PARTE I: DECLARACIÓN

1.1 NOMBRE Y UBICACIÓN DEL SITIO

DePue/New Jersey Zinc/Mobil Chemical Corp.
0110300003 – Condado de Bureau
No. de ID de CERCLIS ILD 062 340 641
Unidad operable 4, suelos fuera del sitio
DePue, Condado de Bureau, Illinois

1.2 DECLARACIÓN DE FUNDAMENTO Y PROPÓSITO

Este Registro de Decisión (ROD, por sus siglas en inglés) presenta la reparación seleccionada para el sitio de DePue/New Jersey Zinc/Mobil Chemical incluido en la Lista Nacional de Prioridades (NPL, por sus siglas en inglés), la Unidad operable (OU) 4, en DePue, Illinois, que fue escogido por la Agencia de Protección Ambiental de Illinois (EPA de Illinois) de acuerdo con la Ley Integral de Respuesta Ambiental, Compensación y Responsabilidad de 1980 y sus enmiendas (CERCLA, por sus siglas en inglés), y sus enmiendas por la Ley de Enmiendas y Reautorización del Superfondo (SARA, por sus siglas en inglés) y, en la medida en que resulte factible, el Plan Nacional de Contingencia para la Contaminación por Petróleo y otras Sustancias Peligrosas (NCP, 40 Código de Regulaciones Federales (CFR) 300-399). Esta decisión está basada en el expediente del Registro administrativo para este sitio.

El organismo de apoyo, la Agencia de Protección Ambiental de los Estados Unidos (USEPA, por sus siglas en inglés), está de acuerdo con la Reparación seleccionada.

1.3 EVALUACIÓN DEL SITIO

La acción de respuesta seleccionada en este ROD es necesaria para proteger a la salud o al bienestar público o al medio ambiente de emisiones reales o potenciales de sustancias nocivas en el medio ambiente.

1.4 DESCRIPCIÓN DE LA REPARACIÓN SELECCIONADA

La estrategia general de la EPA de Illinois para el sitio es abordar la unidad operable con el mayor potencial de exposición directa para los residentes del área; esto es, las áreas residenciales de OU4. Luego se tomarán otras medidas de remediación para el resto de OU4, OU3 y OU1/OU5.

La EPA de Illinois no ha identificado desperdicios de la amenaza principal en OU4. Los niveles de contaminantes en los suelos tienden a encontrarse por debajo de los niveles de gestión de remoción (RML, por sus siglas en inglés), y están presentes a niveles que no se espera que exhiban características de desperdicios peligrosos. Los suelos contienen desperdicios que pueden ser contenidos de manera confiable, no son altamente móviles, y constituyen una amenaza

relativamente menor en caso de exposición. El Material relacionado con el sitio (SRM, por sus siglas en inglés; es decir, material relacionado con el sitio compuesto por escoria de procesamiento de zinc usada como relleno) puede estar presente en áreas discretas. Si bien generalmente se espera que exhiba concentraciones más altas en niveles que pueden presentar características de desperdicios peligrosos, el SRM puede ser contenido de manera confiable y no es probable que sea altamente móvil.

La Reparación seleccionada es la reparación final para las áreas residenciales, las áreas de uso especial y las propiedades diversas en OU4. Sin embargo, la meta de remediación seleccionada en este ROD para uno de los contaminantes preocupantes (COC, por sus siglas en inglés), el plomo, se considera un nivel de limpieza provisorio. Una nueva directiva de la USEPA, llamada *Updated Scientific Considerations for Lead in Soil Cleanups* (Directiva 9200.2-167 de la Oficina de Gestión de la Tierra y las Emergencias (OLEM, por sus siglas en inglés) del 22 de diciembre de 2016), destaca las herramientas científicas y de evaluación de riesgos que existen en la actualidad que deberían ser tomadas en cuenta a la hora de tratar suelos contaminados con plomo en los sitios de la ley CERCLA. A la luz de esta nueva directiva, la EPA de Illinois reevaluará el nivel de limpieza del plomo para este sitio durante la etapa de diseño de remediación, antes de iniciar la acción de remediación. Todos los cambios en el nivel de limpieza del plomo serán abordados en un documento correspondiente a la decisión futura.

El Reparación seleccionada es la excavación de las áreas residenciales, las áreas de uso especial y de las propiedades diversas, y a gestión de los suelos del Área del Sitio de la Planta Antigua (FPSA, OU3). Esta reparación posibilitará una reducción sustancial de los riesgos al remover la fuente de las exposiciones en las propiedades afectadas de OU4 y consolidar los desperdicios en el FPSA donde puedan ser remediados de manera eficiente como parte de OU3. El objetivo de la acción de remediación para los suelos de OU4 es evitar la ingesta, inhalación y el contacto dérmico de los suelos de OU4 con concentraciones de COC por encima de las metas de remediación (RG) designadas para los niños residentes, los adultos residentes y los obreros de la construcción. La alternativa de remediación seleccionada se prefiere porque se podrá alcanzar el objetivo de remediación con menos riesgo para la comunidad y los trabajadores durante la implementación de la reparación a un costo más bajo que otras opciones. El Reparación seleccionada será la reparación definitiva para los suelos contaminados en el área residencial, incluidas las propiedades residenciales, las áreas de uso especial y las propiedades diversas.

Los principales elementos del Reparación seleccionada son:

A. Se obtendrán acuerdos de acceso de los propietarios actuales para permitir que se tomen muestras y el trabajo de limpieza;

B. El muestreo del suelo se llevará a cabo de acuerdo con el Manual para Sitios Residenciales Contaminados con Plomo del Superfondo:

C. Los suelos excavados y el SRM removido de las propiedades serán transportados al FPSA para su acopio y gestión. El SRM y los suelos con concentraciones superiores a las

RG para trabajadores y las RG para residencias serán acopiados de manera separada en OU3[1].

D. Se aplicarán las mejores prácticas de gestión con el material acopiado para prevenir la lixiviación, la filtración, la escorrentía, la dispersión por el viento y el contacto directo de los suelos colocados;

E. Las propiedades residenciales y los parques serán restaurados de la manera más próxima posible a su condición original, usando suelo de una fuente externa al sitio y forestados con semillas de césped adecuadas para la zona climática; se pueden colocar terrones de césped según el caso;

F. Se restaurarán los callejones a su condición original usando grava u otro árido adecuado;

G. Se implementarán controles institucionales (IC) según sea necesario;

H. La EPA de Illinois suministrará cartas de certificación a los propietarios participantes, que incluirán los resultados de los datos, una descripción de las acciones de remediación completadas, y todos los controles institucionales que se pueden justificar para esa propiedad.

