

4 must be developed in coordination with local and state governments, or individual property owners, and their ease of implementation is therefore uncertain.

Cost

This criterion addresses the direct and indirect capital cost of the alternatives. Operation and maintenance costs incurred over the life of the project, as well as present worth costs, are also evaluated. The capital cost estimated for Alternative 2 is $214 million. The capital cost estimated for Alternative 3 is estimated at $122 million. Alternative 4 is estimated to cost $77.4 million. No costs are associated with the No Action Alternative.

Due to the uncertainties associated with the time required to complete the response for each or the alternatives, a meaningful present worth analysis of capital costs can not be performed. As an example, the present worth for Alternative 2 could vary from $72.5 million for a sixteen-year implementation to $124.5 million for an eight-year implementation.

All alternatives involve excavation and final management of contaminated soils. A constructed soil repository for final management of excavated soils would require ongoing operation and maintenance. The present value of operation and maintenance costs for a period of twenty years, assuming $5,000 per year for twenty years, is approximately $71,000.

Alternative 2 is more costly than the other alternatives because it involves excavation of all soil containing lead concentrations of 400 ppm or more. Alternative 3 is less costly than Alternative 2 because it utilizes a lower-cost treatment technology (phosphate stabilization) for soils contaminated at low to moderate levels. The cost estimate for Alternative 4 only includes remediation of properties with lead-soil concentrations above 800 ppm and other designated priority properties, and would need to be followed by a final response action.

Modifying Criteria

State Acceptance

This criterion addresses the state of Nebraska's preferences or concerns about the site remedial action alternatives. The EPA is the lead agency and has coordinated all site activities with the Nebraska Department of Environmental Quality (NDEQ) throughout this project. The NDEQ, as the EPA's support agency, supports a comprehensive approach to lead exposure sources at the site. The NDEQ opposes institutional controls that would place notices or restrictions on individual residential properties. The NDEQ does not support any such institutional controls that would prohibit quarterly deletion of remediated properties and opposes institutional controls for central business district properties.

The Nebraska Department of Health and Human Services System also provided comments on the OLS Proposed Plan. These and the NDEQ comments received are presented and addressed in the attached Responsiveness Summary.

A joint letter of concurrence supporting the selected remedy has been received from the NDEQ and the Nebraska Department of Health and Human Services System.

Community Acceptance

The EPA encouraged public review and comment on the preferred clean up by publicly issuing the Proposed Plan with supporting documents in the Administrative Record. In order to provide the community with an opportunity to submit written or oral comments, the EPA initially released the Proposed Plan on Friday, July 16, initiating a 30-day public comment period. Two public meetings were held on August 10, 2004, in north and south Omaha, Nebraska. Upon receiving requests from members of the public and various stakeholders, the EPA extended the public comment period on three separate occasions. Additional availability sessions were conducted by the EPA on October 20, 21, and 26. The comment period on the OLS Proposed plan closed after more than 14 weeks on November 1, 2004.

The community generally supports the interim remedy being selected by the EPA. The community is very supportive of a comprehensive lead-risk reduction program that will address all sources of lead contamination including lead-based paint. Most community members understand that there are limits to the EPA's authority under Superfund, and are supportive of the EPA working in concert with other agencies and organizations to implement a comprehensive program addressing all identified sources of lead exposure. Some community members expressed reservations about the safety and long-term effectiveness of soil treatment to address lead contamination. The community strongly desires the clean up to be completed in as brief a period of time as possible.

PRINCIPAL THREAT WASTES

Principal threat wastes are source materials containing the lead contamination that require remediation based on toxicity, mobility, and the potential to create unacceptable human health or ecological risks. The principal threat wastes at the site consist of approximately 640,000 cubic yards (960,000 tons) of lead-contaminated residential soils located in an estimated 16,000 residential properties. The NCP (§300.430(a)(1)(iii)(A)) establishes a preference for treatment to be used to address principal threat wastes when practicable. Treatment will not be employed for the interim remedy described in this ROD due to the uncertainty of treatment technologies that can be applied to lead-contaminated soils at the site. Phosphate treatment has traditionally been used in other applications to stabilize lead-containing materials prior to disposal. This technology has not been applied to residential properties intended for unrestricted future use. By comparison, non-treatment technologies (excavation and replacement of removed materials, revegetating) are traditionally applied to residential lead cleanup actions, and are well-demonstrated and effective for eliminating site risks present at the site.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

The EPA is selecting Alternative 4, as developed in the OLS Feasibility Study, in this Interim ROD. Alternative 4 provides for continued response to excavate and replace the most highly contaminated soils at the site while additional work is performed to further evaluate treatment alternatives and risks associated with more low contaminated soils. The selected remedy expands the scope of the response action currently being performed by the EPA at the site under removal response authority to include stabilization of deteriorating exterior lead-based paint and high-efficiency removal of interior dust. The selected remedy includes health education and public outreach programs to further enhance the protectiveness of other response measures. The health education component also helps protect community members from pre-remediation risks associated with site contaminants that will be addressed during the course of the ongoing cleanup and under a final remedy.

Risks posed by existing levels of lead contamination at the site warrant immediate response. The selected remedy enables the EPA to increase the response rate at properties that pose the greatest risks to human health. These highest-risk properties include any property exceeding 400 ppm where a residing child is identified with an elevated blood lead level, any high child-impact area exceeding 400 ppm, and any other residence or residential-type property exceeding 800 ppm lead in soil. High child-impact areas are expanded under this ROD to include not only child-care facilities, but other types of properties where a high incidence of lead-exposure to children could occur. These high child-impact areas include schools, churches, parks, vacant lots, and other areas that could potentially attract young children. Accelerated response to these high priority properties can occur under the selected remedy.

The characterization of risks performed to date at the site clearly supports the need to take action at these high priority properties. Due to the large number of these high priority properties at the site, a period of three to five years will be required to implement this interim remedy. This response period provides an opportunity to evaluate potential treatment technologies that could prove effective for remaining properties, and to further characterize risks associated with the low to moderately contaminated soils. Response to these lower-priority properties will not be delayed or postponed under this interim approach. Additional information and data will be collected during the interim remedy and will be considered in the final remedy selection process. Final remedy selection for the site will occur during implementation of the interim response. This schedule enables the final remedy for the remaining properties to proceed without interruption upon completion of the interim remedy.

The selected remedy allows the EPA to address community concerns by accelerating the rate of response to the properties posing the highest risk to human health and to expand the scope of the response to include elements of a comprehensive plan that the EPA has authority to implement. The selected remedy expands the scope of the existing removal response to include stabilization of loose and flaking exterior lead-based paint in instances where the remedy would

be threatened, and high-efficiency cleaning of home interiors following soil removal for residences that are determined to have elevated lead levels in interior dust.

