STATEMENT OF BASIS
For
Refined Metals Corporation
IND 000 718 130
Beech Grove, Indiana

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INTRODUCTION

This Statement of Basis (SB) for the Refined Metals Corporation (RMC) facility in Beech Grove, Indiana, explains the proposed remedy for the collection, treatment, and removal of hazardous waste from the facility, the adjacent Citizens Gas Coke Company west of the facility, and the drainage ditch north of the facility. In addition, the SB includes summaries of all corrective measure alternatives analyzed by RMC. U.S. EPA will select a final remedy for the facility only after the public comment period has ended and the information provided by the public during this period has been reviewed and substantive comments considered.

U.S. EPA is issuing this SB as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA) and consistent with the August 31, 1998, Consent Decree entered in the matter of United States v. Refined Metals Corporation, U.S. District Court for the Southern District of Indiana, Civil Action No. IP902077C, (Consent Decree). This document summarizes information that can be found in greater detail in the March 29, 2000, Phase I and November 18, 2002 Phase II RFI reports and August 6, 2007 CMS Report and other pertinent documents contained in the Administrative Record for this facility. U.S. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the facility and the RCRA activities that have been conducted. The public can be involved in the remedy selection process by reviewing the documents contained in the Administrative Record.

U.S. EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on **all** alternatives.

After U.S. EPA selects the remedy for this facility, RMC is required under the Consent Decree to implement the remedy beginning with the submission of an implementation plan to U.S. EPA.

PROPOSED REMEDY

SOIL AND SEDIMENTS

Alternative 2. Alternative 2 should be implemented to address lead in onsite soils and sediments, offsite soils along the Arlington Avenue right-of-way, the railroad right-of-way, and the Big Four Road right-of-way. Alternative 2 includes:

- Excavation of the most highly contaminated soils and sediments,
- Demolition of the Material Storage Building, Battery Breaker Building, Filter Press Building, Waste Water Treatment Building and Surface Impoundment, and
- Placement of institutional controls to restrict the use of the property to only commercial/industrial land use.

Alternative 3A. Alternative 3A should be implemented to assure safe and effective long-term management of the excavated soils and sediments as well as debris and rubble generated by Alternative 2. Alternative 3A includes:

- Placement of excavated soils and sediments, as well as the debris and rubble from the building demolition in an onsite Containment Cell,
- Encapsulation of the excavated soils and sediments beneath an impermeable geomembrane cap covering the entire footprint of the Containment Cell and a vegetative cover above the geomembrane,
- Establishment of long-term operation, maintenance and groundwater monitoring of the Containment Cell including existing monitoring wells and
- Placement of institutional controls on the Containment Cell to prevent any disturbance, excavation or other activity that might result in a release of any materials contained in the cell.

Alternative 4. Alternative 4 should be implemented to manage any excavated soils and sediments as well as any demolition debris or ruble that are not safely managed in the onsite containment cell. Alternative 4 includes:

- Shipment of these materials offsite to another facility for recycling or disposal in accordance with all applicable Federal, State and local regulations.

GROUNDWATER

Alternative 2. Alternative 2 should be implemented to prevent human consumption of groundwater at the facility. Alternative 2 includes the placement of a deed restriction preventing the installation of potable groundwater wells at the facility.

Alternative 4 - Monitored Natural Attenuation (MNA). Monitored Natural Attenuation (MNA) is the stabilization and long-term shrinking of a contaminant plume by natural processes such as microbial degradation. A Groundwater Performance Monitoring program should be implemented to assure safe and effective management of contaminated groundwater. The MNA appropriateness must be demonstrated through the performance monitoring program to show that the contaminant plume has been or can be effectively stabilized

FINANCIAL ASSURANCE

Any remedy selected by U.S. EPA will require that RMC must demonstrate that adequate funds will be available to complete the construction as well as the operation and maintenance of the proposed remedy. Under the Consent Decree, RMC must provide this financial assurance within 90 days after it receives U.S. EPA's selected remedy decision.

FACILITY BACKGROUND

The RMC facility is located at 3700 South Arlington Avenue in Marion County, Beech Grove, Indiana, approximately four miles south-southeast of downtown Indianapolis (Figure 3-2). The site occupies approximately 24 acres, of which approximately 10 acres represented the active manufacturing area (including paved areas and buildings). The remaining 14 acres includes grassed and wooded site areas. The configuration of the site is triangular, bounded by Arlington Avenue (oriented in a north to south direction representing the hypotenuse), Big Four Road (along the base), and the common property line with a natural gas company forming the third side. The northwest end of the triangle is truncated by a railroad right-of-way (Figure 3-1).