1.5 DETERMINACIONES LEGALES

El Reparación seleccionada protege la salud humana y el medio ambiente, cumple con los requisitos federales y estatales que son aplicables o relevantes y adecuados para la acción de remediación (a menos que esté justificado por una exención), es rentable, y utiliza tecnologías para lograr una solución permanente y un tratamiento alternativo (o recuperación de recursos) en la máxima medida posible.

El reparación para esta OU no satisface la preferencia legal por el tratamiento como un elemento principal del reparación. Sin embargo, las concentraciones de metales en el suelo, si bien se encuentran por encima de los niveles basados en el riego, no representan desperdicios de amenaza principal. En tanto desperdicios de amenaza de bajo nivel, los suelos de esta OU muy adecuados o generalmente apuntados para el tratamiento por rehabilitación, recuperación o inmovilización. El reparación para esta OU satisface no obstante la expectativa del NCP acerca de la utilización de la contención para los desperdicios de bajo nivel para los cuales el tratamiento es impracticable, y toma en cuenta el sesgo contra el desecho de los desperdicios sin tratar en terrenos fuera del sitio.

Como esta reparación tendrá como resultado que en el sitio permanecerán sustancias peligrosas, que generan polución o contaminantes por encima de niveles que permitan un uso ilimitado y una exposición irrestricta, se realizará una revisión reglamentaria dentro de los cinco años posteriores al inicio de la acción de remediación para garantizar que el reparación protege, o protegerá, la salud humana y el medio ambiente.

[1] La eliminación definitiva y/o el uso del material acopiado se decidirá durante el Estudio de viabilidad que se realizará para OU3.

1.6 LISTA DE CONTROL PARA CERTIFICACIÓN DE LOS DATOS DEL ROD

La siguiente información se incluye en la sección Resumen de la decisión de este ROD. Se puede encontrar información adicional en el expediente del Registro administrativo para el sitio.

Información	Ubicación en el ROD
COC y sus respectivas concentraciones	Secciones 2.5.6 y 2.7
Riesgo inicial representado por los COC	Sección 2.7.1
Niveles de limpieza establecidos para los COC y el fundamento para estos niveles	Sección 2.8.1
De qué manera se tratan los materiales básicos que representan las amenazas principales	Sección 2.11
Suposiciones sobre el uso de la tierra en la actualidad y el uso que puede esperarse razonablemente en el futuro	Sección 2.6
Posible uso de la tierra y el agua subterránea que estará disponible en el sitio como resultado de la Reparación seleccionada	Sección 2.12.4
Costos estimados de capital, operación y mantenimiento anual, y valor actual de los costos totales, tasa de descuento, y la cantidad de años durante los cuales se proyectan los cálculos del costo de la reparación	Secciones 2.9.1 y 2.9.4 y Tabla 2
Factores fundamentales que llevaron a la selección de la reparación	Secciones 2.10 y 2.13

1.7 FIRMAS HABILITANTES

La EPA de Illinois, como el organismo líder para el Sitio del Superfondo DePue/New Jersey Zinc/Mobil Chemical Corp., y a través de la autoridad de la Orden de consentimiento provisional No. 95 CH 18, autoriza este Registro de Decisión.

_____ _____17/5/2017_____

Alec Messina
Director
Agencia de Protección Ambiental de Illinois

Fecha

_____ _____23/6/2017_____

Margaret Guerriero
Directora interina, División del Superfondo
Agencia de Protección Ambiental de los EE.UU., Región 5

PART II: DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

2.1.1 Site Name, Identification Number, Official Site Address, Location

DePue/New Jersey Zinc/Mobil Chemical Corp. Superfund Site
CERCLA Site ID: ILD 062 340 641
Bureau County, DePue, Illinois
Illinois EPA ID: 0110300003 – Bureau County

2.1.2 Site Type and Brief Description

The New Jersey Zinc/Mobil Chemical Site is a former primary and secondary zinc smelter. At various times, it also produced sulfuric acid, lithopone, and diammonium phosphate fertilizer. The Site is located within the Village of DePue in Bureau County, Illinois (Figure 1). The Site includes the smelter and fertilizer plant area and bluff, a phosphogypsum stack and associated features, bottomland areas including a drainage ditch and outfall area, Lake DePue, portions of the floodplain associated with Lake DePue, and soils within the Village of DePue. The Site has been organized into five separate OUs for investigation and remediation (Figure 2):

- OU1 is the South Ditch that received historic groundwater and surface water discharge from the plant area and conveyed this water to Lake DePue. As a result, sediments in the South Ditch are contaminated with metals associated with the operations of the plant. The potentially responsible parties (PRPs) performed an interim remedial action in the South Ditch in 2005 including dredging of contaminated sediment, stabilizing the sediment, and disposing the stabilized sediment on the plant site in a corrective action management unit (CAMU). A final remedial action for OU1 is anticipated to be included as part of the remedial action for OU5.

- OU2 is the phosphogypsum stack, an area of approximately 140 acres that includes phosphogypsum from the fertilizer production operation and several water control features.

- OU3 is the FPSA and includes a 136-acre area enclosed by a fence where the former smelting plant and other production operations were conducted. OU3 also includes a 75-acre Bluff Area north of the plant, and a 25-acre area that includes a former solid waste dump beyond the plant's fence line, south of the main thoroughfare of the Village of DePue.

- OU4 includes soils impacted from Site operations beyond the plant's boundaries within the Village of DePue. The residential areas, public property, parks, alleys, the school, and miscellaneous properties within OU4 are the focus of this ROD. Other areas of OU4 that include primarily ecological areas and agricultural areas will be evaluated and addressed at a later time.

- OU5 is Lake DePue and its associated floodplain. The South Ditch and another site-related outfall discharged to Lake DePue, resulting in metals-contaminated sediments concentrated in certain areas of the lake.