The remedy also commits EPA to participate with other agencies and organizations in a comprehensive approach to addressing all potential lead exposure sources at the site. The EPA policy recognizes threats posed by other potential sources of lead exposure, including interior and exterior lead-based paint, interior dust, drinking water, and occupational exposure. As part of the data collection effort to better characterize lead-related risks at the site, these other potential sources of lead exposure will be characterized to assess their impact on total exposure. The EPA will work with other agencies and organizations to develop and implement this comprehensive data collection program, and will actively participate in efforts to identify and arrange for cleanup mechanisms to address sources that are beyond EPA authority.

Description of the Selected Remedy

The Selected Remedy represents an interim action that will enable the EPA to continue to address immediate site risks while additional work is performed to evaluate potential treatment technologies and better characterize risks associated with the low and low-contaminated soils. This interim approach requires the EPA to propose a final remedy and seek public comment for the remaining contaminated soils not addressed by this ROD. The selected remedy in this

ROD was developed as Alternative 4 in the OLS Feasibility Study and includes the following elements:

Excavation and replacement of soils at properties with greatest human health risk
- Excavation of soils exceeding 800 ppm at any residential-type property
- Excavation of soils exceeding 400 ppm in high child-impact areas
- Excavation of soils exceeding 400 ppm at properties with a child exhibiting an elevated blood-lead level

Final management of excavated materials
Stabilization of loose and flaking exterior lead-based paint
High efficiency interior cleaning
Participation in comprehensive program addressing all potential lead sources
Health Education

<u>Excavation of soils at properties with greatest human health risk</u>

The selected remedy involves the excavation and removal of lead-contaminated soils, backfilling the excavated areas to original grade with clean topsoil, and restoring a grass lawn at remediated properties. Excavation would be performed at properties where exposure to lead-contaminated soils is of greatest concern. Generally, the properties that will be designated for response include:

Any residential-type property where at least one non-foundation sample exceeds 800 ppm lead;

Residences with any non-foundation sample exceeding 400 ppm lead where a child identified with an elevated blood lead level resides;
Child-care facilities and other high child-impact areas with any non-foundation sample exceeding 400 ppm lead.

When a remedial response action is initiated at a property meeting any of the above criteria, soil excavation and replacement will be performed in all portions of the property where soil concentrations of 400 ppm or higher have been detected, including drip zones. Excavation will continue until the lead concentration measured at the exposed surface of the excavation is less than 400 ppm in the initial foot from the original surface, or less than 1,200 ppm at depths greater than one foot. The excavation will terminate at less than 12 inches if a residual soil lead concentration less than 400 ppm is measured within the initial foot of excavation. Soils in garden areas would be excavated until reaching a residual concentration of less than 400 ppm in the initial two feet from the original surface, or less than 1,200 ppm at depths greater than two feet. Creation of raised-bed gardens may be considered as an option for remediation of garden areas where removal of contaminated soil to achieve cleanup criteria is not practicable. After confirmation sampling has verified that cleanup goals have been achieved, excavated areas will be backfilled with clean soil to original grade and revegetated.

Remedial response performed in accordance with this ROD will be prioritized for residences and residential-type properties exceeding 400 ppm where a child is identified with an elevated blood lead level. When a child residing within the site is identified with an elevated blood-lead level through the ongoing blood screening program for children, the status of sampling and response at the child's residence will be checked. If sampling results indicate any non-foundation sample exceeding 400 ppm, the property will be prioritized for remediation. If sampling of the subject property has not occurred, sampling and potential remediation will likewise be prioritized. Child-care facilities and high child-impact areas will be the next highest priorities for sampling and remediation.

The selected remedy provides for remedial response at an estimated 5,600 residential-type properties with the highest human health risks, originally based upon the number of properties estimated to exceed 800 ppm. The estimate of 5,600 total properties in this ROD includes not only properties exceeding 800 ppm, but properties included due to elevated blood lead levels or considered high child-impact. Many of the properties where a child exhibits an elevated blood-lead level are anticipated to also exceed 800 ppm. The number of additional properties included due to elevated blood-lead levels or considered high child impact areas are within the margin of error for the initial estimate of 5,600 properties, and do not warrant an adjustment to the estimated number of properties to be remediated under the selected remedy.

Soil sampling performed to guide response decisions will be done in accordance with procedures described in the "Superfund Lead-Contaminated Residential Sites Handbook." Residential yards will be divided into a number of sections and one multi-aliquot composite

sample[1] will be collected from each section. The number of sections in each yard will depend upon the size of the yard. For properties less than 5,000 square feet, separate sections will generally be designated for the front yard, back yard, and side yard (if substantial). For properties greater than 5,000 square feet, the lot will generally be divided into four sections of roughly equal surface area. Properties over one acre in size will be divided into approximately one-quarter acre sections. A five-aliquot composite sample will typically be collected from each section. In addition, a four-aliquot composite sample will typically be collected from the drip zone of the house within 6 to 30 inches from the exterior walls. A separate composite sample is collected from distinct play areas and gardens, if present. Soil samples will generally be analyzed for lead content using X-Ray Fluorescence Spectrography (XRF). Sampling results are compared to appropriate soil action levels. If one or more non-drip zone sections exceed the appropriate action level, the property becomes eligible for Superfund response.

Soil will be excavated using lightweight excavation equipment and hand tools in the portions of the yard where the surface soil exceeds an applicable action level. For costing and planning purposes, each property is estimated to require removal of approximately 60 cubic yards of contaminated soil to achieve cleanup goals. Under these assumptions, a total of 336,000 cubic yards of soil would require excavation, replacement, and disposal under the selected remedial action. Clean fill and topsoil will be used to replace the soil removed after excavation, returning the yard to its original grade and elevation. The EPA will not use protected soils from the loess hills for backfill of excavated properties at the site.

After the topsoil has been replaced, a grass lawn will be re-established through either sodding or hydro-seeding. The EPA anticipates that most, if not all, residential yards will be restored through placement of sod. Sodding provides a more immediate cover and requires less maintenance to establish. Sod must be used in sloped areas of properties that would be subject to erosion before the hydro-seed could become established. Hydro-seeding offers potential cost savings relative to sodding, but can present more difficulty in establishing a high quality lawn. Hydro-seeding may be considered for very large properties, or for unoccupied properties, in lieu of sodding. Hydro-seeding would only be applied to a residential property, however, with the agreement of the homeowner and when circumstances assure that a quality grass cover can be effectively established from seed. Installation of landscaping features including mulch, crushed stone, landscaping cloth, sand, wood chips or other forms of vegetation may be considered in remediated areas where grass cover can not be established.

In the process of identifying appropriate options and recommendations for soil remediation, the conditions of existing vegetation, the use patterns of the property, and current drainage patterns within and adjacent to a property will be evaluated.

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[1]To collect a "composite" sample, a number of individual portions or "aliquots" are collected from a sampling section and combined to form a single composite sample.

