Proposed Plan for Cleanup at the

Lake Calumet Cluster Site

Chicago, Illinois **June 2006**

Introduction

This Proposed Plan[1] announces the recommendation of the Illinois Environmental Protection Agency (Illinois EPA) for addressing contaminated soil and buried wastes at the Lake Calumet Cluster (LCC) site located in Chicago, Illinois (see Figure 1). The proposed remedy would provide a protective cover that would prevent direct contact with the buried wastes and prevent surface water runoff from coming into contact with site contaminants (see Alternative 4 on page 10 for details).

While there is a groundwater contaminant plume associated with the LCC site, groundwater contamination will be addressed under a separate operable unit.

The Illinois EPA is issuing this Proposed Plan as part of the public participation requirements of Section 300.430 (f)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP; 40 Code of Federal Regulations [CFR] 300. 430(f)(2)), and 42 United States Code §9617[1]. This Proposed Plan summarizes information explained in greater detail in the Focused Feasibility Study (FFS) report and other documents contained in the Administrative Record file for this site.

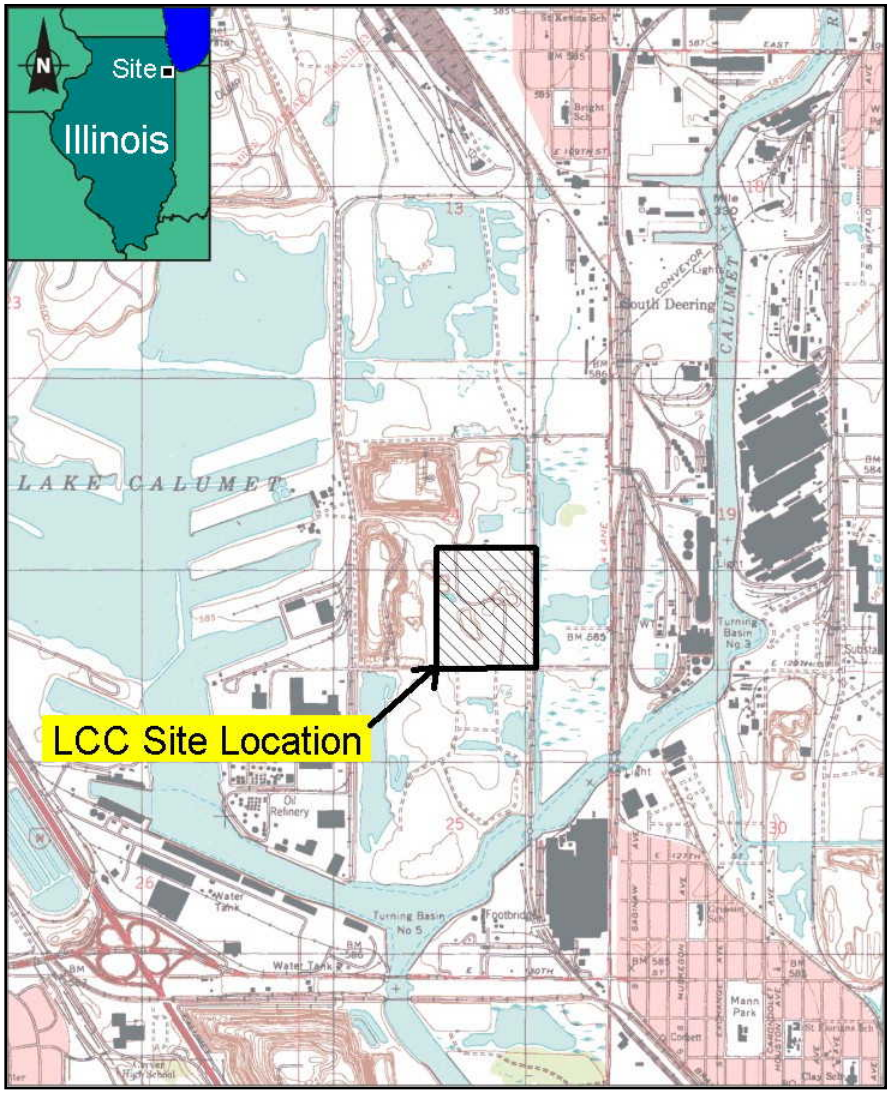

Figure 1 – Site Location Map

The objective of the FFS was to summarize the nature and extent of contamination at the site; to evaluate alternatives to address contamination at the site; and to evaluate alternatives to address threats to human health and the environment or potential threats posed by the site. The Administrative Record for the site is located in the Illinois

[1] Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, requires publication of a notice and Proposed Plan for the site remediation. The Proposed Plan must be made available for public comment.

EPA, Bureau of Land records in Springfield, Illinois and in information repositories at the Harold Washington and Hegewisch Public Libraries in Chicago, Illinois.