Illinois EPA is the lead agency; USEPA is the support agency. The site is being investigated under the authority of an interim consent order and funded by the potentially responsible parties which include ExxonMobil Oil Corporation and CBS Corporation (the DePue Group).

2.2 Site History and Enforcement Activities

2.2.1 Site History

Zinc smelting operations were begun at the site by Mineral Point Zinc circa 1905 on what had been farmland. The primary smelter produced slab zinc, zinc dust, and sulfuric acid. A lithopone production plant was added to the smelter in 1923 and closed in 1956. In the late 1930s, New Jersey Zinc acquired Mineral Point Zinc and by the mid-1950s was operating the Site as New Jersey Zinc. In 1971, the primary smelter was closed. The zinc dust plant continued to operate. In the early 1980s, Horsehead Industries acquired certain assets of the New Jersey Zinc Company, later changing its name to Zinc Corporation of America. Zinc dust operations ceased in 1989 and Zinc Corporation of America completed the demolition of the majority of the remaining structures in 1990 and 1991.

In the mid-1960s, Gulf & Western purchased New Jersey Zinc and began operation of a diammonium phosphate fertilizer plant in 1967. The fertilizer and acid plants ceased operations in 1971. The plants were then leased to the phosphorous Division of the Minerals Group of Mobil Chemical Company, a division of Mobil Oil Corporation, in 1972. Mobil Chemical Company purchased the fertilizer and acid plants in 1975. Manufacturing operations ceased in 1978. Mobil Chemical Company transferred ownership to Mobil Mining and Minerals Company in 1985. Mobil then operated the plant as a fertilizer terminal until December 1990. The Mobil plant's structures were demolished in the early 1990s.

Through a series of name changes, acquisitions, and mergers, the property eventually came to be owned by CBS Corporation and ExxonMobil Oil Corporation.

Currently, the main plant area is fenced. Two buildings are present on the property. One building, the former power plant, now houses the operating interim water treatment plant (IWTP), and the other building is used for equipment storage, office space, and as a base for field operations.

2.2.2 Enforcement Activities

A Preliminary Assessment was performed by a USEPA Field Investigation Team contractor in December 1980, and was followed by two Screening Site Inspections in 1984 and 1987. Illinois EPA conducted an Expanded Site Inspection (ESI) in 1991 and 1992. The purpose of the ESI was to gather additional information needed to develop a CERCLA Hazard Ranking System

(HRS) proposal. The ESI included collection and analysis of surface water samples and soil/sediment/waste samples from background locations and from the Site and Lake DePue. Soil samples were also taken from several residential yards within the Village of DePue.

USEPA took additional samples in 1993 from drums of spent vanadium pentoxide catalyst and Illinois EPA collected additional samples of sediment and water in the South Ditch.

In November 1995, the State of Illinois entered into an Interim Consent Order (ICO) with Horsehead Industries, Inc., Mobil Oil Corporation, and Viacom International, Inc. in response to a notice sent to the parties on April 14, 1994 pursuant to Section 4(q) of the Illinois Environmental Protection Act. The notice provided the PRPs with the opportunity to conduct certain remedial activities, to determine the nature and extent of hazardous substances released from the Site and to identify and evaluate alternatives for remedial action. Several other interim measures and response actions were specified in the ICO. The Site is now being investigated and remediated by the PRPs, i.e., CBS Corporation and ExxonMobil Oil Corporation.

Pursuant to the ICO, the DePue Group installed and repaired fencing around the plant site and partially fenced the South Ditch, vegetated the Site to control dust, conducted a dust monitoring program to determine if particulates and dust were leaving the Site, and removed vanadium pentoxide catalyst. During the mid to late-1990s, the DePue Group installed a storm water management system throughout the plant and Bluff Area to intercept surface water and storm water.

Construction of the IWTP occurred during the mid-1990s and it continues to operate. The IWTP and associated lift station receive storm water and contaminated groundwater from the slag pile and eastern portion of the plant site. The lift station routes collected water to the IWTP for treatment. Metals-contaminated water is treated at the IWTP by adjusting the pH which causes metals to precipitate out of the water. Treated water is discharged to the Illinois River and collected sludge is dewatered and stabilized before being sent off-site for disposal in a special waste landfill. Water samples are collected and analyzed before treatment and after treatment to ensure discharge standards to the Illinois River are met.

Based on information to support the HRS scoring package, the Site was proposed for the National Priorities List in April 1997 and the listing was finalized on May 10, 1999.

Each OU is briefly discussed below.

<u>OU1: South Ditch</u>
The South Ditch conveyed uncontrolled discharges of groundwater and surface water from the plant site to Lake DePue. Investigation of the South Ditch was initiated in November 1995 and concluded that approximately 8,000 cubic yards of metals-contaminated sediments contained elevated concentrations of arsenic, zinc, copper, cadmium, and lead. The ecological screening risk assessment portion of the remedial investigation (RI) indicated the sediments were acutely toxic to two different test species.

Illinois EPA signed an interim action ROD in October 2003 to address these risks and to address intermittent migration of contaminated sediment into Lake DePue. The USEPA concurred with the ROD. The DePue Group excavated contaminated sediments to a visual standard and dewatered the sediment. The sediments were then stabilized and disposed in a lined and covered containment cell (i.e., a CAMU) located on the plant facility, OU3.

The interim action is not the final action for the South Ditch, and a more permanent remedy for the South Ditch will be incorporated into a remedial action for OU5, Lake DePue.

OU2: Phosphogypsum Stack

The phosphogypsum stack serves as a permanent disposal area for phosphogypsum and is being closed consistent with the requirements of Illinois' landfill regulations, 35 Illinois Administrative Code (Ill. Adm. Code) Part 807. To meet this requirement, the DePue Group submitted a Closure Plan in 1996. Illinois EPA did not accept this plan and requested additional information regarding how the proposed closure activities would address protection of groundwater. A detailed hydrogeological study was conducted over the next several years to address these concerns. The long-term study identified contaminants of concern and delineated the extent of groundwater impacts. The DePue Group submitted a revised Closure Plan in December 2014 which was approved by Illinois EPA in February 2017. Construction is anticipated to begin in 2017.

OU3: Former Plant Site Area

The FPSA includes the fenced area of plant operations, the Bluff Area to the north of the plant, and an area to the south of the plant, across Marquette Street, including the former dump and upland portion of the southeast area of the PRP's property.