During remediation activities, clean access to the residence will be provided at all times. Clean access will provide residents with access to their home that avoids contact with potentially contaminated soil. Sidewalks will be thoroughly brushed and washed off with water after each workday to provide as clean an entry as possible to the residence. In the absence of a sidewalk, placement of plywood, pallets, plastic, or using other temporary measures to prevent exposure and tracking of soils will provide a clean pathway to the residence. All residents will be required to stay away from the construction area during remediation activities. Unsafe excavation areas or stockpiled soils will be protected to prevent accidents and exposure.

Water application will be used, as necessary, to minimize the potential for fugitive dust emissions. Application rates will be regulated to control dust during excavation, yet prevent the development of muddy conditions. The objective will be to minimize airborne dust and minimize the production of mud that could be transported off-site on vehicle tires and other mobile equipment. Outdoor faucets and hydrants from private residences and public areas will be used as water supply sources.

Installation of a clean soil cover may be considered for areas contaminated at levels less than 1,200 ppm as an acceptable alternative to, or in combination with, excavation to reduce cost in special cases such as large parks or open spaces. Installation of a clean soil cover on residential properties in lieu of excavation and soil replacement will generally not be considered, and would not be performed without the informed consent of the individual property owner. Installation of a clean soil cover would only be considered in areas where surface soil-lead concentrations are greater than 400 ppm, but less than 1,200 ppm, and where drainage and other site-specific considerations would otherwise accommodate placement of a soil cover. The soil cover would consist of a minimum of 12 inches of clean vegetated soil. Installation of a clean soil cover would not occur in areas where surface soils exceed 1,200 ppm lead.

In some instances, properties that are contaminated at levels that are very near an action level may be located in close proximity to other properties that do meet the criteria for remedial response under this Interim ROD. These circumstances may present an opportunity to gain construction efficiency by excavating these properties that would not otherwise qualify for remedial response contemporaneously with other nearby properties that do meet the criteria for response. This provision of the selected remedy achieves cost savings through construction efficiency by avoiding duplication of mobilization and demobilization costs and other fixed costs associated with initiating and closing of a response action in a particular area.

Final Management of Excavated Materials

Three options are available for final management of contaminated soils excavated from residential properties. As the remedial response progresses, the EPA will continue to assess opportunities that become available for final management of excavated material. The selected remedy provides for flexibility to utilize the final management option that is both protective and cost-effective during the course of the response action.

The most expedient, and perhaps the most costly, means of managing excavated soils would be to transport the material to an offsite sanitary landfill for disposal or use as daily cover. This option is currently being utilized during the ongoing time-critical removal action at the site

Alternatively, the excavated materials could be used as beneficial fill in the construction of an industrial or other non-residential facility. Lead-contaminated soils at the site are considered a risk to human health only in residential settings. In certain instances, removed soils could be safely used in a non-residential setting without creating a risk to human health. Special engineering features may be designed into the fill area to assure protection of human health and the environment. Coordination with other agencies, particularly at the state and local level are required for an acceptable beneficial use to be identified and implemented. The value associated with the beneficial use of excavated materials could potentially offset the costs to transport and place the materials, resulting in a cost-effective solution to final management of contaminated soils.

The third option involves constructing an offsite repository for final management of excavated materials. This alternative has costs associated with design, construction, and operation and maintenance. This option is limited by the availability of land and the ability to arrange for maintenance of such a facility. For costing purposes, construction and operation of a soil repository for final management of excavated materials was assumed.

Stabilization of Loose and Flaking Exterior Lead-Based Paint

In order to prevent the re-contamination of the clean soil placed in yards after excavation, loose and flaking exterior lead-based paint that threatens the continued protectiveness of the remedy will be stabilized on affected structures prior to soil excavation. Only those homes and other structures where lead-based paint is visibly flaking and deteriorating will be addressed. Loose and flaking paint will be removed primarily through wiping or wet scraping, although power washing may be considered on surfaces where limited damage to the siding or structure would be expected. Once loose and flaking paint has been removed, an encapsulant or other appropriate material will be applied to stabilize the affected surface. Coating material used to stabilize affected surfaces will be color-matched to the existing surface to the extent practicable.

The stabilization of exterior lead-based paint will be conducted on a voluntary basis prior to soil removal and replacement, and will only be performed at homes where soil cleanup actions are conducted. Procedures used to stabilize lead-based paint will be consistent with HUD requirements presented in "Guidelines for the Evaluation and Control of Lead-based Paint Hazards in Housing (HUD, June 1995). Contractors working on removal of lead-based paint will operate in conformity with the Residential Lead-Based Paint Hazard Reduction Act, the Toxic Substances Control Act, and Title 178, Chapter 23 of the Nebraska Administrative Code.

High-Efficiency Interior Cleaning

At residences where soil cleanup actions are conducted, sampling will be performed to assess lead concentrations and loadings in interior dust. Homes that exceed the EPA and HUD standards for lead in interior dust will be eligible for a thorough interior cleaning using high-efficiency equipment. Interior cleaning of affected residences will be provided, in accordance with HUD procedures, on a voluntary basis for willing residents, after the soil cleanup is completed in the yard.

Participation in Comprehensive Program Addressing All Potential Lead Sources

The EPA recognizes that a number of sources potentially contribute to lead exposure at the site. In addition to soil, other potential sources include interior and exterior lead-based paint, lead-contaminated interior dust, drinking water, occupant hobbies or activities, and occupational exposure that can also result in subsequent contamination of homes. The remedial response at the site will be expanded to include all elements of a comprehensive program that are consistent with EPA policy and authorized under CERCLA, and will be integral to a comprehensive remedy addressing all potential sources of lead exposure at the site. The EPA will seek to partner with other public and private entities to characterize and address all identified sources of lead exposure to the site community.

Consistent with Agency policy, the EPA will assess the contribution of all identified sources of lead to overall lead exposure at the site. The EPA will participate in the development of risk reduction strategies that address all identified sources that significantly contribute to overall lead exposure. The CERCLA statute limits the EPA's authority to respond to certain sources such as interior lead-based paint[2] and plumbing. In cases where CERCLA authority is limited, the EPA will work with other interested parties and authorities to identify potential funding sources and mechanisms to address these other sources of lead exposure as part of a comprehensive lead-exposure reduction program.

Many agencies and groups currently contribute to public awareness and community outreach within the site community. These include, but are not limited to, the following:

Agency for Toxic Substances and Disease Registry
Charles Drew Health Center
Chicano Awareness Center
City of Omaha Lead Hazard Control Program
Douglas County Health Department

[2]Generally, CERCLA response actions are undertaken to address a release or threat of a release of a hazardous substance, such as lead, into the environment. There are potential limitations to CERCLA authority. For example, CERCLA Section 104(a)(3) states that "the President (EPA) shall not provide for removal or remedial action under this section in response to a release or threat of release...from products which are part of the structure of, and result in exposure within, residential buildings...." This section generally limits EPA's authority to respond to interior lead-based paint inside a house.