The Illinois EPA encourages the public to review these documents to gain a more comprehensive understanding of the site and the activities that have been conducted at the site. Public input is an important part of the cleanup decision making process. The public is encouraged to review and comment on the alternatives presented in this Proposed Plan (see "For Additional Information" on page 12).

Site Background

Location and Description

The LCC site is a group of several land and waste storage/disposal facilities located in southeastern Chicago, Cook County, Illinois (latitude 41°41'15.0" North and longitude 87°34'35.0" West). The site is approximately 87 acres in size and is bordered by the Paxton I Landfill to the north, Land and Lakes #3 Landfill to the west, the Norfolk and Western Railroad right-of-way to the east, and 122nd Street to the south (see Figure 2). The LCC site consists of the following individual areas: Alburn Incinerator, an Unnamed Parcel, U.S. Drum II, and Paxton Avenue Lagoons. A site location map is presented in Figure 1, and an oblique aerial photograph of the site with area features is presented as Figure 2.

From approximately 1900 to the 1970s, nearby industries deposited slag and other wastes that raised the ground surface at the LCC site to an elevation just above the water table. From 1940 to 1992, much of the area was used for unpermitted waste disposal. The contaminated runoff in the area impacts wetland soils and area hydrology.

Site History

More than a century ago, the Calumet region was the largest wetland complex in the Great Lakes area, but by the 1900s it became the heart of heavy industry for the upper Midwest. Currently, a combination of natural, Industrial, and residential areas typifies the contrast found around Lake Calumet. Abundant wildlife (including many state and federally endangered species) live in remnants of a once-vast wet prairie system scattered among industrial facilities. Much of the wetland area that was not converted into active industrial or residential land use was used for unpermitted municipal, industrial, and chemical waste disposal. Today, remnant wetlands and other natural areas remain, but they are interspersed among active and abandoned industries, slag materials generated by nearby steel manufacturers, and chemical waste disposal sites and landfills.

Prior to 1949, aerial photographs did not show any indications of activity at what is now the LCC site, according to an investigation conducted by Ecology and

Figure 2 – Aerial Photograph of the LCC Site

Environment, Inc. in 1999. The site was mostly wetlands, characterized by marsh-type vegetation and some open water. Activities up to the 1970s consisted primarily of a combination of what are described as "extraction" activities, which refer to excavation and removal of soil materials from the site, and filling activities. The filling activities were first noted in the northwest quadrant of the site, and included the dumping of both solid and liquid wastes. Drainage was noted to flow toward the eastern half of the site, which at the time was still a wetlands area.

Extraction and filling continued on the site through the early 1970s, at which time the entire site was disturbed, with fill materials occupying the entire site from north to south and over half the site from west to east. Liquids were noted to be draining in all directions, and standing pools of liquids were noted in several excavated areas that remained unfilled.

A brief description of each of the waste/storage/disposal facilities that make up the LCC site is presented below. These descriptions also include a discussion of previous removal or remedial action(s) at the sites.

Alburn Incinerator

The Alburn Incinerator parcel encompasses approximately 35 acres. The Alburn site operated as an unpermitted landfill from 1967 through 1977, and historic records suggest that the property received a large amount of slag material that raised the ground height above the existing surface water level. No details are available concerning the other types and quantities of wastes buried during this period. In 1977, Alburn initiated hazardous waste incineration, storage, and transfer operations. In 1979, the U.S. Environmental Protection Agency (U.S. EPA) issued an interim status Resource Conservation and Recovery Act (RCRA) permit to Alburn for the operation of the incinerator. Alburn incinerated/stored hazardous wastes and sludge, including paints, thinners, varnishes, chlorinated solvents, styrene, ink, adhesives, waste oils, antifreeze, petroleum, naphtha, coal tar, and waste solvents. Site storage and disposal methods included landfilling, incineration, operation of a surface impoundment, and bulk liquid waste storage.

In 1982, Alburn had their permit revoked due to several RCRA violations. Alburn continued to accept bulk waste until January 1983. On July 5, 1983, two on-site drums exploded apparently from heat expansion and a subsequent chemical reaction. U.S. EPA conducted an immediate removal action to remove all visible sources of hazardous materials from the site, including bulk storage tanks, drums, 5-gallon pails, and lagoon sludge. In addition, the top 6 inches of site soil, assumed to be the most contaminated soil, was excavated, and a partial cover was placed over the site.

Unnamed Parcel

The Unnamed Parcel is approximately 38 acres in size and is classified as an unpermitted landfill. It is believed that this area received various municipal, industrial, and chemical waste materials from approximately the 1940s through the 1960s. Now, much of the Unnamed Parcel area has little or no soil cap and is covered with perennial grasses, weeds, and wetland vegetation.