The site is relatively flat with less than 10 feet of total relief. Natural site drainage is toward the north and east. The former manufacturing area is characterized by nearly 80,000 square feet of structures consisting of the battery breaker, a wastewater treatment plant, a filter press, material storage areas, a blast furnace, a dust furnace, a metal refining area, a warehouse and offices. In addition, there are four baghouses, a vehicle maintenance structure, and five stormwater pump houses. The site plan is illustrated in Figure 2-2.

The ground surface surrounding the buildings is currently paved (primarily with concrete). Older facility photographs indicate that areas northwest and northeast of the main facility structure were unpaved except for a concrete driveway, which encircled the facility. The paved surface areas are sloped to drain toward catch basins situated around the site. The catch basins in-turn flow to the storm water pump houses that convey collected storm water either directly to the wastewater treatment plant for immediate processing (small storm events) or to a 750,000 gallon storm water and fire control lagoon where it is stored until it can be processed (large storm events). The lagoon was originally lined with concrete. During 1988, the lagoon was cleaned out and the concrete was covered with a geomembrane liner.

The site was reportedly undeveloped woodlands until 1968. In 1968, the property was developed as a secondary lead smelter by National Lead. National Lead operated the facility from 1968 through 1980, when it was sold to Exide Corporation. In 1985, the site was purchased from Exide Corporation by RMC. RMC continued to operate the facility until the cessation of operations on December 31, 1995. From April 14, 1995 through December 31, 1995, operations were reduced to enriching and casting lead ingots from off-specification lead products. Since

1996, no operations have taken place at the facility except for operation of the wastewater treatment facility, which is still used to treat stormwater runoff from the former manufacturing areas. Soil and groundwater in several areas at the facility are contaminated at levels above appropriately protective risk-based screening thresholds. Offsite contamination has also been reported north of the facility and in a drainage ditch east of the facility and at the Citizen's Gas Property west of the facility.

Samples of soil, sediments and groundwater were analyzed for other metals, but only lead and arsenic concentrations exceeded risk-based threshold criteria. Therefore, lead and arsenic were identified as contaminants of interest at the RMC facility.

CORRECTIVE MEASURES ALREADY IMPLEMENTED

To address the potential for lead containing sediments to be eroded from the drainage ditch along the railroad tracks at the north end of the site and subsequently transported offsite, RMC implemented an interim measure consisting of four check dams and silt fence. Each check dam consists of stone and geotextile placed across the existing ditch and perpendicular to flow direction. The silt fence was installed parallel to the check dams. The implementation of the interim measure will provide a means of intercepting, detaining and controlling runoff which ultimately should prevent sediment from leaving the facility.

SUMMARY OF FACILITY RISKS

Risks from exposure to lead and arsenic are unacceptable for construction workers/ redevelopment workers in the main manufacturing area of the facility, and for construction workers/redevelopment workers, groundskeepers, future industrial workers, and for trespassers exposed to soils and sediments in the grassy area of the facility.

Soil and groundwater in several areas at the facility are contaminated at levels above appropriately protective risk-based screening thresholds. In addition, the adjacent Citizen's Gas property and several offsite right-of-ways are contaminated above appropriate protective risk-based screening thresholds. The risk-based screening thresholds used for this determination are 1300 mg/kg of lead in industrial areas, and 400 mg/kg of lead for soil in unrestricted areas. A screening level of 20 mg/kg was used for arsenic in industrial soils, and 3.9 mg/kg in soils in unrestricted areas. The screening thresholds are 42 mg/l of lead and 10 mg/l of arsenic for groundwater.

On-Site Soils in the Former Manufacturing Area
Concentrations of lead in the top thirty inches of soil ranged from 4.7 mg/kg to 475,000 mg/kg. Concentrations of arsenic ranged from 3.9 mg/kg to 1111 mg/kg at this depth.

On-Site Soils and Sediments in the Grassy Area
The soil and sediment samples collected within the lined lagoon, the drainage ditch adjacent to the lined lagoon, the intermittent stream northeast of the site, and the other areas collectively known as the grassy area show high lead concentrations. Concentration of lead collected within the 30 inches interval ranged from 11 mg/kg to 243,000 mg/kg. Concentrations of arsenic ranged from 3.9 mg/kg to 2,300 mg/kg.

Off-Site Soils
Soils were sampled on the adjacent properties to the north of the facility (the Arlington Avenue right-of-way, the railroad right-of-way, and the Big Four Road right-of-way) for lead and arsenic characterization. Lead concentrations in the 0-10 inch interval ranged from 13 mg/kg to 8430 mg/kg. Arsenic concentrations in this interval ranged from 9.4 mg/kg to 169 mg/kg.

Offsite Citizen's Gas Property Soils
Concentrations of lead in soil samples collected from this property averaged 1311 mg/kg. Concentrations of arsenic averaged 28.5 mg/kg.