Douglas and Sarpy County Extension Services
Fred Leroy Health and Wellness Center
Governor's Council for Lead Safe Neighborhoods in Omaha
Greater Omaha Chamber of Commerce
Hope Medical Outreach Coalition
Lead Safe Omaha Coalition
Metropolitan Omaha Medical Society
NAACP
Nebraska Health and Human Services System
Nebraska Urban Indian Health Coalition
North and South Omaha Community Care Councils
Nuesto Mundo
Omaha Housing Authority
One World Community Health Centers
Sierra Club – Missouri Valley Chapter
Sisters Together, Inc.
University of Nebraska Medical Center
U.S. Department of Housing and Urban Development

Strategies have been developed by a number of interested parties to address overall lead exposure in Omaha. In particular, the OLS Community Advisory Group has developed a "Comprehensive Plan for the Elimination of Lead Hazards in Omaha, Nebraska" describing the creation of an Omaha Lead Superfund Site Alliance to direct implementation of a comprehensive lead risk reduction program. The Union Pacific Railroad Company has likewise developed a "Kids First" strategy for controlling lead exposure to children. The DCHD has developed, and is implementing, a strategy involving blood screening, public education, and outreach directed at reducing exposure to multiple sources of lead. Other involved Omaha service providers include the city of Omaha Planning Department, Douglas and Sarpy County Extension Services physicians and clinics, and community-based organizations. The EPA will seek to coordinate and partner with these and other entities having an interest in reducing overall lead exposure in the site community to develop and implement a comprehensive lead risk reduction program.

Health Education

Due to the multiple sources of potential lead exposure at the site, health education for the community is needed to help control overall exposure levels and reduce the potential for adverse health effects. An active educational program will be conducted in cooperation with interested individuals, agencies, and organizations throughout the duration of the EPA remedial action. These parties could include government entities such as the DCHD, the ATSDR, Nebraska Health and Human Services, and numerous local non-governmental organizations including the Education Subcommittee formed under the OLS Community Advisory Group. Educational activities will be funded by the EPA through completion of the soil remediation activities. The

following, although not an exhaustive list, indicates the types of educational activities that may be conducted at the site:

Physicians' education for diagnosis, treatment, and surveillance of lead exposure
Prevention programs for Lamaze and pre-natal groups associated with local hospitals
Extensive community-wide blood-lead monitoring
In-home assessments for children identified with elevated blood-lead concentrations

- Distribution of prevention information and literature
- Development and implementation of prevention curriculum in schools
- Education of community groups such as Girl and Boy Scouts
- Provision of a high-efficiency particulate adsorption (HEPA) vacuum for interior cleaning of affected residences

Maintenance of a public database for homes where protective barriers have been placed at depth as warning to underlying contamination

Equipment may be purchased to support these educational and outreach activities and to enhance the EPA's ability to perform adequate environmental assessments in the home.

Institutional Controls

Institutional controls will generally not be required to assure the continued protectiveness of properties remediated in accordance with this ROD. Excavation of contaminated soils will continue until reaching a residual concentration at the exposed surface of the excavation of less than 400 ppm in the initial foot or less than 1,200 ppm at depths greater than one foot. Soils in garden areas would be excavated until reaching a residual concentration of less than 400 ppm in the upper two feet, or less than 1,200 ppm at depths greater than two feet. Excavated areas will be backfilled to the original surface with clean material and revegetated. The EPA has been advised by ATSDR[3], and concurs, that these actions are protective of human health. Attainment of these criteria allows for unrestricted future use of remediated properties. No additional physical control measures or institutional controls are anticipated at this time to assure continued protection of human health and the environment at properties meeting these criteria.

Institutional controls are potentially required as part of this remedial action to control land use where a clean soil cover is installed in lieu of soil excavation and replacement, or for construction and operation of a soil repository that would require additional restrictions on future land use. These institutional control requirements will be assessed as they arise during implementation of the interim remedy. The need for additional institutional controls will be further evaluated during the final remedy selection process for the site.

[3]Health Consultation, Evaluation of the U.S. Environmental Protection Agency Proposed Soil Excavation Plan for the Omaha Lead Refinery Site, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Division of Health Assessment and Consultation, Atlanta, Georgia, June 2, 2004.

Summary of the Estimated Remedy Costs

Capital costs associated with implementation of the interim remedial action are presented in Table 1. For costing purposes it is assumed that the voluntary exterior lead-based paint stabilization and interior cleaning are performed at fifty percent of residences where soil remediation is conducted.

Table 1.
Cost Summary for Selected Remedy

	QUANTITY	UNIT PRICE	TOTAL PRICE
RESIDENTIAL YARD EXCAVATION			
1. Mobilization		$50,000	$50,000
2. Property Access and Sampling	5,600	$400	$2,240,000
3. Yard Soil Excavation, Transport, and Backfill	5,600	$11,000	$61,600,000
4. Post Cleanup Reports	5,600	$400	$2,240,000
5. Exterior Lead-Based Paint Stabilization	2,800	$500	$1,400,000
6. Interior Dust Cleaning	2,800	$500	$1,400,000
7. Health Education for 3 Years	3	$112,600	$387,800
Subtotal			$69,317,800
REPOSITORY			
1. Design		$90,000	$90,000
2. Site Preparation	21 acres	$4,000/acre	$84,000
3. Material Placement	336,000 cy	$1.20/cy	$403,200
4. Vegetative Cover	21 acres	$2,000/acre	$42,000
Subtotal			$619,200
Contingencies			$7,433,700
TOTAL INTERIM ACTION COSTS			$77,370,700

The information in this cost summary table is based on the best available information regarding the anticipated scope of the selected remedial action. Changes in the cost elements are likely to occur as a result of new information and data collected during the design and implementation of the remedial alternative. Major changes, if they arise, may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or an amendment to this ROD. This is an order-of-magnitude engineering cost estimate that is expected to be accurate within +50 to -30 percent of the actual project cost.

A present worth analysis was performed to evaluate project durations of three and five years. For purposes of this analysis, it is assumed that a soil repository is constructed and maintained for final management of contaminated soils excavated at the site. An annual operation and maintenance cost of $5,000 per year for a period of twenty years was assumed for the soil repository. Operation and Maintenance requirements could be expected to continue beyond the twenty-year period assumed in the following cost analysis. Actual final management costs for excavated materials are somewhat uncertain at this time, since a number of management scenarios are possible, and the most cost-effective alternative may not be available. Data obtained during implementation of the remedial action will be used to evaluate final management alternatives and refine long-term operation and maintenance costs. This information will be considered in the selection of a final remedy for the site.

Table 2 projects the present value costs associated with implementation of the selected remedial action over a three-year period, including construction and maintenance of a soil repository for management of excavated soils. Capital costs are divided evenly between years for this analysis. Actual distribution of funding requirements may vary due to fiscal scheduling, contracting strategies, or other considerations.

Table 2.