U.S. Drum II

The U.S. Drum II area is an unfenced, undeveloped area covering about 2.5 acres. Historic records suggest that as early as the 1940s, U.S. Drum II and the adjacent areas were used as dumping grounds for industrial and municipal wastes. Currently, the U.S. Drum II property is elevated approximately 10 feet above the original natural ground level, because of the unauthorized land disposal activities. During the mid-1970s the site was used as a hazardous waste transfer and petroleum recovery facility until a fire occurred in July 1975. Operations at the facility were abandoned temporarily in 1976. In 1979, a waste drum temporary

storage and transfer facility operated at the site.

In April 1979, a temporary restraining order was issued by the Illinois EPA and operations ceased due to the discovery of 6,000 55-gallon drums, four open-dump lagoons of sludge and various wastes, 25 semi-trailers, and three bulk liquid trucks. The site ceased operations shortly thereafter. A removal action was completed in December 1979. This action included the removal of an estimated 34,100 gallons of liquid and semisolid wastes. An estimated 1,750 drums were left on site inside earthen berms.

An Illinois EPA removal action occurred at the site from December 1984 through July 1985. During construction of a new access road, an additional 1,500 buried drums were discovered. The ends of the drums had been cut off or the drums had been punctured to allow the contents to drain into the ground prior to or at the time of burial.

By July 1, 1985, all 6,000 drums were removed and approximately 341,000 gallons of semisolid wastes and liquids, 435 cubic yards of contaminated soil, and 62,000 gallons of standing water were disposed of. Following the removal action, the area was leveled and partially covered.

Paxton Avenue Lagoons

The Paxton Avenue Lagoons consisted of three lagoons, a berm composed of soil and crushed drums, and an area of oily soil. The lagoons were reportedly active during the 1940s, and a variety of chemical wastes from nearby steel mills were allegedly brought to the site. A large number of drums are also alleged to have been buried here. Illinois EPA samples collected in 1985 indicated significant levels of volatiles, semivolatiles, polychlorinated biphenyls (PCBs), and heavy metals. In 1990, the Illinois EPA conducted an immediate remedial/early action at the site, which involved the removal of 60 drums of hazardous materials and the incineration/low temperature thermal destruction of 2,200 cubic yards of acidic soil. The lagoon area was capped with clay. The lagoons have been closed and fenced since October 1993.

Summary of Previous Investigations

Investigations at the LCC site have been conducted by Illinois EPA, U.S. EPA, and various consultants for the site representatives.

Since 1998, a total of 123 surface soil samples and 19 subsurface soil samples have been collected and submitted for laboratory analyses. The attached Table 1 provides a summary of the surface soil analytical results. Additionally, a total of 145 test pit excavations have been performed to evaluate subsurface conditions, assess the presence of buried waste, and to collect a minimum of two soil samples from each pit.

In addition to the soil and test pit investigations, groundwater was also investigated. A total of 18 groundwater monitoring wells were sampled for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. Based on the detected contaminant concentrations, iron, manganese, benzene, and benzo(a)-pyrene exceeded the human health threshold for drinking water established by U.S. EPA. Groundwater contamination for these contaminants of potential concern (COPCs) extends across most of the site, with the two most highly contaminated areas located beneath the Alburn site. Additionally, immediately north of the LCC site within the Paxton I area, a significant tetrachloroethene and trichloroethene groundwater contaminant plume was identified. While this information shows that groundwater has been adversely affected by previous site use, groundwater will be addressed under a separate action and will not be further addressed by this Proposed Plan.

Surface and Subsurface Soil Sampling Results

Between August 1998 and June 1999, surface and subsurface soil samples were submitted for laboratory analysis of approximately 135 different compounds. Based on the detected concentrations in these samples, the following COPCs were identified:

- Metals – arsenic, barium, chromium, lead, and mercury;
- PCBs and Pesticides – Aroclor 1254, beta-BHC, and Dieldrin;
- VOCs – naphthalene; and
- Polynuclear aromatic hydrocarbons (PAHs) - benzo(a)pyrene, benzo(a)-anthracene, and dibenzo-(a,h)anthracene.

The former Alburn incinerator was the most consistently contaminated parcel on the LCC site. Two other areas that consistently showed contamination were the southwestern section of the Unnamed Parcel and the area immediately south of the Alburn parcel.

Sediment and Surface Water Sampling Results

In addition to surface and subsurface soil sampling, sediment and surface water samples were collected from the LCC site and from the adjacent Indian Ridge Marsh for laboratory analysis. Based on the detected contaminant concentrations, the following sediment and surface water COPCs were identified:

Sediment:

- Metals – arsenic, barium, cadmium, chromium, lead, manganese, mercury, and nickel; and
- PAHs – anthracene, benzo(a)anthracene, benzo(a)pyrene, and chrysene.