Groundwater
Shallow groundwater sample results, obtained as part of the RFI activities, show that the current Maximum Contaminant Level (MCL) for arsenic (10 ug/L) has been exceeded on more than one occasion at groundwater monitoring wells MW-1, MW-2, MW-3, MW-7 and MW-8. The 15 ug/L MCL standard for lead was exceeded on more than one occasion in MW-2, MW-7 and MW-8.

MEDIA CLEANUP STANDARDS

The goals of the proposed remedy are to eliminate significant exposures that pose threats to human health and the environment, to clean up contaminated soils to levels consistent with current land use, to restore groundwater to its maximum beneficial use, and to eliminate risks to human health by meeting the applicable health-based groundwater protection standards. U.S. EPA considers corrective action for groundwater to be complete at this facility when all releases to groundwater, including releases from SWMUs, have been remediated. Groundwater cleanup objectives include three components: groundwater cleanup levels, point of compliance, and remediation time frames. Point of compliance for corrective action should be throughout the area where groundwater is contaminated above cleanup levels, or, when waste is left in place, at and beyond the boundary of the waste. U.S. EPA refers to this point of compliance as the "throughout-the plume/unit boundary" point of compliance.

RMC's soil and groundwater sampling reports identified total concentrations of lead and arsenic in soil that were above the U. S. EPA's risk based screening thresholds and therefore potentially pose an unacceptable risk to human health. Accordingly, RMC submitted a site specific Baseline Human Health Risk Assessment (BHHRA). The BHHRA evaluated multiple lead and arsenic exposure scenarios for the former manufacturing areas as well as the surrounding areas of the site covered by lawn, brush and woods ("grassy areas"). The BHHRA concluded that under some of the exposure scenarios, an unacceptable risk may exist for lead.

The BHHRA calculated proposed Media Clean-up Standards (MCSs), which are the average allowable concentrations for each contaminant in each area where contamination presented an unacceptable risk. The Remedial Action Levels (RALs), which are the concentrations above which soil removal is necessary to achieve the MCSs for these areas, were also calculated. In this SB, U.S. EPA is proposing 920 mg/kg of lead in soil as the MCS for the onsite manufacturing areas and the onsite grassy areas of the site, based on a site-specific risk assessment. U.S. EPA is proposing 400 mg/kg of lead in soil as the MCS in the offsite Arlington Avenue right-of-way and the Big Four Road right-of-way because institutional controls are impractical for these properties. After excavation and removal of soils with contaminant levels above the RAL and replacement with clean fill, the average of the post-remediation soil concentrations will meet the MCSs for this facility. This residual concentration will be protective of these receptors, even though the soils in some areas may have concentrations up to 920 mg/kg.

Exposure scenarios evaluated as part of the BHHRA for the soils on the Citizens Gas Property did not identify any current unacceptable exposure risks for commercial/industrial use on that property. Based on the current zoning of the Citizen's Gas property as commercial/industrial, U.S. EPA proposes to apply the commercial/industrial risk-based cleanup standards for this parcel.

Based on the results of the site specific BHHRA, the media cleanup standards and Remedial Action Levels for lead in soil are proposed to be as follows:

CLEANUP OBJECTIVES*

	On-site Manufacturing Area	On-site Grassy Area	Arlington Ave., Big Four Road and Railroad right-of-ways	Citizens Gas Property
MCS	920	920	400	1300
RAL	8,470	4,954	400	Not Applicable

* All values reported in mg/kg.

In the BHHRA, lead risks were evaluated for adult and adolescent receptors by comparing the predicted fetal blood lead level (BLL) for each receptor to U.S. EPA's BLL goal of 10 ug/dl. After excavating the soils contaminated per the action level described in the table (above), the predicted 95th percentile fetal BLL will meet our goal of 10 ug/dl. The residual risk from arsenic was calculated assuming that soil was remediated for lead in both the main facility and the grass area. Residual cancer risks range from 9x10-7 to 1x10-6. Residual noncancer risks range from hazard quotients of 0.1 to 0.2. The calculated cancer and noncancer risk associated with post remedial concentration of arsenic in the offsite properties fall below the U.S. EPA's target risk range of 1x10-6 to 1x10-4 and the hazard quotient of 1.

Additionally, soil to groundwater modeling shows that the concentrations of lead and arsenic remaining in soil after the proposed soil remediation will be less than the soil concentrations for which groundwater would be above the MCL (arsenic) or IDEM industrial default groundwater concentrations (lead).

SUMMARY OF ALTERNATIVES

Corrective measures alternatives are intended to mitigate potential exposure to, control migration of, and/or remediate the contaminants of interest. A step-wise process was used to select and evaluate corrective measures alternatives for implementation at the former RMC facility. The following remedial technologies were considered for remediation of soil and groundwater at the site. Where a particular technology was obviously inappropriate and not suitable for further retention a basis for such a determination is also provided.