The DePue Group completed Phase 1 of the RI in 2006, which focused primarily on delineating soil contamination, and completed Phase 2 in 2014, which focused primarily on groundwater contamination. Findings from the RI indicate that the slag pile near the southeast extent of the fenced area is estimated to include over 700,000 cubic yards of slag. About 69,000 cubic yards of lithopone is deposited in several ridges near the base of the Bluff. General fill including slag and demolition debris, occurs throughout the plant area. Fill in the eastern portion of the plant also includes lithopone. The upland portion of the southeast area includes site-related construction debris, demolition debris and slag.

The Phase 1 and Phase 2 RIs document metals contamination present in Site soils, sediment, and groundwater. Both the slag pile and lithopone ridges are contributing contamination to groundwater that occurs in an upper water bearing zone and a lower aquifer. The human health risk assessment was completed in February 2016. The human health assessment indicates that carcinogenic risks from arsenic and/or PAHs and non-carcinogenic hazards from metals, particularly arsenic and lead, are present to all receptors evaluated, though some risks and hazards are localized. The ecological risk assessment is ongoing.

OU4: Off Site Soils

OU4 includes the residential, commercial, and public areas of the Village of DePue. The Village is generally bounded to the south by Lake DePue, agricultural property, state-owned property

managed for habitat, and the Illinois River, to the east and west by agricultural property and open space, and to the north by agricultural property.

Previous focused sampling efforts on the residential areas of OU4 occurred in 1992 and 1993, 2000, 2005 and 2013. These efforts are described in detail in Section 2.5.5. In general, these efforts documented the presence of elevated concentrations of metals associated with FPSA operations and fill materials from the plant area. In most yards sampled, concentrations of arsenic, cadmium, cobalt, lead, and manganese exceeded background and exceeded conservative screening levels based on background or a hazard index (HI) of 1.0 within specific areas of the yard.

OU5: Lake DePue, Floodplain Soils and Sediments

OU5 includes Lake DePue and associated floodplain soils and sediments 450 feet below mean sea level. Lake DePue is a large former oxbow connected at its western end to the Illinois River. The DePue Group conducted a comprehensive RI in 2006 and 2007 to determine the nature and extent of contamination within the lake associated with former plant operations. Information about the lake's physical characteristics such as a bathymetry study, sedimentation rates, and surface water inputs was gathered as well as contaminant concentrations in surface water, groundwater seeps, lowland soil, lake sediment, and various biota.

The RI concluded that in general, metals are present at elevated concentrations in surface water, seeps, lowland soils, and sediment. These concentrations tend to be higher in areas associated with the South Ditch and Division Street Outfall. In the soil, concentrations of metals tend to be higher in the subsurface than in the surface. Sediment concentrations tend to increase with depth within the upper 6-10 feet, then decrease below 10 feet. Most metals concentrations tend to be higher at near-shore locations, though zinc and cadmium are more widespread (Arcadis, 2009).

Twenty-six receptor-specific routes of exposure were evaluated in the human health risk assessment (HHRA) conducted for the lake. The HHRA concluded that cancer risks from exposure to soil, sediment, and surface water in OU5 were generally lower than or within the CERCLA target risk range of 1×10^{-4} to 1×10^{-6}. The highest cancer risk was 7×10^{-5} for the lake-wide recreational child exposed to lake sediment and surface water under a swimming scenario. Non-cancer hazards for all scenarios and receptors were below the target HI of 1. An evaluation of risks from lead concluded that lead did not present a risk under any scenario based on a threshold of 5 percent probability of a blood lead level (BLL) greater than 10 micrograms per deciliter (µg/dL) (Arcadis, 2014).

The baseline ecological risk assessment (BERA) is ongoing. Risks to plants, soil invertebrates, aquatic invertebrates, fish, reptiles/amphibians, birds, and mammals have been evaluated. Additional data will be collected in an effort to determine with more certainty if there are significant risks within a formerly dredged area of the lake. Beyond the formerly dredged area, ecological risks appear to be more elevated within the South Ditch and Division Street Outfall area and an area along the shore of Lake Park for all receptor groups. Metals in soil and sediment are likely driving the risks, though additional evaluation will be conducted to define the risk to certain aquatic species.

2.3 COMMUNITY PARTICIPATION

Illinois EPA issued the Proposed Plan for OU4 on June 7, 2016. Pursuant to the requirements of the NCP, 40 CFR 300.430(f)(3), Illinois EPA published a notice of the availability of the Proposed Plan in two area newspapers, the Bureau County Republican and LaSalle News Tribune on June 7, 2016. The community was provided with the opportunity to comment on the Proposed Plan from June 14 through July 14, 2016. Illinois EPA held an availability session for the public on June 22, 2016 and conducted a formal public meeting on June 29, 2016 in DePue to hear public comments. The Village of DePue requested an extension to the public comment period; consequently, Illinois EPA extended the public comment period to August 15, 2016. A public notice announcing the extension of the public comment period was published in the Bureau County Republican on July 13, July 14, 2016 and July 19, 2016 and in the LaSalle News Tribune on July 16-17, 2016.

2.4 SCOPE AND ROLE OF THE OPERABLE UNIT OR RESPONSE ACTION

The response action will address metals-contaminated soil in portions of OU4, specifically the residential areas (including vacant lots), special use areas (i.e., athletic fields, parks, alleys, school), and certain miscellaneous (e.g., commercial) properties within the Village of DePue, as indicated on Figure 3. The action is not intended to be the final response action for OU4, since it does not address the entire OU, but it is intended to be the final response action for those properties within OU4 that have the greatest potential for human exposure and where access is granted to conduct the work. Other areas of OU4, such as agricultural property and properties evaluated primarily for ecological concerns, will be addressed at a later time.

The proposed action does not address the other OUs. OU1, the South Ditch, was addressed by an interim action in 2005. The remaining contamination in OU1 will be addressed as part of the remedial action for OU5, Lake DePue, when that occurs. Separate investigations have been completed for OUs 3 and 5, and once the ecological risk assessments are completed, Feasibility Studies will be conducted. Illinois EPA will develop separate or combined Proposed Plans for OUs 3 and 5 in the future. OU2, the phosphogypsum stack, is being closed pursuant to Illinois landfill regulations and is not expected to be the subject of a CERCLA Proposed Plan and ROD.