Surface Water:

- Metals – barium, iron, lead, and manganese; and
- Pesticides – heptachlor and 4, 4'-DDD.

The most highly contaminated sediment samples at the site were collected from the Alburn area. Toxicity characteristic leaching procedure (TCLP) analysis was also performed for metals. No detectable TCLP concentrations were reported for any analyte.

In all of the collected samples, barium concentrations were detected at concentrations above the ecological threshold screening value of 0.004 milligrams per liter. As with the sediment sample results, the most contaminated surface water samples were collected in the vicinity of the Alburn parcel. Water quality in the drainage ditches and various ponds across the LCC site varies from north to south with the northern section having the highest detected contaminant concentrations and the southeastern section having the lowest detected concentrations.

Test Pit Results

In 2000, the Illinois EPA, with assistance from the U.S. EPA and the City of Chicago, performed 134 test pit excavations. At each excavation, a minimum of two samples were submitted for laboratory analysis. The first sample in each test pit was collected from a depth of 0.5 to 5 feet below ground surface (BGS), and the second sample was collected in the range of 5 feet to 30 feet BGS. The samples were analyzed for total metals, VOCs, SVOCs, pesticides, PCBs, and at certain locations, dioxins.

In 2001, 11 additional test pits were excavated with the samples being submitted for TCLP analysis in addition to the previously listed parameters.

Soil:

At all of the test pit locations, several contaminants were detected in soil samples at concentrations exceeding their respective Tiered Approach to Corrective Action Objectives (TACO) Tier 1 Soil Remediation Objectives. Analytical results for the soil samples collected from the test pits indicated a total of 21 VOCs, 23 SVOCs, eight PCBs and pesticides, and six metals at concentrations that exceeded at least one of their TACO Tier 1 criteria.

Solid Waste:
With the exception of one test pit, solid waste was encountered at all of the excavation locations. In general, at each excavation pit with solid waste, there was 1 foot to 3 feet of soil covering the waste material. The excavation depths ranged from 4 feet to 30 feet BGS, and the types of wastes encountered varied greatly, ranging from household wastes to chemical drums. Based on the varying depths of buried waste and the fact that the excavations apparently did not reach the bottom of the waste, the vertical extent of contamination (i.e., total depth/thickness of waste) was not defined in the previous site investigations.

TCLP Results

In addition to standard analytical testing, a limited number of soil samples were submitted for Toxicity Characteristic Leaching Procedure (TCLP) testing. Based on the TCLP analytical results, isolated areas of site soils would be classified as a characteristic hazardous waste.

Summary of Site Risks

A human health risk assessment and a baseline ecological risk assessment (BERA) were conducted for the LCC site to assess risks to both human and ecological receptors in the absence of remedial actions, and to support the determination of the need for site remediation.

Baseline Ecological Risk Assessment (BERA)
A BERA was prepared by the U.S. EPA Environmental Response Team (ERT 2001) for the LCC site, which followed guidance issued by the U.S. EPA. The BERA was conducted as a follow-up to a screening-level ecological risk assessment (SLERA) for the site, which identified over 100 COPCs, including metals, VOCs, SVOCs, PAHs, pesticides, and PCBs.

Assessment endpoints are explicit expressions of the actual ecological resources that are to be protected. Ecological resources include those without which ecosystem function would be significantly impaired, or those providing critical components (i.e., habitats). A review of the habitat of the LCC site and its associated wetlands provided information for the selection of assessment endpoints.

The BERA evaluated risk to multiple endpoints. In general, endpoints are aimed at the viability of terrestrial and aquatic populations. Endpoints included:

1. Wetland structure and function;
2. Fish recruitment and nursery function;
3. Benthic organisms;
4. Amphibian populations;
5. Insectivorous birds;
6. Omnivorous waterfowl;
7. Herbivorous birds;
8. Piscivorous birds;
9. Omnivorous mammals;
10. Carnivorous mammals;
11. Soil invertebrates; and
12. Plant communities.

Field sampling to support the BERA was conducted in 2001 and included: (1) collecting water, sediment, soil, fish, and crayfish for chemical analysis; (2) collecting water and sediment for toxicity testing with laboratory-reared fish (*Pimephales promelas*, fathead minnow) and benthic invertebrates (*Hyalella azteca*, amphipod), respectively; and (3) collecting soil for toxicity and bioaccumulation testing with earthworms (*Eisenia foetida*) and ryegrass (*Lolium perenne*).

For assessment endpoints including wetland structure, fish recruitment, benthic organisms, soil invertebrates, and plant communities, multiple measures of exposure and effects were evaluated and a weight-of-evidence approach was used to infer the presence or absence of risk. For amphibian and carnivorous mammal populations, which pertain to wildlife, a food-chain exposure model was used to estimate a daily chemical dose from food for comparison with toxicity reference values from the literature.