SOIL REMEDIATION ALTERNATIVES

NO ACTION (ALTERNATIVE 1)
No Action is a general response action, which does not have any specific technologies or process options. The No Action alternative does not include any additional remedial responses for the Site. It was retained to provide a baseline to compare the relative benefits of the other options.

EXCAVATION (ALTERNATIVE 2)
Soils above the RAL will be excavated and the resulting area backfilled or re-graded to promote surface water drainage. The amount of excavation required will be dictated by the results of previous soil sampling. Alternative 2 must be implemented in conjunction with an On-Site Containment Cell (Alternatives 3A or 3B) or Stabilization and Off-Site Disposal (Alternative 4).

Alternative 2 would include excavating all onsite soils and sediments within the on-site manufacturing area that have concentrations above the RAL of 8,470 mg/kg for lead, and excavating the soils within the onsite grassy areas above the RAL of 4,954 mg/kg for lead. Alternative 2 also includes excavating offsite soils along the Arlington Avenue right-of-way, railroad right-of-way and the Big Four Road right-of-way above the RAL of 400 mg/kg for lead.

The volume of soil to be excavated for Alternative 2 is estimated to be 3,224 cubic yards (cy) in the on-site areas outside the Solid Waste Management Units (SWMUs), 1,771 cy within the SWMUs, 1,057 cy from the grassy areas, 3,177 cy from the railroad right of way, 1,269 cy from the Arlington Avenue right of way and 3,640 cy from the Big Four Road right of way. The volumes of pavement (concrete and bituminous) and building floors (all concrete) that must be removed to access the soils to be excavated are 3,366 cy for the SWMUs and 1,325 cy for the areas outside the SWMUs. Excavated areas will be backfilled with clean soils as specified in the BHHRA. Confirmatory soil sampling of excavations will be specified in the Corrective Measure Implementation Program Plan. It is also assumed that 100 confirmatory samples will be required. This alternative includes the implementation of a deed restriction on the property indicating that any future development or reuse of the property must be supported by the exposure scenarios evaluated in the BHHRA or the BHHRA must be rerun to support any other use other than evaluated in the BHHRA.

Alternative 2 will include the demolition of several buildings, including the Material Storage, Battery Breaker, Filter Press, and Wastewater Treatment Buildings, and the removal/closure of the Surface Impoundment. Removal of the Filter Press and Wastewater Treatment Buildings will mean that storm water runoff and other water generated during corrective action could not be treated unless the existing system were replaced or relocated. Therefore, all surface water runoff must be collected and treated before disposal through a storm water outfall or transported for offsite disposal. All excavated soils and sediment above RAL would be managed using an on-site containment cell (Alternative 3A) or transported for off-site disposal. The building demolition will generate debris and rubble. Metal debris can be sent for recycling, but will require pressure-washing to remove dust and soil. The remaining debris and rubble from both the building and pavement demolition would be consolidated in the on-site containment cell. Wood, trash and other degradable materials generated during demolition would be sent off-site for disposal.

Although the RFI and CMS confirmed that the contamination of soil at the offsite Citizen's Gas property resulted from past operations at the RMC facility, the U.S. EPA agrees with RMC's BHHRA conclusion that the soils on this property do not pose any unacceptable risk. Concentration of lead in soil samples collected at the Citizen's Gas property did not exceed the media cleanup standard of 920 mg/kg for lead. The Citizen's Gas property is zoned commercial/industrial. However, since the commercial/industrial cleanup standards are applicable to this property, and no remediation is planned, this alternative requires implementation of a deed restriction on the Citizen's Gas property to make sure that its use is restricted to only commercial/industrial. As an alternative to a deed restriction, this alternative allows for soil removal on the Citizens Gas property to an MCS of 400 mg/kg of lead.

ON-SITE CONTAINMENT CELL (ALTERNATIVES 3A AND 3B)

Constructing a capped containment cell is a remedial technology typically chosen as a source controls action because it can effectively isolate impacted soil, reduce infiltration, prevent direct exposure, and is adaptable to various Site conditions. Remediated soil, concrete, and other non-degradable rubble would be consolidated into a single location and capped. A wide range of readily available materials can be used to construct the cap. For this facility, U.S. EPA examined the construction of the on-site containment cell in the following two ways:

1) Alternative 3A - Composite Cover consisting of (from top to bottom) vegetative cover, 6" topsoil, 18" cover soil, geocomposite drainage layer, and HDPE geomembrane.

2) Alternative 3B - Bituminous Asphalt Cover consisting of (from top to bottom) bituminous concrete pavement, a geotextile filter fabric, and a crushed aggregate subgrade.