Present Worth Analysis for the Selected Remedy - 3 Year Period

YEAR	CAPITAL COST	ANNUAL O&M	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT WORTH
0	$25,790,000		$25.790,000	1.00	$25,790,000
1	$25,790,000	$5,000	$25,795,000	0.935	$24,118,325
2	$25,790,000	$5,000	$25,795,000	0.873	$22,519,035
3		$5,000	$5,000	0.816	$4,080
4		$5,000	$5,000	0.763	$3,815
5		$5,000	$5,000	0.713	$3,565
6		$5,000	$5,000	0.666	$3,330
7		$5,000	$5,000	0.623	$3,115
8		$5,000	$5,000	0.582	$2,910
9		$5,000	$5,000	0.544	$2,720
10		$5,000	$5,000	0.508	$2,540
11		$5,000	$5,000	0.475	$2,375
12		$5,000	$5,000	0.444	$2,220
13		$5,000	$5,000	0.415	$2,075
14		$5,000	$5,000	0.388	$1,940
15		$5,000	$5,000	0.362	$1,810
16		$5,000	$5,000	0.339	$1,695
17		$5,000	$5,000	.0317	$1,585
18		$5,000	$5,000	0.296	$1,480
19		$5,000	$5,000	0.277	$1,385
20		$5,000	$5,000	0.258	$1,290
TOTAL	$77,370,000				
				TOTAL PRESENT WORTH	$72,471,290

O&M costs are reported as present worth estimates given a 7% discount rate for a 20 year duration. Cost estimates are based on soil volumes and unit costs estimated in the RI/FS. Cost estimates are within 50 to -30% accuracy prediction.

Table 3 presents a similar analysis that assumes the selected remedial action is implemented over a five-year period.

Table 3.

Present Worth Analysis for the Selected Remedy - 5 Year Period

YEAR	CAPITAL COST	ANNUAL O&M	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT WORTH
0	$15, 474,000		$15,474,000	1.00	$15,474,000
1	$15,474,000	$5,000	$15,479,000	0.935	$14,472,865
2	$15,474,000	$5,000	$15,479,000	0.873	$13,513,167
3	$15,474,000	$5,000	$15,479,000	0.816	$12,630,864
4	$15,414,000	$5,000	$15,479,000	0.763	$11,810,477
5		$5,000	$5,000	0.713	$3,565
6		$5,000	$5,000	0.666	$3,330
7		$5,000	$5,000	0.623	$3,115
8		$5,000	$5,000	0.582	$2,910
9		$5,000	$5,000	0.544	$2,720
10		$5,000	$5,000	0.508	$2,540
11		$5,000	$5,000	0.475	$2,375
12		$5,000	$5,000	0.444	$2,220
13		$5,000	$5,000	0.415	$2,075
14		$5,000	$5,000	0.388	$1,940
15		$5,000	$5,000	0.362	$1,810
16		$5,000	$5,000	0.339	$1,695
17		$5,000	$5,000	.0317	$1,585
18		$5,000	$5,000	0.296	$1,480
19		$5,000	$5,000	0.277	$1,385
20		$5,000	$5,000	0.258	$1,290
TOTAL	$77,370,000				
				TOTAL PRESENT WORTH	$67,937,408

O&M costs are reported as present worth estimates given a 7% discount rate for a 20 year duration. Cost estimates are based on soil volumes and unit costs estimated in the RI/FS. Cost estimates are within 50 to -30% accuracy prediction.

Expected Outcomes of the Selected Remedy

The selected remedy will provide accelerated response to contaminated site properties and will significantly improve human health protection in the community. The selected remedial action at the site will take a period of years to implement due to the number of properties involved. The interim strategy allows for further assessment of human health risks and potential treatment alternatives to be performed while properties posing the highest human health risks are remediated through the well-demonstrated approach of excavation and soil replacement. A final remedy selection process for the low to moderately-contaminated properties will proceed with an improved understanding of human health risks and the effectiveness of potential treatment technologies.

Concurrent with the selected remedy, the EPA will work with other interested parties to design and implement a comprehensive program to better characterize risks associated with all potential sources of lead at the site. The focus of this effort will include soil, interior dust, interior and exterior lead-based paint, tap water, and other media. Information will be collected to evaluate the potential impact of occupational exposure and personal hobbies and activities. The EPA will participate in a comprehensive program to assess all potential lead exposure sources in the site community and will work with other agencies, organizations, and interested parties to identify and arrange for mechanisms to address identified exposure sources.

Additional data collection will also be performed to enhance the characterization of risks performed in the OLS Human Health Risk Assessment. Additional data will be collected to further refine input parameters to the IEUBK model to better assess human health risks associated with the low and low-contaminated soils at the site.

The interim remedial response strategy provides an opportunity to perform treatability studies to evaluate the effectiveness of potential treatment technologies while properties with the highest human health risks are remediated. Treatment will only be considered as a potential final remedy for properties not addressed by the interim remedial action if treatability studies conclusively demonstrate that a technology is safe and effective and remains protective over a long-term period. Treatability studies performed for lead-contaminated soils at the site will be subject to public review and comment prior to final remedy selection.

Since human health risks are associated with lead-contaminated soils with concentrations up to 800 ppm that are not addressed by this action, this selected remedy can not be considered a final action for the site. Public involvement will continue during implementation of the interim remedy to assess new information that is developed to support selection of a final remedial action for the site. Prior to selection of a final remedy, the EPA will release a Proposed Plan identifying the Agency's preferred alternative to remediate site contaminants not addressed during the interim action. Following public review and comment of the Agency's Proposed Plan for Final Remedial Action, EPA will issue a Final ROD for the site.

STATUTORY DETERMINATIONS

The EPA's primary legal authority and responsibility at Superfund sites is to conduct response actions that achieve protection of human health and the environment. Section 121 of CERCLA also establishes other statutory requirements and preferences that include compliance with federal and state applicable or relevant and appropriate requirements (ARARs), cost effectiveness, and the use of permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable. Additionally, the statute includes a preference for remedies that utilize treatment to reduce the mobility, toxicity, and volume of contaminants. The following sections discuss how the selected alternative meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy will protect human health and the environment at remediated properties by achieving the Remedial Action Objectives through conventional engineering measures. Risks associated with lead-contaminated soils at the site are caused by the potential for direct contact with contaminated soils. The selected remedy eliminates this direct exposure pathway through excavation and replacement of lead-contaminated soils at the residential properties. Contaminated soils will be removed from remediated areas, permanently eliminating this identified source of exposure. The implementation of the Selected Remedy will not pose unacceptable short-term risks or cross-media impacts.

Compliance with ARARs

In general, selected remedies should comply with ARARs unless waivers are granted. The selected remedy is expected to meet all chemical-specific, action-specific, and location-specific ARARs and does not involve any waivers.

Chemical Specific ARARs

- Lead-Based Paint Hazard Regulations, 40 C.F.R. Part 745.