Nearly all assessment endpoints were found to be at

risk. A summary of the individual assessment endpoint findings is provided below:

- Wetland structure and function were predicted to be at risk based on adverse effects on fish, benthos, and nearly all wildlife functional groups from a variety of chemicals in water, sediment, and biota.
- Fish recruitment and nursery function were predicted to be at risk for two reasons: (1) reduced survival of fathead minnows in toxicity tests with surface water from on-site ponds, and (2) exceedances of surface water screening criteria for numerous metals and PCBs in the southeast ponds.
- Benthic community viability and function were predicted to be at risk for three reasons: (1) low diversity and abundance of benthos in on-site ponds and nearby wetlands, (2) reduced survival of amphipods in toxicity tests with sediment from on-site ponds, and (3) exceedances of sediment benchmarks for metals, DDT breakdown products, and PCBs in sediment from on-site ponds.
- Amphibian populations were predicted to be at risk based on reduced survival of amphipods in toxicity tests with sediment from on-site ponds. Amphipods were considered to be a suitable surrogate for amphibians because both amphipods and amphibians have intimate contact with sediment in ponds and wetlands.
- Insectivorous bird viability and recruitment were predicted to be at risk from PCBs and numerous metals based on food-chain modeling.
- Omnivorous waterfowl were predicted to be at risk from PCBs and selenium based on food-chain modeling.
- Herbivorous bird viability and recruitment could not be evaluated. The plan for evaluating herbivorous birds was to grow ryegrass in soil samples from the site, analyze the ryegrass for chemicals of concern, and use the resulting data as input for a food-chain exposure model. However, because of poor growth of ryegrass in site soil, there was insufficient plant biomass for chemical analysis.
- Piscivorous bird viability was predicted to be at risk from PCBs and selenium and other metals based on food-chain modeling.
- Omnivorous mammal viability was predicted to be at risk from PCBs, numerous SVOCs, antimony, and barium based on food-chain modeling.
- Carnivorous mammal viability was predicted to be at risk from PCBs and numerous metals based on food-chain modeling.
- The soil-invertebrate community at the site was predicted to be at risk for two reasons: (1) reduced survival of earthworms in toxicity tests with site soils, and (2) exceedances of soil screening levels for chromium, iron, and lead at all sampling locations and for SVOCs at selected locations.
- Plant community viability was predicted to be at risk for two reasons: (1) reduced ryegrass survival in toxicity tests with site soil samples, and (2) exceedances of one or more soil screening benchmarks for metals (aluminum, chromium, lead, and silver) and pesticides (Aldrin, DDD, DDE, and chlordane) at most sampling locations.

BERA Conclusion

The BERA concludes that there is a risk to the aquatic and terrestrial communities at and in the vicinity of the LCC site. The calculated risks used only contaminant exposure from food sources. Contaminant concentrations in water, sediment, and soil were excluded from the calculations. Therefore, the risk to receptor organisms living on the site is likely underestimated in this assessment, and there is likely risk to off-site communities

preying on organisms that use the site.

Human Health Risk Assessment

A Human Health Risk Assessment (HHRA) for the LCC site was prepared for the City of Chicago Department of Environment by Montgomery Watson Harza. In the HHRA, soil data were compared to Illinois TACO background concentrations and Tier 1 Soil Remediation Objectives (ROs). Sediment data were compared to Ontario Ministry of the Environment guidelines for protection of aquatic sediment quality. Groundwater data were compared to Illinois TACO Class I Groundwater ROs. Chemicals that exceeded any of these criteria were selected as COPCs and were evaluated in the HHRA.

Approximately 25 to 35 COPCs were identified on each parcel of the LCC site. A greater number of COPCs were found in soil and groundwater; fewer were found in surface water and sediment. The largest numbers of COPCs were metals or PAHs, but VOCs, SVOCs, pesticides, and PCBs also were represented.

Five categories of on-site workers were considered:

- Maintenance worker;
- Mower;
- Landscape maintenance worker;
- Construction worker; and
- General industrial / commercial maintenance worker.

Potential exposure pathways considered for various worker categories included:

- Dermal contact with surface water, groundwater, sediment, and surface and subsurface soils;
- Ingestion and inhalation of contaminants in surface and subsurface soils; and
- Inhalation of volatile groundwater contaminants.

Exposure estimates were calculated using standard U.S. EPA exposure estimation equations. Most exposure factor and physical chemical values were obtained from U.S. EPA or Illinois EPA guidance documents.

HHRA Conclusions

The HHRA conclusions discussed below summarize the potential risks posed to human health and the environment if no remedial action is taken at the site.