STABILIZATION AND OFF-SITE DISPOSAL (ALTERNATIVE 4)

This alternative involves sending excavated soils to an off-site disposal facility. Depending on the results of characterization analysis for the excavated soil, treatment may also be required. The evaluation has been completed based on the assumption that excavated soils will be stabilized on-site and disposed off-site at a non-hazardous landfill.

RESOURCE RECOVERY AND RECYCLING (ALTERNATIVE 5)

Excavated soils which have sufficiently high concentrations of lead could be processed through a secondary lead smelter for the purpose of recovering the lead. Based on discussions with secondary lead smelter personnel, the concentrations that would be conducive to resource recovery and recycling would be in excess of 100,000 mg/kg (i.e., 10% lead) and preferably greater than 250,000 mg/kg. None of the soil samples collected as part of the RFI was above 100,000 mg/kg. Only 10 of the soil borings conducted as part of the closure investigation for the SWMUs encountered one or more samples with lead concentrations greater than 100,000 mg/kg. These are generally situated within the footprint of the former outdoor waste piles and are estimated to represent less than five (5%) of the total amount of material requiring remediation. Therefore, the Resource Recovery and Recycling option (Alternative 5) was not retained for further evaluation as a site wide alternative. Although not suitable for site wide application, resource recovery and recycling may still be considered as a possible disposal alternative for specific solid waste streams generated during corrective action with very high lead concentrations. Implementation of this alternative would be dependent on the cooperation of an off-site lead smelting company.

IN-SITU STABILIZATION (ALTERNATIVE 6)

Stabilization involves a physical or chemical reduction of the mobility of hazardous constituents. Immobilization typically provides a significant decrease in leachability and the potential for contaminant migration. Immobilization is accomplished through physical (i.e., microencapsulation) and chemical (i.e., pH control, changes in chemical species) processes. Physical processes involve the entrapment of contaminants within a solid matrix, thus, reducing contaminant mobility by decreasing the permeability of the contaminated material. Chemical processes reduce contaminant mobility by various means such as converting the contaminant to a less mobile form or adjusting the pH of materials to reduce their solubility. Stabilization would not change the mass of contaminants present at the Site. Stabilization can be addressed via ex-situ or in-situ processes. Surface soil mixing allows for mixing without removal of treated materials. Shallow (8 to 12 inch) lifts of contaminated soil can be stabilized using modified construction equipment such as bulldozers. Excavators and caisson drilling rigs can be modified to deliver stabilization reagents to depths greater than 100 feet (as reported by various vendors). The degree of mixing varies with each of these technologies.

While in-situ stabilization decreases the mobility of the contaminants, it does not decrease the volume or toxicity of the contaminants. Additional measures would be required to prevent direct contact for protection of human health. In-situ stabilization is not a widely-accepted technology and has not been implemented full-scale for remediation of lead-contaminated soil, primarily due to the effort involved in application of reagents and the uncertainty in mixing thoroughness. When in-situ stabilization has been used, it has been on large, open sites with sufficiently large volumes of waste to justify the mobilization of specialized equipment and development and implementation of monitoring and testing protocol. Quality control could only be conducted through extensive investigation such as test pits or borings.

For the reasons cited above, the In-Situ Stabilization option (Alternative 6) was not retained for further evaluation as a Site wide alternative.

SOIL WASHING (ALTERNATIVE 7)

Soil washing technology consists of two primary processes: 1) use of a liquid wash solution to physically separate the large grain-size fraction (e.g., battery casings, gravel and sand) from the small grain-size portion or fines fraction (e.g., clay/silt particles); and 2) use of a chemical extraction agent to solubilize (dissolve) contaminants of concern (i.e., soil leaching), thereby providing higher contaminant removal efficiencies from the large grain-size (coarse) material and/or separating the contaminants from the fines fraction. The goal of treatment is to concentrate contaminants to the fines fraction of the material since most organic and inorganic contaminants tend to bind, either chemically or physically, to the clay/silt particles, and/or organic matter within the soil matrix. The large grain-size (coarse) fraction is 'cleaned', and there is a reduction in the volume of contaminated material but not the mass of the contaminant (lead).

The washing process typically involves the physical separation of contaminated material utilizing mineral processing equipment and techniques. Acids, caustics, and surfactants may be added to the process in an attempt to enhance contaminant removal by leaching. Chemicals which have been attempted by various parties for soil lead leaching include ethylenediamine tetraacetic acid (EDTA, a chelation agent which complexes lead and increases solubility) and nitric acid. Surfactants are commonly used to remove organic contaminants from soil. End products of the soil washing process include plastic casings, ebonite casings, washed soil (coarse-grained fraction), and the lead product (fine-grained soil fraction), all of which are solid fractions.