These regulations identify concentrations in dust which may present a hazard. When the interior of a home is included for cleaning the dust levels in the home will be compared to the levels found in 40 C.F.R. Part 745.65. These regulations identify a level of concern for lead concentrations in dust inside homes as a mass-per-area concentration of lead equal to or exceeding 40 micrograms/square foot (ug/ft^2) on floors or 250 ug/ft^2 on interior window sills based on wipe samples. Pursuant to the Superfund Lead-Contaminated Residential Sites Handbook the soil-lead hazard identified in this regulation should not be treated as as ARAR. Site specific soil cleanup levels are developed using the IEUBK model.

- EPA Revised Interim Soil Lead Guidance For CERCLA Sites And RCRA Corrective Action Facilities, August 1994, and 1998 Clarification, OSWER Directive 9355.4-12, August 1994, and OSWER Directive 9200,2-27P, August 1998.

These guidance documents recommend using the Integrated Exposure Uptake Biokinetic Model (IEUBK) on a site-specific basis to assist in developing cleanup goals.

Location-specific ARARs

- The Endangered Species Act (16 U.S.C., Section 1531, 50 CFR Part 200, 30 CRF Part 402).

No federal or threatened and endangered species have been identified at the Site to date.

- The National Historic Preservation Act (16 U.S.C.), and the regulation at 33 CFR Part 800.

No affected properties have been identified to date that are eligible for, or included on, the National Register of Historic Places.

- The National Archeological and Historic Preservation Act (16 U.S.C., and 36 CFR Part 65).

These requirements provide for recovery and preservation of artifacts which may be discovered during implementation of response actions. No such items have been identified to date.

- Protection of Wetlands, Executive Order 11990; 40 C.F.R., Part 6, Appendix A.

The remedial action will be designed to avoid adversely impacting wetlands wherever possible including minimizing wetlands destruction and preserving wetland values.

- Protection of Floodplains, Executive Order 11988: 40 C.F.R. Part 6, Appendix A.

If a repository is constructed it will be designed to avoid adversely impacting any floodplain areas and consider flood hazards and floodplain management.

- Clean Water Act (Section 404 Permits), Dredge or Fill Substantive Requirements, 33 U.S.C. Sections 1251-1376; 40 C.F.R. Sections 230 and 231.

No dredging or filling will occur in waters of the United States without compliance with the appropriate substantive requirements of these regulations.

Action Specific ARARs

- Subtitle D of the Resource Conservation and Recovery Act (RCRA), Section 1008, Section 4001, et seq., 42 U.S.C. §6941, et seq., State or Regional Solid Waste Plans and implementing federal and state regulations.

All excavated soil disposed in a sanitary landfill will comply with Subtitle D requirements. If other disposal alternatives are used, Subtitle D of RCRA may be applicable.

- Occupational Safety and Health Act, 29 C.F.R. part 1910 will be applicable to all actions.

  Requirements of 29 CFR part 1910 will be followed.

- Subtitle C of RCRA, 42 U.S.C. Section 6901, et seq., 40 C.F.R. Part 260, et seq. and implementing federal and state regulations for contaminated soils that exhibit the characteristic of toxicity and are considered RCRA hazardous waste.

Subtitle C of RCRA is potentially applicable for the removal of soils contaminated with heavy metals, particularly if these soils exceed the TCLP regulatory threshold. Any wastes exceeding the TCLP regulatory threshold will undergo treatment on site in accordance with the substantive requirements of RCRA before being transported to a sanitary landfill or a repository. Wastes will not be stored on site for longer than 90 days after excavation.

- Department of Transportation (DOT) regulations, 49 C.F.R. Parts 107, 171-177.

DOT hazardous material transportation regulations may be relevant and appropriate for transportation of the contaminated soils to the disposal facility.

- Clean Water Act, Stormwater Runoff Requirements, 40 C.F,R. Part 122.26.

If the construction work at a property requires excavation resulting in a land disturbance of greater than 1 acre and less than 5 acres then the stormwater runoff requirements may be applicable and the substantive stormwater requirements must be met to prevent erosion, including best management practices. The EPA does not anticipate this situation to arise very often because most of the properties affected by this action will require work on less than an acre of land.

In addition, if a repository is constructed for soil disposal compliance with these regulations will be required during construction and management of the repository.

- Residential Lead-Based Hazard Reduction Act, 42 U.S.C. Section 4851 et seq.; Toxic Substances Control Act, 15 U.S.C. Section 2601 et seq.; Lead-Based Paint Hazard Regulations, 40 C.F.R. Part 745.

The dust-lead hazard may be triggered as an ARAR when EPA is performing the interior cleaning of homes if levels of dust are found above levels of concern. The regulations found at 40 C.F.R. Part 745.65 identify a level of concern for lead concentrations in dust inside homes as a mass-per-area concentration of lead equal to or exceeding 40 micrograms/square foot (ug/ft^2) on floors or 250 ug/ft^2 on interior window sills based on wipe samples. If dust levels exceed these concentrations a cleaning may be performed and the notice requirements of these regulations would have to be met.

Also, when addressing the deteriorating exterior lead-based paint on properties to protect the soil cleanup, compliance with these requirements would be appropriate.

Pursuant to the Superfund Lead-Contaminated Residential Sites Handbook the soil-lead hazard identified at 40 C.F.R. 745.65 should not be treated as as ARAR. Site specific soil cleanup levels are developed using the IEUBK model.

- The Lead Safe Housing Rule, 24 C.F.R. Part 35.

While these regulations only apply to federally owned property or housing receiving federal assistance it may be relevant and appropriate to apply these regulations when addressing exterior lead-based paint on a property in order to prevent the recontamination of the soil, when a soil cleanup is being performed.

To Be Considered Criteria

- EPA Guidance, Reducing Lead Hazards When Remodeling Your Home, EPA 747-K-97-001, September 1997.

It may be appropriate to consider this guidance when addressing exterior lead-based paint on a property in order to prevent the recontamination of the soil, when a soil cleanup is being performed

- Concerns have been raised by a Loess Hills preservation society that the EPA not use protected soil from the Loess Hills as backfill for properties where excavation occurs. The EPA is sensitive to this concern and will not use Loess Hills soils for backfill of excavated properties at the site

The State of Nebraska identified the following ARARs:

Title 129 - Nebraska Air Quality Regulations

Title 128 - Rules and Regulations Governing Hazardous Waste Management in Nebraska

Title 132 - Integrated Solid Waste Management Regulations

Title 119 - Rules and regulations Pertaining to the National Pollutant Discharge Elimination System

Title 178 - Chapter 23, Nebraska Rules on Lead-Based Paint Activities.

Cost Effectiveness

The selected remedy is a cost-effective permanent solution to lead-contaminated residential soils at the site. Excavation and replacement of contaminated soils has the highest level of short- and long-term effectiveness and permanence of the alternatives evaluated. No treatment technologies were identified that could demonstrate short- or long-term effectiveness and permanence for remediation of residential site soils at this time. Although not achieved through treatment, the selected remedy does result in reduced mobility of site contaminant through engineering controls.