The estimated excess lifetime cancer risks (ELCRs) for the Alburn area, U.S. Drum II, and Unnamed Parcel are within or less than the 10^{-4} to 10^{-6} range generally considered acceptable by U.S. EPA. Remedial action is usually not required for risks in this range; however, this general rule is subject to modification based on site-specific factors.

The estimated Hazard Index (HI) of 3 for construction workers in the Alburn area exceeds 1, the value below which adverse noncarcinogenic effects would not be expected. An HI above 1 does not necessarily mean that adverse effects would be expected, but as the value increases above 1 the risk of adverse effects also increases. The elevated noncancer hazard was due primarily to toluene. The oral reference dose (RfD) for toluene includes an uncertainty factor of 1,000 and the inhalation reference concentration (RfC) includes an uncertainty factor of 300. Given the magnitude of these uncertainty, or "safety" factors, coupled with the conservative exposure assumptions used, construction workers are probably not likely to experience adverse noncancer effects from exposure to toluene at a level that gives an estimated HI of 3.

An important limitation of the HHRA report is that it only considers worker exposure. Workers, as a group, are generally adults and are generally healthy. Therefore, they may be less sensitive to potential adverse effects of exposure to environmental toxicants than other segments of the population such as the young, the old, and the infirm. If the site is ultimately used for a purpose such as a recreational or general commercial facility, exposure

of more sensitive segments of the population could become a significant concern.

Remedial Action Objectives

The remedial action objectives (RAOs) describe what the proposed site cleanup is expected to accomplish. In addition to the LCC site soil, surface water, and groundwater contamination, landfill gas (LFG, typically methane) production associated with the anaerobic decomposition of organic materials in the landfill is a potential concern. Since significant concentrations of organic vapors were documented during the test pit excavations, it has been assumed that methane is being generated. Based on the Human Health Risk Assessment, Baseline Ecological Risk Evaluation, probable LFG generation, and potentially complete exposure pathways, the following list of RAOs was developed for protection of human health and the environment:

- Prevent direct and dermal contact with, and ingestion of, contaminated soil/ landfill contents;
- Prevent inhalation of dust;
- Minimize or eliminate contaminant leaching to groundwater aquifers;
- Prevent ingestion, adsorption, and bioconcentration of on-site surface water and sediment;
- Prevent explosion or fire from accumulation of LFG; and
- Prevent inhalation of COPCs present in the LFG in excess of benchmark concentrations.

Selected RAOs are consistent with those presented in *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites* (EPA / 540 / P-91/001). Groundwater remedies and development of groundwater RAOs are not included as part of this Proposed Plan.

Focused Feasibility Study (FFS) Results

Summary of Cleanup Alternatives

In the FFS, U.S. EPA's presumptive remedy for landfills was used as a basis for developing the remedial alternatives. For the LCC site, the presumptive remedy is containment of the landfill mass and collection and/or treatment of landfill gas. Section 300.430(a)(iii)(B) of the NCP states that engineering controls, such as containment, will be used for waste that poses a relatively low long-term threat where treatment is impractical. Waste in landfills is present in large volumes and is a heterogeneous mixture of municipal, industrial, and/or hazardous waste. Using the presumptive remedy of containment across the LCC site, five cover/cap alternatives, including the No Action alternative, were developed.

Currently, there is a cooperative agreement between the Illinois EPA and the Illinois Department of Transportation to allow excess soils generated as part of the Dan Ryan Expressway expansion to be brought to the LCC site. The soil meets the TACO Tier 1 residential cleanup standards, as well as PAH background standards for the City of Chicago, as established by the Illinois EPA. As part of the remedial alternatives development, IDOT soils were used as cover material wherever possible.

Alternative 1 – No Action

Under this alternative, no action would be taken to remove, treat, or contain contaminated soils, wastes, and groundwater at the site. Because contaminated media would remain in place, the potential for continued migration of contaminants would not be mitigated. Additionally, no institutional controls would be implemented to prevent intrusive activities into the waste materials. The No Action alternative has been included as a requirement of the NCP and to provide a basis for the comparison for the remaining alternatives.

Estimated Cost:
Construction - $0

Annual Operation and Maintenance (O&M) - $0
Present Worth[2] - $0

Alternative 2 - Capping of Existing Wastes with a Permeable Soil Cover

For this alternative, the entire site would have a permeable soil cover placed over it that would create an appropriate grade for stormwater management. A permeable cap would allow for surface water runoff to infiltrate through the cap and to come into contact with the buried waste, which would leach additional contaminants into the groundwater. Activities included under this alternative include site preparation / grading, placement of the cover material, and planting of a vegetative cover, which would consist of native plants and prairie grasses. This alternative would also utilize the imported IDOT fill material.