All of the solid end products would theoretically be clean (i.e., below RALs), except the lead product which have high lead concentrations. Generally finer soil particles with high concentrations of lead could be sent to a secondary lead smelter for recovery or stabilized via ex-situ methods and landfilled. The other end products which no longer contain high concentrations of lead (i.e., coarse soil and battery casings) could conceptually be used for clean fill, fuel supplements or alternatively landfilled. The washing solution would likely be treated and recycled as much as practicable until the end of the project. Treatment most likely would involve filtration and/or precipitation to remove lead. The number of vendors who have successfully completed full-scale projects is very limited as the technology is innovative. Due to the large variation in materials to be treated on-site and the fine material (i.e., silt and clay) in the soil, implementation of soil washing would be difficult. Bench-scale studies for similar projects have not proven to be successful in treating the coarse soil fraction to below TCLP limits for lead. Debris such as battery casing fragments are anticipated to be more difficult to clean because of their irregular size and shape of the casings results in hard to clean corners and cracks in which lead may reside. The intricate nature of this technology inherently requires high maintenance and frequent process modifications. Many of the additives used have hazardous characteristics themselves (i.e., acids and bases) and may require special handling and spill prevention/response plans. Implementation of this technology may require designing and fabricating a site-specific treatment plant. For these reasons, the Soil Washing option (Alternative 7) was not retained for further evaluation as a Site wide alternative.

PHYTOREMEDIATION (ALTERNATIVE 8)

Phytoremediation is an emerging technology which involves the use of trees and plants to aid in the remediation of soils and/or groundwater. Plants used for remediation of heavy metals include alyssum, hybrid poplars, Indian mustard, pennycress and sunflower. Phytoremediation of metals occurs through several processes including: Phytoextraction and Phytostabilization. Phytoextraction is the uptake of a contaminant by plant roots and translocation of that contaminant into the aboveground portion of the plants. The contaminant is removed by harvesting the plants. Phytostabilization is the immobilization of a contaminant through absorption and accumulation by roots, adsorption onto roots, or precipitation within the root zone of plants.

Phytoremediation is an innovative technology which may be effective in remediation of shallow (less than 1 ft below ground surface without repeated tilling and only as deep as 2 feet with such measures) soils. It requires wide-open areas that are not covered with impervious surface such as buildings and pavement. Obviously, the majority of the proposed remediation area is impervious and some of the proposed excavations are projected to be greater than 2 feet deep and as much as 4.25 feet deep; therefore, phytoremediation would not be conducive to remediation of those areas. The time required for implementation of phytoremediation is lengthy as plants and trees grow at a limited rate. As phytoremediation is not conducive to the proposed excavations and schedule, and as the technology is innovative and not widely applied, the Phytoremediation option (Alternative 8) was not retained for further evaluation as a Site wide alternative.

GROUNDWATER REMEDIATION ALTERNATIVES

NO ACTION (ALTERNATIVE 1)

No Action is a general response action, which does not have any specific technologies or process options. The No Action alternative does not include any additional remedial responses for the Site. It was retained to provide a baseline to compare the relative benefits of the other options.

INSTITUTIONAL CONTROLS (ALTERNATIVE 2)

Institutional controls would place limitations on the use of groundwater at the site to prevent consumption by human receptors. The institutional controls would be applied in the form of deed restrictions that would prevent the installation of potable groundwater wells at the site. The deed restriction would apply to current and future property owners.

SOURCE REMOVAL (ALTERNATIVE 3)

This alternative coincides with areas of contaminated soil areas considered for remediation to address soil contamination above. This alternative will not be further discussed in this document as it is being proposed as part of Soil Remediation Alternative 2 above.

MONITORED NATURAL ATTENUATION (ALTERNATIVE 4)

Monitored natural attenuation (MNA) is the stabilization and long-term shrinking of a contaminant plume by natural processes such as microbial degradation. This alternative is generally applicable only to dissolved groundwater plumes. In order to implement this alternative, the source of the contamination must first be removed and the presence and rates of natural degradation processes must be documented. Natural attenuation processes can be demonstrated through a variety of lines of evidence, including static or retreating chemical isoconcentration contours over time, changes in the ratios of parent to breakdown products, the presence of bacteria capable of degrading the contaminants of interest, and/or the presence of geochemical indicators of naturally occurring biodegradation.

The major component of MNA as a remedial alternative would be the long-term monitoring program to provide initial and continuing confirmation that the predicted biological activity and/or reductions in contaminant concentrations occur and remain effective. Risk and hazard management measures may be required to protect human health and the environment during the long term until overall effectiveness can be achieved.

MNA is appropriate as a remedial alternative where natural degradation can be currently documented. MNA is also appropriate as an option for future consideration after the source has been removed and monitoring data indicate that natural degradation may be occurring.