The actions undertaken at OU4 pursuant to the selected remedy will result in contaminated soil and SRM from residential properties and Village properties being brought to the plant area where they will be consolidated with other plant-area wastes for final management and/or disposal when a final remedy is selected for OU3.

2.5 OU4 Characteristics

The portion of the OU that is the focus of this ROD is generally defined as the area between County Road 1300 North (State Rt. 29) to the north (but including Oakbrook Subdivision to the northwest), Negro Creek to the east, Lake DePue to the south, and Oakbrook Drive to the west.

The boundaries are based on the corporate boundaries of the Village of DePue. Approximately 814 residential lots (including vacant lots) are included within the Village boundaries.

Beyond the residential areas are agricultural properties which will be investigated at a later time and are not addressed in this ROD. The future investigations will extend generally to County Road 1400 North to the north and possibly beyond. Figure 3 depicts the entirety of OU4 as it is currently understood. The developed areas within the West, Northwest, East, and South Subareas will be addressed as described in this ROD, as illustrated on Figure 3. The ecological areas and other open spaces of these Subareas and the Northeast Subarea will be addressed at a later time.

The OU4 subareas are described as follows (see Figure 3):

- West Subarea – Approximately 322 acres, the West Subarea is located west of the plant site and extends from the CSX Transportation, Inc. railroad tracks north to Route 29. The area is defined by the FPSA and Bluff Area boundary to the east and the agricultural fields to the west (up to a southern projection of Oakbrook Drive). This subarea includes single family residential homes that are located immediately adjacent to the FPSA (along East Street) and the western residential portion of the Village of DePue that is located north of the railroad tracks and south of Princeton Street.

- Northwest Subarea – Approximately 369 acres, the Northwest Subarea extends from the northern boundaries of the West Subarea and the OU3 Bluff Area north to 1400 Avenue North. It is bounded to the east by agricultural fields along the western boundary of the Northeast Subarea and by Oakbrook Drive and a northern projection of Oakbrook Drive to the west. The Northwest subarea contains a residential subdivision known as Oakbrook Terrace and an associated park. There are additional residences along East Street and the eastern boundary of the subarea.

- East Subarea – Approximately 385 acres, the East Subarea extends from approximately the 450-foot topographic contour interval along Lake DePue north to Highway 29. The East Subarea is bounded by OU3 to the west and Negro Creek to the east. This subarea includes single family residential areas within the western, central, and northeastern portions of the subarea. The residential area within the western and central portions of the subarea is referred to as White City and includes White City Park.

- South Subarea – The South Subarea extends from approximately the 450-foot topographic contour interval along Lake DePue (the northern study boundary of OU5) north to the southern boundaries of OU3 and the West Subarea. The South Subarea is bordered by OU3 to the east and by the agricultural fields (up to a southern extension of Oakbrook Drive) to the west. The South Subarea includes approximately 221 acres. The eastern half of the subarea includes the central portion of the Village of DePue, and is bordered to the south by the Lake DePue lowlands. Commercial properties, single and multifamily homes, several churches, the DePue Unit School, and Lake Park are located in the South Subarea.

- Northeast Subarea – Approximately 1,056 acres, the Northeast Subarea extends north of the phosphogypsum stack to approximately County Road 1400 N, and possibly beyond. The Subarea is defined by Negro Creek to the east and the Northwest Subarea to the west. The subarea is primarily agricultural fields and forested areas. No reconnaissance of this area has occurred. This Subarea is not addressed by this ROD.

The Village of DePue is primarily residential, with an estimated population of 1,852 (US Census, 2010). Commercial properties and a school are also present. 54.7 percent of the Village's population is Hispanic or Latino (US Census, 2010). 27 percent of the Village's population is less than 16 years old (US Census, 2010).

The plant is located in the north central part of the Village and surrounded by residential property to the west and east. Residential and commercial properties are located to the south. To the north of the plant is a large Bluff Area owned by the PRPs and the Site's phosphogypsum stack.

The contamination in OU4 is likely due to two sources: aerial deposition of contaminants emanating from the plant area as emissions from former operations or particulates transported by wind or water, and SRM taken directly from the Site and placed in yards, alleys, and other areas as fill material.

2.5.1 Surface Water Hydrology

Most of the surface water features in the DePue area are associated with the other OUs. These surface water features include the South Ditch, the Division Street outfall, the outfall for the Village of DePue Wastewater Treatment Plant (WWTP), the unnamed tributary south of the WWTP, seeps, and sheet flow from storm water runoff along the banks of Lake DePue, and Lake DePue. Surface water in the Village generally flows to Lake DePue.

Within OU4, the nearest perennial stream is Negro Creek, which forms the eastern boundary of OU4. Small, likely intermittent, tributaries to Negro Creek are located in the Northeast and East subareas. In addition, a small intermittent stream is present along the western side of East Street, in the West and Northwest subareas. This intermittent stream enters a culvert near the intersection of East Street and Princeton Street, and exits from a culvert west of High Street and north of Railroad Street where it joins the unnamed tributary south of the WWTP. Several small ponds and one large pond located southwest of the Village are also present within OU4.

2.5.2 Hydrogeology

The regional hydrogeologic system consists of recharge in the higher elevation plains areas north of OU4, with discharge to the Illinois River and its tributaries. On a more local scale, particularly in the unconsolidated deposits, flow is controlled by varying stratigraphy and lithology, and the presence of deep, incised valleys cut by tributaries to the Illinois River (e.g., Negro Creek). There are two notable hydrostratigraphic units monitored in OU3: the upper water bearing zone (UWBZ) and the Lower Aquifer. Both units are described in detail in the OU3 RI report (ENVIRON, 2014).

The UWBZ is a saturated zone within surficial alluvial soils and fill material that occurs above a peat layer and lower permeability silt and clay soils of the recent alluvium throughout the eastern portion of OU3. The UWBZ may extend south of the fence line along Marquette Street, but has not been identified in monitoring wells installed beyond the limits of the FPSA and upland portion of the southeast area, and is not considered to be present within the boundaries of OU4.