Estimated Cost:
Construction - $10,899,000
Annual O&M - $63,000
Present Worth - $11,900,000

[2]Present Worth: A method of evaluation of expenditures that occur over different time periods. By discounting all costs to a common base year, a total present worth cost estimate for each alternative allows the public to compare different alternatives that have varying amounts of O&M costs.

Alternative 3 – Capping of Existing Wastes with an Evapotranspiration (ET) Cap

Under this alternative, an ET cap would be placed over most of the site. The ET cap would utilize evaporation as well as vegetative uptake to prevent infiltration of stormwater into the waste causing contaminants to leach into the groundwater. Potential vegetation to be used for this alternative includes a mixture of warm- and cool-season native grasses, shrubs, and trees. Given the necessary soil properties associated with an ET cover, the imported IDOT material would likely not be suitable for use with this alternative.

Estimated Cost:
Capital - $18,730,000
Annual O&M - $63,000
Present Worth - $19,730,000

Alternative 4 – Capping of Existing Wastes with a Low-Permeability 35 IAC 724 Clay Cap

This alternative involves construction of a low-permeability clay cap over the existing wastes that would create an appropriate grade for stormwater runoff. This multilayer cap system is comprised of a biosolids layer to promote plant growth on the surface, and a protective cover layer overlying a drainage layer composed of cobble, sand, and a geonet fabric. Beneath the drainage layer is the low-permeability clay layer, which would be approximately 3 feet thick. This cap meets the requirements of IAC, Title 35, Part 724. The low-permeability cap provides grading for stormwater collection over the entire site; construction of a stormwater retention pond with overflow to the Paxton I Landfill stormwater collection system; installation of a gas collection system; and vegetation of the entire site with native plants and prairie grasses.

Estimated Cost:
Capital - $17,700,000
Annual O&M - $83,000
Present Worth - $18,980,000

Alternative 5 – Capping Existing Wastes with a Low-Permeability 35 IAC 811 Clay Cap

Alternative 5 involves construction of a cover system that consists of a low-permeability clay layer overlain by a protective layer which would shield it from freezing. Both the low-permeability layer and protective layer would be constructed using IDOT material. While not a requirement of 35 IAC 811, this alternative includes a gas collection system to protect the integrity of the clay layer. Additionally, grading for stormwater collection over the entire site, construction of a stormwater retention pond with overflow to the Paxton I Landfill stormwater collection system,

and vegetation of the entire site with native plants and prairie grasses would be performed.

Estimated Cost:
Capital - $15,900,000
Annual O&M - $83,000
Present Worth - $17,180,000

Evaluating the Alternatives

Nine evaluation criteria have been developed by the U.S. EPA to address the statutory requirements and the technical, cost, and institutional considerations for appropriate remedial actions at waste sites. These nine criteria are described below. Table 2 compares the alternatives evaluated in the FFS to the nine evaluation criteria.

1) Overall Protection of Human Health and the Environment addresses whether or not the remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2) Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether or not the remedy will meet all of the applicable or relevant and appropriate requirements of other state and federal environmental statutes or provide grounds for invoking a waiver.

3) Long-Term Effectiveness and Permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4) Reduction of Toxicity, Mobility, or Volume Through Treatment is the anticipated performance of the treatment technologies a remedy may employ.

5) Short-Term Effectiveness involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6) Implementability is the technical and administrative feasibility of a remedy, including the availability of goods and services needed to implement the chosen solution.

7) Cost includes capital and operation and maintenance costs.

8) Support Agency Acceptance indicates whether, based on its review of the Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan, the support agency concurs, opposes, or has no comment on the proposed alternative. In this case, the support agency is the U.S. EPA.

9) Community Acceptance addresses the public's comments and concerns about the Proposed Plan and the FFS Report. The specific responses to public comments will be addressed in the Responsiveness Summary attached to the Record of Decision.

Recommended Alternative

Based on the information collected to date on soil, groundwater, surface water, and sediment contamination and associated risks to human health and the environment, the Illinois EPA recommends Alternative 4 for addressing waste containment at the LCC site. (Groundwater contamination will be addressed under a separate action.)

Alternative 4 includes a multilayer cap system, which will greatly reduce the potential for surface water to infiltrate through the cap, come into contact with the waste material, and leach contaminants into the groundwater.

Only Alternative 4 fully satisfies all of the nine evaluation criteria. Alternative 5 provides slightly less protectiveness of human health and the environment as compared to Alternative 4, since there is no drainage layer for water that infiltrates into the cover system. While Alternatives 4 and 5 are

similar, with the only distinction being the complexity of the cap systems, Alternative 4 is the only alternative that fully meets all the ARAR requirements.

Alternative 4 fully satisfies the evaluation criteria for the LCC site. Alternative 4 would protect human health and the environment, provide long-term effectiveness, comply with state and federal environmental regulations, be implementable and cost effective, and satisfy the RAOs established for a presumptive remedy for a landfill.