PERMEABLE REACTIVE BARRIER (ALTERNATIVE 5)

A permeable reactive barrier is a passive in-situ option which allows groundwater to pass through a porous media containing a catalyst/formulation. Relative to arsenic, the catalyst is typically an iron or manganese coated sand. The permeable barrier is placed downgradient of the source and is of sufficient length and depth to intercept the impacted groundwater. This technology was not determined to be feasible since the arsenic and lead plumes do not appear to be moving laterally beyond the facility boundary.

CONTAINMENT (ALTERNATIVE 6)

Groundwater containment is used to control or limit the lateral flow of groundwater in a finite area or region. Containment can be accomplished by using low permeability barrier walls constructed around the impacted groundwater. This technology was not determined to be feasible and was not retained because the contaminant plume is not moving laterally.

GROUNDWATER EXTRACTION AND TREATMENT (ALTERNATIVE 7)

Groundwater extraction and treatment involves the removal of impacted groundwater using wells or extraction trenches and treatment through an ex-situ treatment system prior to discharge, re-injection or discharge to the POTW. Extraction and treatment can be effective at reducing mobility and effectively reducing the mass and toxicity of the contaminants in groundwater. Such systems, however, are expensive to design, install and operate.

FINANCIAL ASSURANCE

The U.S. EPA will require that RMC demonstrate that adequate funds will be available to complete the construction as well as the operation and maintenance of the selected remedy. RMC must provide this financial assurance within 90 days of its receipt of U.S. EPA's selected remedy decision. Any of the following financial mechanisms may be used to make this demonstration: financial trusts, surety bonds, letters of credit, insurance, or qualification as a self-insurer by means of a financial test. RMC may request that the amount of the financial assurance be reduced after successfully completing the construction, and again from time to time during the operation and maintenance phase of the remedy.

Cost Analysis

The estimated costs for the proposed Soil and Sediment alternatives including capital costs and the annual operation and maintenance costs are presented in Attachment A will be revised upon selection of final remedial alternatives for the RMC facility.

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

The selected remedies for cleaning up contaminated media at the RMC facility as discussed above are excavation of all onsite and offsite soils and sediments above the RALs (Soil and Sediment Alternative 2), consolidation of all excavated soils and sediments above RAL including all debris from demolition in an onsite Containment Cell and placement of a composite cap on the cell (Soil and Sediment Alternative 3A), shipment of some excavated soils and sediments offsite for recycling or disposal (Soil and Sediment Alternative 4), institutional controls (Groundwater Alternative 2), and Monitored Natural Attenuation (Groundwater Alternative 4). The selection of these remedial measures is based on the following reasons: (a) the facility will not pose acute risks to humans and other ecological receptors when the remedy is complete; (b) the preponderance of wastes at the units in question have been removed/or will be consolidated in a cell with a composite cap and/or disposed offsite; (c) the communities do not use the groundwater as a drinking water source since drinking water supplies are already provided by the local governments in the area; (d) the alternatives do not require frequent or complex operation and maintenance and (e) the remedy will achieve the corrective action objectives and will provide for continued productive use of the property.

The following discussion profiles the performance of the proposed remedy against the U.S. EPA's remedy selection criteria. The proposed remedy must meet all four of the following threshold criteria.

Protection of Human Health & the Environment

The selected remedy should mitigate the short and long term potential for exposure to hazardous constituents and protect human health during and after its implementation. The overall protection of human health is addressed most effectively at the RMC facility by the proposed alternatives. The isolation and capping of the impacted soils/sediments within the cell will reduce exposure and leachability of this material to the environment.

Monitored Natural Attenuation in combination with source removal may under certain conditions (i.e., through sorption or oxidation-reduction reactions) reduce the mass toxicity, mobility, or concentration of contaminants thereby further reducing or eliminating potential risk posed by these contaminants.

Attainment of Media Cleanup Standards Set by U.S. EPA

The excavation of contaminated soils and sediments (source removal) and consolidation in a Containment Cell with an impermeable geomembrane will reduce the leachability of lead left in place post remediation. Concentrations below the Media Cleanup Standards are achievable through these remediation processes. Compliance with applicable ground water protection standards would be addressed by monitoring the existing onsite wells and installation of additional wells to monitor the efficacy of the remedial alternatives.

Controlling Sources of Release

The selected remedies should provide the greatest improvement to the environment over the shortest period of time. Approximately 18,829 cubic yards of contaminated soils and sediments will be excavated and consolidated in a Containment Cell. The overall protection of the environment is addressed most effectively at RMC by these proposed alternatives. Characteristically hazardous soils/sediments, will be excavated and consolidated in an onsite cell.