The Lower Aquifer corresponds to the outwash deposits of the Henry Formation beneath the recent deposits and above the bedrock, and includes the contiguous outwash deposits of the Sankoty Sand Member beneath the Bluff Area, that may extend southward into OU3. The upper portion of this aquifer is sandy gravel or gravelly sand, while the lower portion is sand with little fine material or gravel. Clay is nearly absent from the unit. This relatively permeable unit, is approximately 60 feet thick near the base of the Bluff, and thins to a thickness of approximately 10 to 30 feet in the southeast area. The entire thickness of the Lower Aquifer is saturated. The Lower Aquifer occurs in OU4 at least as far as Lake DePue and thins or is absent beneath Lake DePue. An upward vertical gradient is present beyond the boundary of OU3 and in the southern part of the Village such that groundwater from the Lower Aquifer surfaces through seeps and springs associated with the wetlands just north of Lake DePue and along the north shore of Lake DePue.

Other groundwater zones include thin, perched, saturated layers within the soils beneath the White City Area of OU4 and the Wedron Group tills in the Bluff Area. These saturated zones occur in permeable layers at elevations higher than the FPSA land surface and are truncated along the face of the Bluff Area and the western face of the unconsolidated deposits beneath White City.

The potential for groundwater contamination beneath OU4 has been investigated through a monitoring well network installed to support the investigations of OU2 and OU3. In general, monitoring wells installed in the Lower Aquifer within the East Subarea of the village and south of the Slag Pile along the edges of the UWBZ show contamination with ammonia, sulfate, and occasionally arsenic. Based on previous remedial investigations, these plumes are associated with the Phosphogypsum Stack in OU2 and the Lithopone Ridge Area and Slag Pile area on OU3 (ENVIRON, 2014). Although manganese is elevated in all monitoring wells, other wells located in the South Subarea downgradient of OU3 show no contamination. Based on the Pilot Study data, most OU4 contamination occurs within the upper 18 inches of soil. Therefore the contaminated soils throughout OU4 are not considered a source to groundwater contamination within the Village. There may be isolated properties, particularly in the southern part of the Village near the lakeshore, where SRM, if present in significant volumes as fill material, could be contributing to groundwater contamination, but this is unlikely to occur on properties throughout the Village. Regardless, any future groundwater remedial action that may be necessary will be addressed as appropriate as part of actions taken for other OUs, not as part of OU4.

2.5.3 Soils

Based on the Bureau County Soil Survey (SCS, 1992), soils within the residential and public areas of OU4 are classified mainly as silty loam to clay loam. Most of the area south and west of

the FPSA is classified as Jasper silt loam (440A). Additional soil types within OU4 east of the FPSA are primarily Camden silt loam (134A), Warsaw silt loam (290C2), Waukegan silt loam (564A), and Catlin silt loam (171C2).

2.5.4 Drinking Water Sources

The Village of DePue obtains its drinking water from a deep groundwater aquifer consisting of sandstone and limestone bedrock. The water is pumped from the aquifer by two wells. These wells are regulated as community water supply wells for the Village of DePue, and are designated Well #2 (also known as Village No. 4) and Well #3 (also known as Village No. 3). These two wells have depths of about 1,487 and 1,490 feet below ground surface (bgs), respectively. The wells are located behind the Village Hall and old Public Works building. Water is pumped from the wells, monitored and treated by the Village as needed in a filter and ion exchange plant (e.g., chlorine is added as a disinfectant), pressurized, and distributed throughout the Village.

The aquifer utilized by the DePue community wells is overlain by more than 900 feet of bedrock of which over 300 feet is low permeability shale bedrock. The top of the bedrock surface is overlain by permeable sand and gravel river deposits. Illinois EPA considers the aquifer utilized by the Village of DePue as "confined." Due to its natural qualities (i.e., its depth and the geologic materials above it), the aquifer is isolated from contaminant sources and Illinois EPA does not consider the aquifer to be susceptible to contamination from the Site or from OU4 (Illinois EPA, 2014).

2.5.5 Investigation Findings

Several previous investigations have been conducted by the DePue Group, Illinois EPA and the Illinois Department of Public Health (IDPH) focused on the residential areas of OU4. These investigations include the following:

1992 Illinois EPA CERCLA Site Inspection
In 1992, the Illinois EPA conducted an ESI at the Site and surrounding areas. Surface water, soil, sediment, and waste material samples were collected from various areas associated with the Site, and 20 soil samples were collected from residential yards and public areas in the Village. Soil samples from the residential properties were collected from 1-2 inches deep and were analyzed for target analyte list (TAL) inorganics. The results of the Illinois EPA CERCLA site inspection were reported in the ESI Report (undated). The ESI categorized barium, cadmium, calcium, lead, magnesium, manganese, selenium, and zinc as significantly elevated compared to the background soil samples, and arsenic, copper, and silver results were qualified as estimates. Key findings from samples taken from residential properties were presented in the ESI and were based on HRS guidance in place at the time regarding "significant concentrations." Results considered "significant" from the residential sampling included detections of several metals, including barium, cadmium, lead, manganese, selenium, and zinc. The range of significant concentrations is provided in the following table:

	Range of Significant Concentrations from 1992 ESI **(mg/kg)**
Barium	736 -- 8,710
Cadmium	13.2 -- 98.1
Lead	371 – 729
Manganese	1,180
Selenium	1.2 -- 1.3
Zinc	1,210 -- 6,580

1992–1994 IDPH Toxicology Investigation
IDPH collected soil, dust, and paint samples in December 1992, October 1993, and October 1994 to evaluate potential health impacts associated with these media. A total of 65 randomly selected and biased soil samples (approximately one inch bgs) were collected from several residential and non-residential areas. Residential dust, paint, and garden soil samples were also collected. Samples were analyzed for cadmium, lead, and zinc. The results showed that these metals were sometimes present above comparison values used for children, adults, and children who exhibit pica behavior (the propensity to mouth or ingest non-food items, IDPH/Agency for Toxic Substances and Disease Registry (ATSDR, 1999).