Based on new information or public comments, the Illinois EPA, in consultation with the U.S. EPA, may later modify the preferred alternative or select another remedial action presented in the Proposed Plan. The public is therefore encouraged to review and comment on all of the alternatives identified in this Proposed Plan. The FFS report should be consulted for more information on these alternatives.

In summary, the recommended Alternative 4 is believed to provide the best balance among the alternatives with respect to the nine criteria used to evaluate the remedies.

Next Step

The Illinois EPA will consider public comments received during the public comment period before choosing a final capping plan for the site. All comments received during the public comment period will be addressed in a "Responsiveness Summary," which will be included in the final decision document called a Record of Decision (ROD). The ROD will be available for public review at the information repository.

For Additional Information

Anyone interested in learning more about the Proposed Plan for the Lake Calumet Cluster site is encouraged to review the information repository located at the Harold Washington and Hegewisch Public Libraries in Chicago, Illinois. An Administrative Record, which contains detailed information upon which the selection of the cleanup plan will be based, is also located at the libraries and at the Illinois EPA office in Springfield. For further information about this Proposed Plan and the LCC site, please contact:

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Table 1
Summary of Detected Surface Soil Concentrations
Lake Calumet Cluster Site
Chicago, Illinois

Compound	Frequency of Detection	Minimum Detection	Average Detection	Maximum Detection	Region 3 Human Health RBC[a]	Number of Samples Exceeding RBC	RCRA EDQL[b]	Number of Samples Exceeding RCRA EDQL
Metals (milligrams per kilogram)								
Arsenic	83/120	0.8	7.8	26	4	74/120	5.7	59/120
Barium	120/120	21.3	143.4	1,200	14,000	0/120	1.04	120/120
Chromium	120/120	9.55	245	2,200	NP	NP	0.4	120/120
Lead	112/120	10.7	185.9	1,170	NP	NP	0.451	112/120
Mercury	116/120	0.012	0.364	13	61	0/120	0.008	116/120
Volatile Organic Compounds (milligrams per kilogram)								
Naphthalene	66/121	0.022	0.89	41	41,000	0/121	0.1	39/121
Semivolatile Organic Compounds (milligrams per kilogram)								
Benzo(a)pyrene	112/121	0.034	1.04	6.8	0.78	45/121	1.52	23/121
Benzo(a)anthracene	116/121	0.029	1.02	9	7.8	1/121	5.21	3/121
Dibenzo(a,h)anthracene	99/121	0.038	0.34	2.2	0.78	11/121	18.4	0/121
PCBs/Pesticides (milligrams per kilogram)								
Aroclor 1254	68/120	0.007	1.48	68.8	2.9	2/120	NP	NP
beta-BHC	58/120	0.001	0.009	0.078	3.2	0/120	0.004	33/120
Dieldrin	61/120	0.001	0.056	1.8	0.36	3/120	0.002	37/120

Note: Data summarized from *The Nature and Extent of Contamination at the Lake Calumet Cluster Site* (E & E 1999).

Key:
RBC = Risk-based concentration.
NP = Information not provided or calculated.

Source:
[a]U.S. EPA Region 3 human health risk-based screening concentrations for soils for commercial or industrial use (October 1998).
[b]U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Table 2
Summary of Detailed Analysis of Alternatives
Lake Calumet Cluster Site
Chicago, Illinois

Evaluation Criterion	Alternatives				
	1	**2**	**3**	**4**	**5**
	No Action	**Capping of Existing Wastes with a Permeable Soil Cover**	**Capping of Existing Wastes with an Evapo-transpiration (ET) Cap**	**Capping of Existing Wastes with a Low-Permeability 35 IAC 724 Clay Cap**	**Capping of Existing Wastes with a Low-Permeability 35 IAC 811 Clay Cap**
1. Overall Protection of Human Health and the Environment	○	⊙	⊙	●	●
2. Compliance with ARARs	○	⊙	⊙	●	⊙
3. Long-Term Effectiveness and Permanence	○	⊙	⊙	●	●
4. Reduction of Toxicity, Mobility, or Volume Through Treatment	○	⊙	⊙	⊙	⊙
5. Short-Term Effectiveness	●	⊙	⊙	●	●
6. Implementability	⊙	⊙	⊙	●	●
7. Cost (Net Present Worth)	$0	$11,900,000	19,730,000	18,890,000	17,180,00
8. Support Agency Acceptance	The U.S. EPA concurs with the recommended alternative.				
9. Community Acceptance	Community acceptance of the recommended alternative will be evaluated after the public comment period.				

Definition of Symbols:

- ○ Alternative does not fully meet the requirements of the criterion.
- ⊙ Alternative partially meets the requirements of the criterion.
- ● Alternative meets the requirements of the criterion.