Compliance with Applicable Standards for Management of Remediation Waste

For each of the alternatives considered for this facility, U.S. EPA would require compliance with all applicable Federal, State and local requirements. For example, any shipment of hazardous waste off-site under Soil and Sediment Alternative 4 would entail compliance with the applicable standards for generators and transporters of hazardous waste.

The following five balancing criteria are used for choosing among alternative remedies that meet the threshold criteria. For the RMC facility, these criteria would be used to choose between Soil and Sediment Alternative 3A and Alternative 3B, as well as Groundwater Alternative 4 and Alternative 7.

Long-term Reliability and Effectiveness

Soil and Sediment Alternatives 3A and 3B are both capping remedial methodologies. Alternative 3A consists of a vegetative cover over a geocomposite drainage layer and HDPE geomembrane, while, Alternative 3B consists of an asphalt cover over a geotextile filter fabric. Both methodologies can isolate impacted spoil and reduce infiltration. However, the integrity of the cover specified by Alternative 3B may be easily compromised and tends to be more susceptible to impacts from weather. It requires intensive and regular maintenance over a long period of time. The only maintenance required under Alternative 3A is regular mowing of the vegetative cover. Soil and Sediment Alternative 3A is more reliable and effective in long-term that Alternative 3B.

Groundwater Alternative 4 is a natural process of degrading contamination in place. Groundwater Alternative 7 is a process which removes the contaminated groundwater for treatment and discharge. Both Alternatives 4 and 7 can be reliable and effective in the long-term. There is no significant difference between Groundwater Alternative 4 and Alternative 7 for this criterion.

Reduction of Toxicity, Mobility or Volume of waste
There is no significant difference between Soil and Sediment Alternative 3A and Alternative 3B for this criterion. There is no significant difference between Groundwater Alternative 4 and Alternative 7 for this criterion.

Short-term Effectiveness
There is no significant difference between Soil and Sediment Alternative 3A and Alternative 3B for this criterion. There is no significant difference between Groundwater Alternative 4 and Alternative 7 for this criterion.

Implementability
There is no significant difference between Soil and Sediment Alternative 3A and Alternative 3B for this criterion. There is no significant difference between Groundwater Alternative 4 and Alternative 7 for this criterion.

Cost
A cost estimate for each alternative was prepared that considers capital expenditures as well as operation and maintenance costs. Capital expenditures include both direct and indirect costs. Direct capital costs include material and labor used in construction and equipment and services used in the treatment of affected media. Indirect capital costs include engineering expenses, licensing and permit costs, start up and take down costs, and a contingency allowance or unforeseen circumstances. Operation and maintenance costs include post construction costs necessary to ensure the continued effectiveness of the corrective measure. These costs include operating labor costs; repairs and scheduled maintenance; supplies and utilities; subcontractor services; disposal and treatment costs of generated wastes; and a reserve or contingency fund.

There is no significant difference between Soil and Sediment Alternative 3A and Alternative 3B for this criterion. Groundwater Alternative 7 is much more expensive that Alternative 4 to design, install and operate.

In summary, the proposed alternatives provide the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. The proposed alternatives are protective of human health and the environment and will effectively remove the source of contaminants into the groundwater so as to reduce or eliminate further contamination. All applicable standards regarding groundwater protection and onsite/offsite waste management would be addressed under this proposal and complied with during the corrective measures implementation process. Therefore, for the current groundwater contamination, U.S. EPA proposes that RMC implement Soil and Sediment Alternatives 2, 3A, 4 in combination with institutional controls and Monitored Natural Attenuation (MNA).

PUBLIC PARTICIPATION

U.S. EPA solicits input from the community on the cleanup methods proposed for each of the corrective measure alternatives. The public is also invited to provide comment on alternatives not addressed in this Statement of Basis (SB). U.S. EPA has set a public comment period from ...., ... to ...., 2007 to encourage public participation in the selection process.

The Administrative Record for the RMC facility is available at the following location:

Beech Grove Public Library
1102 Main Street
Beech Grove, Indiana 46107
(317) 788-4203

E-mail: bgplreference@bgpl.lib.in.us

Hours: Monday thru Thursday
9:00 AM - 8:00 PM
Friday and Saturday
9:00 AM - 5:00 PM

and

U.S. EPA, Region 5
Waste Management Division Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604
(312) 353-5821
Hours: Mon-Fri, 8:30 a.m. - 5:00 p.m.

After consideration of the comments received, U.S. EPA will select the remedy and document the selection in the Response to Comments (RTC). In addition, comments will be summarized and responses provided in the RTC. The RTC will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record.

Written comments should be sent to:

Jonathan Adenuga
U.S. Environmental Protection Agency
77 West Jackson Boulevard, DRE-9J
Chicago, Illinois 60604