1993 IDPH Community-Wide Blood and Urine Testing Program
IDPH conducted a community-wide blood and urine testing program in the Village in September 1993 to assess whether residents had been exposed to cadmium and/or lead. IDPH collected samples from volunteers. A total of 109 blood samples were analyzed for lead, and 106 blood samples and 33 urine samples were analyzed for cadmium. The results of the 1993 IDPH Community-Wide Blood and Urine Testing Program indicated one child had an elevated BLL (i.e., above the level of concern of 10 µg/dL), one adult had a slightly elevated blood level for cadmium (5.1 µg/L compared to the comparison standard of 5.0 µg/L), and one adult had an elevated urine level for cadmium above the national worker standard in place at the time of 3.0 µg cadmium per gram of creatinine. Further investigation identified workplace and residential metal sources for these three individuals (ATSDR, 1999). IDPH concluded that the biological testing did not show an immediate public health hazard.

1999 IDPH/ATSDR Public Health Assessment
In cooperation with the ATSDR, the IDPH evaluated the public health significance of the DePue Site based on available data from investigations completed prior to 1999. The purpose of the Public Health Assessment was to determine whether adverse health effects were possible and to recommend further actions to reduce or prevent possible health effects. The Public Health Assessment included pathways analyses which identified potentially complete exposure pathways for the DePue Site and off-site areas (i.e., surrounding residential areas). A toxicology evaluation was also conducted by the IDPH using the 1992 Illinois EPA and IDPH soils data to evaluate potential health effects. This evaluation involved comparing chemical concentrations to ATSDR Minimal Risk Levels and/or USEPA Reference Doses. IDPH's overall conclusion was that the site was considered a public health hazard due to contamination in surface soils and sediments. The results of the study were presented in the Public Health Assessment for the

DePue/New Jersey Zinc/Mobil Chemical Corporation, DePue, Bureau County, Illinois (ATSDR, 1999).

2000 Illinois EPA XRF Soil Study

The Illinois EPA collected x-ray fluorescence (XRF) soil screening data on publicly-owned property throughout the Village of DePue in August 2000. Illinois EPA collected a total of 101 soil samples at 52 discrete locations within the Village of DePue. XRF data were collected below sod (approximately 1 inch bgs) at the sample locations, and at 6 to 8 inches bgs at most locations. The XRF soil study screened for select metals, including: antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc. The XRF Soil Screening Study results were compared to remediation objectives from 35 Ill. Adm. Code Part 742, Tiered Approach to Corrective Action Objectives (TACO), that were established at the time. Results indicated that arsenic, barium, cadmium, chromium, and lead concentrations in soils may be greater than screening criteria based on TACO, Tier 1 Residential values at some of the locations. Excluding non-detections, the results indicated the following contaminant ranges:

	Range of Detected Concentrations that Exceed Screening Criteria from 2000 XRF Soil Screening Study (mg/kg)	Screening Criteria (mg/kg)
Arsenic	84.9	11.3
Barium	348 -- 11,897	5,500
Cadmium	109 – 448	78
Chromium	720 – 982	230
Lead	28 -- 1,180	400

RAL Assessment

As outlined in the Revised Removal Action Level (RAL)[2] Assessment Report (ENVIRON, 2011), in 2005, the DePue Group collected surface and subsurface soil samples from 17 off-site properties in the vicinity of the Site in the Village of DePue that were previously sampled by IDPH in 1992.

Samples were collected from front, side, and back yard areas, gardens (if present), and/or drip zones/downspouts. The samples were composite samples, including four depth intervals (i.e. 0-1 inch, 1-6 inches, 6-12 inches, and 12-18 inches bgs). Select composite and discrete soil samples were analyzed by XRF methods and laboratory analytical methods. The composite sample data were evaluated in the field, and based on these results, discrete samples were selected for analysis by XRF and (as applicable) laboratory methods.

Arsenic and lead were the only metals detected in laboratory samples that exceeded their respective RALs. A summary of arsenic and lead laboratory detections above their respective

[2] Removal action levels (RALs) were established by USEPA to assist CERCLA On-Scene Coordinators in decision-making concerning removal actions at Superfund sites. USEPA's Superfund program calculates these values using the latest toxicity values and exposure assumptions. These values continue to be updated and are now known as Removal Management Levels (RMLs).

RALs is provided in the table below. Two RALs for arsenic, one based on cancer risk and one based on non-cancer hazards, were used to evaluate the data. (ENVIRON, 2011).

	Number of Laboratory Samples Analyzed	RAL Screening Value (mg/kg)	Number of Laboratory Samples Exceeding RAL	Range of Concentrations Above the RAL in Laboratory Samples (mg/kg)
Composite Samples				
Arsenic	106	43 (cancer) 230 (non-cancer)	0 0	NA NA
Lead	62	1,200	4	1,350 – 2,420
Discrete Samples				
Arsenic	29	43 (cancer) 230 (non-cancer)	6 0	43.4 – 111 NA
Lead	8	1,200	0	NA

106 composite samples and 29 discrete samples were analyzed for arsenic. 62 composite samples and 8 discrete samples were analyzed for lead. The RALs were exceeded in 4 of the 62 composite samples analyzed for lead and 6 of the 29 discrete samples analyzed for arsenic. No other RALs were exceeded in any other discrete or composite laboratory samples.
The frequency of detections above the RAL did not indicate extensive contamination above RALs. At most, only two samples on a single property exceeded a removal action limit. None of the properties in the Village were recommended for immediate removals based on these sample results. Few exceedances occurred in the surface interval where exposure would be greatest. The only lead exceedances occurred in samples within drip zones, where exposures are extremely limited.

Off-site Soils Study Area Research and Reconnaissance
Research and reconnaissance for areas of potential SRM were conducted in 2005 within the off-site soils study area as part of the PRP's RAL Assessment. The objective of the research was to identify areas of potential SRM within the Village; characterize the type and general extent of the potential SRM; and provide a preliminary evaluation of potential exposure (based on land use, accessibility, cover, etc.). In addition, research was conducted to identify special use areas such as parks, playgrounds, schools, or other equivalent public recreation spaces.

The search for potential SRM included sending out a survey to DePue area residents inquiring about the suspected location of fill material, conducting interviews with past employees and people from the Village of DePue government, and a walking reconnaissance of areas within OU4 for potential SRM. The findings of the research included:

- Residential Survey Forms: Of the 854 survey forms sent out in English and Spanish, 58 forms were returned. Of these, 15 respondents indicated that suspect SRM occurred on their property or elsewhere that they were aware of. Each of these properties were visually evaluated by the PRPs and Illinois EPA (from the street level) to identify the potential for the fill material to be site-related. In almost all instances, visual observation from the street level was inconclusive in the identification of potential fill materials on the properties evaluated.