The selected remedy relies on conventional engineering methods that are easily implemented. Contaminated soils are removed and replaced, thereby providing a permanent remedy for remediated soils that will not be subject to future costs associated with residual risks.

Utilization of Permanent Solutions and Alternate Treatment Technologies

The selected remedy utilizes a well-demonstrated approach to remediation of contaminated soils that will provide a permanent remedy for remediated soils. Removal and replacement of contaminated soils permanently removes site contaminants as a potential source of exposure. No treatment technologies were identified that could be considered reliable at this time. The selected remedy best satisfies the statutory mandates for permanence and treatment.

The EPA has concluded that the selected remedy is protective, compliant with ARARs, cost-effective, and provides the best balance of trade-offs for utilizing permanent solutions and alternative treatment technologies to the extent practicable for the site.

Preference for Treatment

The selected remedy does not utilize treatment to address the principle threats posed by the site. No treatment technologies were identified that have demonstrated the ability to reliably provide short- and long-term effectiveness and permanence. The selected remedy establishes an interim approach to remediation of site risks that provides an opportunity to further evaluate the potential for treatment to be applied to principle threats at the site.

Reduction of Mobility, Toxicity, and Volume

The selected remedy will reduce the mobility of contaminants of concern at the site through removal and final management in a facility providing containment through engineering controls. The volume and toxicity of principle threat materials will not be reduced. The effective isolation of these materials in an engineered cell effectively controls the potential for future exposure.

Five-Year Review Requirements

At remediated properties, the selected remedy does not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure. The selected remedy is not subject to periodic five-year reviews in accordance with Section 121 (c) of CERCLA and the NCP §300.430(f)(5)(iii)(C). The five-year review requirement will be further evaluated during the selection of the Final Remedial Action for the site.

DOCUMENTATION OF SIGNIFICANT CHANGES

The interim remedy selected in this Record of Decision was presented as Alternative 4 in the OLS Feasibility Study and Proposed Plan. This Alternative differs somewhat from the Preferred Alternative presented in the Proposed Plan. The selected remedy involves excavation and replacement of contaminated soils at properties that exceed one of the following criteria:

- At least one non-foundation sample exceeding 800 ppm at any residential-type property;
- At least one non-foundation sample exceeding 400 ppm in high child-impact areas, including child-care facilities; or
- At least one non-foundation sample exceeding 400 ppm at properties with a child exhibiting an elevated blood-lead level.

The Preferred Alternative presented in the OLS Proposed Plan involved excavation of 5,600 properties where human health risks were highest. Although the estimated number of properties to be excavated pursuant to this Record of Decision remains 5,600, the actual properties that will be remediated are those that exceed the specified criteria. This modification does not result in a significant change in the scope of the selected remedy from the Preferred Alternative in the OLS Proposed Plan, and is intended to clarify the properties that will be remediated under this Interim Record of Decision.

This Interim Record of Decision also provides further clarification of several aspects of the selected remedy. These clarifications provide additional information regarding the provision for capping, the criteria used to determine if deteriorating lead-based paint threatens the continued protectiveness of the remedy, and the use of institutional controls.

The OLS Feasibility Study and Proposed Plan presented capping that could be considered in certain cases that lend themselves to placement of a clean soil cover. The Interim Record of Decision clarifies that this feature is not an engineered cap that would typically be installed as a component of a containment remedy. Caps are typically multi-layer engineered features that may incorporate impermeable membranes or compacted clay layers to prevent infiltration. Installation of trees and other landscaping that could penetrate such a cap are generally not allowed.

The provision for a cap has been changed to clarify that the selected remedy may include placement of a clean soil cover. A clean soil cover may be considered for areas contaminated at levels less than 1,200 ppm as an acceptable alternative to excavation to reduce cost in special cases such as large parks or open spaces. Installation of a clean soil cover on residential properties in lieu of excavation and soil replacement will generally not be considered, and would not be performed without the informed consent of the individual property owner. Installation of trees and other landscaping features would generally not be prohibited in areas remediated through installation of a clean soil cover.

The criteria for determining if deteriorating lead-based paint threatens the continued protectiveness of the remedy was modified due to confusion regarding the application of the originally stated criteria that at least 10% of a surface must be affected. The language in the Interim ROD was changed to provide for stabilization of deteriorating lead-based paint if recontamination of remediated areas would be expected to occur. The decision to stabilize deteriorating exterior lead-based paint will be a qualitative determination based on a property-specific assessment.

Institutional controls were originally specified for both Alternative 4 in the site Feasibility Study and the Preferred Alternative in the OLS Proposed Plan. The use of institutional controls was not adequately described in either of these documents, and language was added to the Interim ROD to clarify elements that are included within the scope of the selected remedy.

Institutional controls are potentially required as part of the selected remedy to control land use where a clean soil cover is installed in lieu of soil excavation and replacement, or for a soil repository constructed for final management of excavated soils that would require additional restrictions on future land use. These institutional control requirements will be assessed as they arise during implementation of the interim remedy. Since EPA anticipates that excavation and soil replacement will allow for unrestricted future use of residential areas remediated in accordance with this ROD, institutional controls are not anticipated to be necessary to provide overall protection of human health.

Institutional controls for individual remediated properties are not included as a component of this interim ROD. The need for additional institutional controls will be further evaluated during the final remedy selection process for the site.

Other elements of the selected remedy remain consistent with the description of Alternative 4 presented in the OLS Feasibility Study and Proposed Plan.

Figure 1
Omaha Lead Site Investigation
Sampling Map

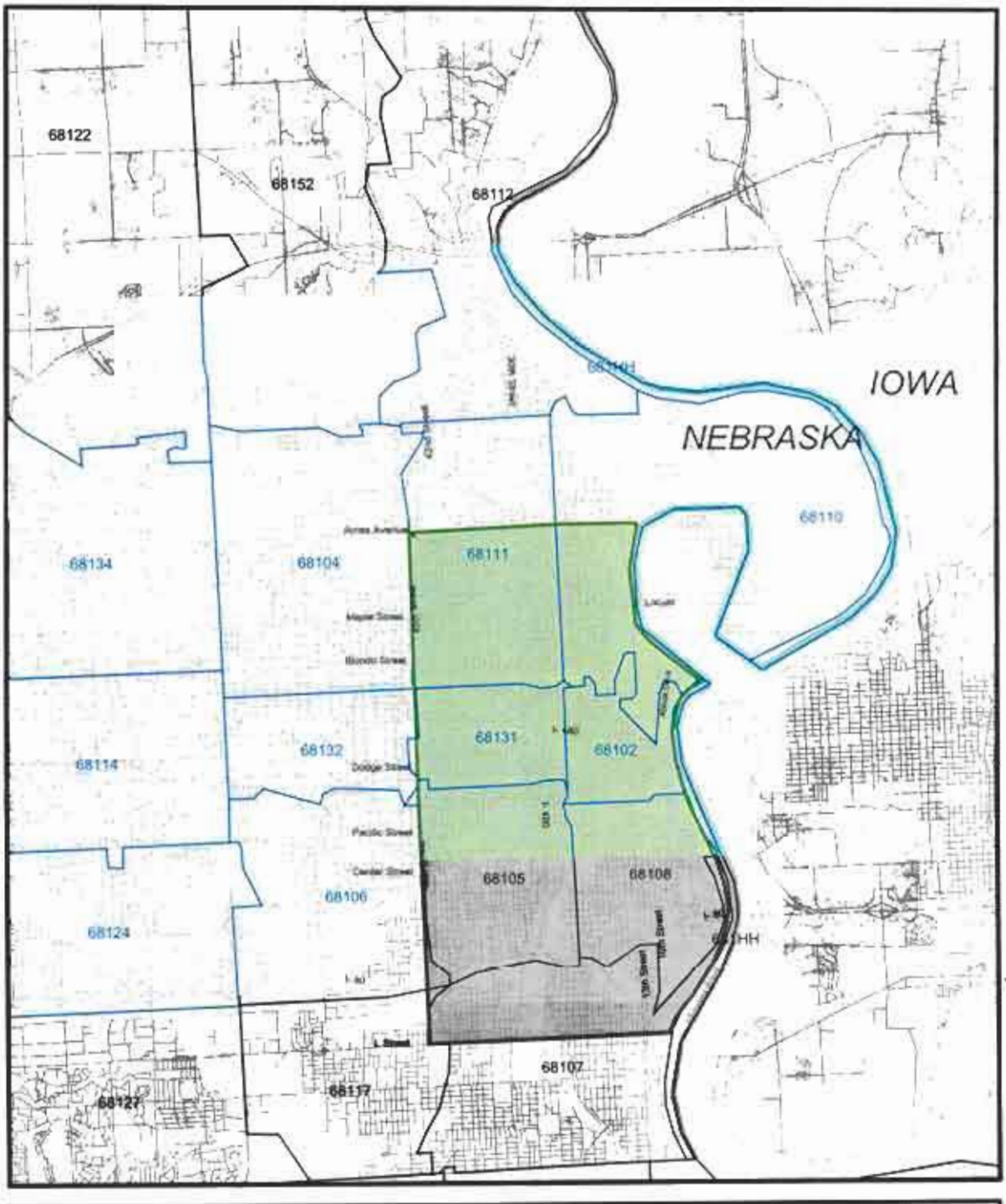
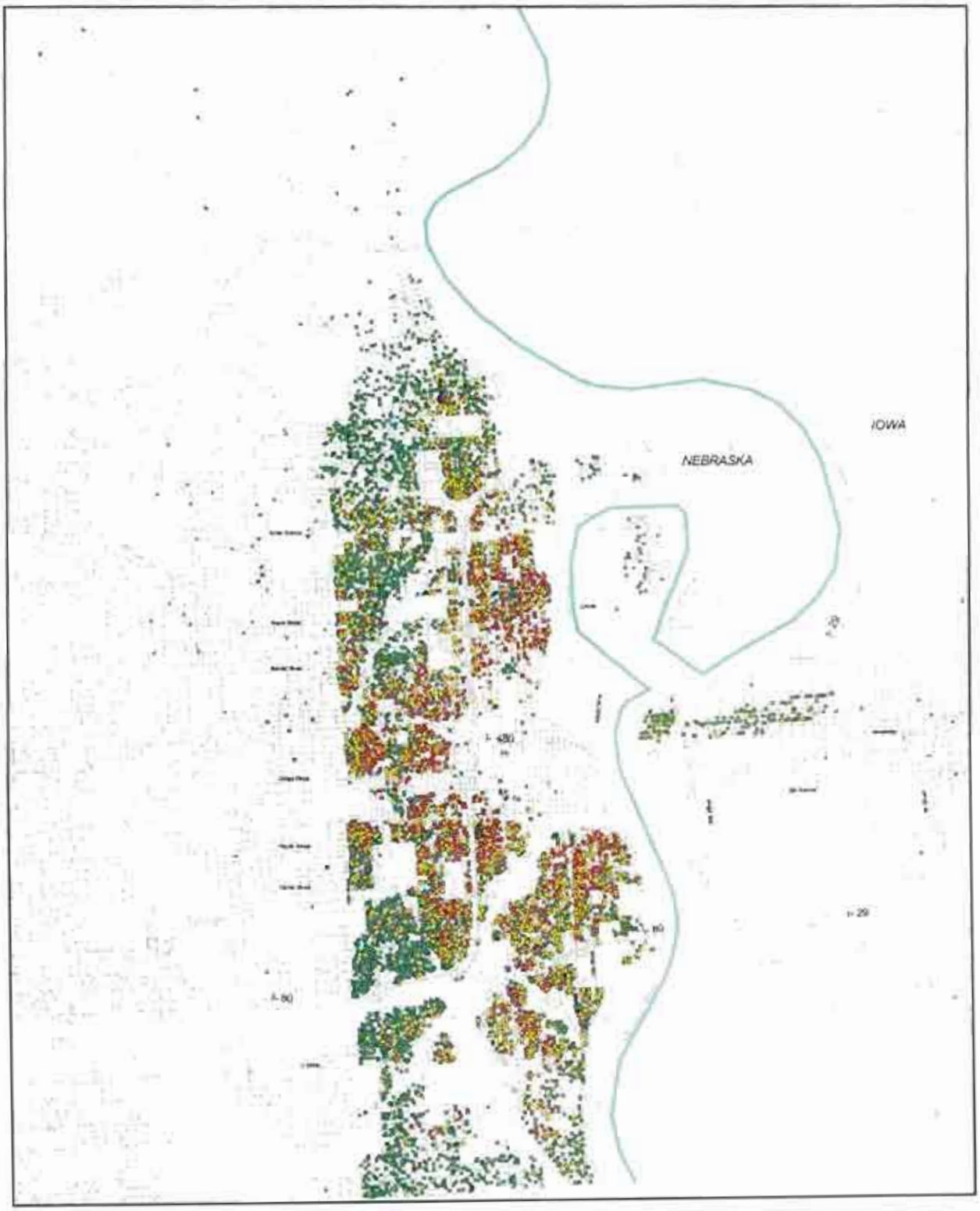


Figure 2
Omaha Lead Remedial Study
Residential, Child Care, and EBL Properties - Lead Results



LEGEND

0 - 399 mg/kg Lead Concentrations

400 - 799 mg/kg Lead Concentrations

800+ mg/kg Lead Concentrations

Roads

Missouri River/State Line

N

Results shown are based on highest non-foundation lead concentration at each property.