- Interviews: Several individuals were interviewed in an attempt to determine where fill material may be located within OU4. Locations where the individuals previously encountered fill material (or suspected the presence of fill material) were identified on a map. These areas were also subsequently visited as part of the off-site soils study area reconnaissance.

- Reconnaissance: The off-site soils study area reconnaissance was conducted in 2005 by walking the streets, alleys, and rail corridors within the study area and recording observations of possible SRM. The reconnaissance was conducted by the PRPs with participation from Illinois EPA. Field notes were recorded where isolated pieces of SRM occurred as well as more substantial occurrences.

Background Study
The DePue Group conducted a study of soil background concentrations in 2006. The study included surface and subsurface soil samples (i.e., to 18 inches bgs) collected from 30 locations in six areas throughout Bureau County. The six areas represented land uses and soil types similar to those in DePue. Land uses represented were developed (i.e., residential/commercial/ recreational), forested/woodland, and uncultivated/cultivated fields. Three depth intervals were sampled for developed and forested/woodland areas, and two depth intervals were evaluated for cultivated/uncultivated fields. Samples were analyzed for metals, pesticides, and polynuclear aromatic hydrocarbons. For purposes of the OU4 residential and residential-like properties, the 95 percent upper prediction limit values calculated from developed land samples were used to represent site-specific background concentrations.

Pilot Study
The Pilot Study conducted in November and December 2013 included the collection of over 1,000 composite soil samples and over 200 discrete garden soil samples from 41 properties. Included were three properties in the Northwest Subarea, 12 properties in the West Subarea, 14 in the South Subarea, and 12 in the East Subarea. These OU4 subareas are shown on Figure 3.

Soil samples were collected in accordance with the methodologies outlined in the Pilot Study Sampling Plan (ENVIRON, 2013) and USEPA's Superfund Lead-Contaminated Residential Sites Handbook (USEPA, 2003). Composite soil samples were collected from yard areas at depth intervals of 0 to 1 inch, 1 to 6 inches, 6 to 12 inches, 12 to 18 inches, and 18 to 24 inches bgs from up to four quadrants of a yard (depending on property size). Drip zone, downspout, play area, and bare area (if present) samples were also collected. Discrete soil samples were obtained from garden areas from 0 to 6 inches, 6 to 12 inches, 12 to 18 inches, and 18 to 24 inches bgs. The soil samples were analyzed for the OU4 human health contaminants of potential concern (HCOPCs): antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, thallium, and zinc. The soil samples were analyzed at both a fixed-based laboratory and with a field portable bench-top XRF analyzer. The analytical results obtained using XRF were compared to the results from the fixed-base laboratory to determine the utility of using the XRF during future OU4 investigation and remedial activities.

In addition to the evaluation of soil samples from yard and garden areas, additional work was performed to evaluate the fine fraction of lead in soil, the speciation of total chromium in OU3 soil, and to evaluate the similarity of the 0 to 1 inch and 1 to 6 inch sampling intervals.

2.5.6 Nature and Extent of Contamination

Based on results of the 41 properties included in the Pilot Study, 40 properties exhibited concentrations of metals above screening criteria or exhibited SRM in at least one sample. Arsenic and lead were the only metals that demonstrated area-wide exceedances of screening criteria, with 29 properties exceeding the lead screening level of 400 mg/kg, and 40 properties exceeding the arsenic screening level of 11.6 mg/kg. Elevated levels of lead above 1,200 mg/kg were rare, occurring in only seven samples, with only two of these samples at the surface. Cadmium was detected above screening criteria at 11 properties. Cobalt was detected above screening criteria in only two of the Pilot Study samples on two properties. Iron was detected above its screening criteria in eight samples from two properties. Manganese was detected above its screening criteria in 15 samples from 11 different properties, most of these in the East Subarea. The metals antimony, barium, chromium, copper, mercury, thallium, and zinc were not detected in soil from the Pilot Study properties greater than the OU4 screening criteria at any property.

Soil samples obtained from garden areas exceeded screening criteria for arsenic, cadmium, and lead. Of the 16 properties with gardens, 10 properties had garden soils with detections above screening criteria. Six gardens included samples that exceeded the lead screening level, three gardens included samples that exceeded the arsenic screening level, and eight gardens included samples that exceeded the cadmium screening level.

The potential presence of hexavalent chromium was evaluated through speciation analyses on samples from the former plant area that exhibited high concentrations of total chromium. Hexavalent chromium was detected in two of nine samples; however, neither concentrations of hexavalent chromium nor total chromium exceeded their respective screening levels.

During the 2005 reconnaissance, in much of the south, east, and west areas, exposed potential SRM was limited to occasional pieces within alleys and along roadways (Ramboll Environ, 2015). Exposed potential SRM was noted in the athletic fields and parks, though none was noted on school property. More detailed location descriptions are included in the Scoping Document. During the Pilot Study, potential continuous SRM was noted in 7 of the 41 properties. The SRM was mostly found within the top 18 inches. In one property, fill material was observed up to depths of 72 inches bgs. In general, the greatest amount of potential SRM was noted in the South Subarea close to Lake DePue (ENVIRON, 2015).

To assess the nature and extent of contamination within OU4, the Pilot Study made use of screening criteria for comparison of sample results. The screening criteria are presented in the table below and, with one exception, were selected from three primary sources: Illinois EPA's TACO, USEPA's Regional Screening Levels (RSLs), and USEPA's Soil Screening Levels (SSLs). Arsenic was the lone exception, with its screening criterion based on a site-specific background value of 11.6 mg/kg.

Screening criteria for carcinogens are generally based on a cancer risk of 1 x 10^{-6}. For arsenic, a screening criterion based on background was deemed appropriate in this case because a concentration representing 1 x 10^{-6} cancer risk (i.e., 0.68 mg/kg) is orders of magnitude below naturally-occurring background for Illinois (i.e., 11.3 mg/kg) and site-specific background (i.e., 11.6 mg/kg). The site specific background value of 11.6 mg/kg represents an excess lifetime cancer risk (ELCR) of 4 x 10^{-5}. Illinois EPA would not require remediation below the State or site-specific background value. The purpose of the Pilot Study was to learn more about the vertical and horizontal extent of contaminants and to screen the chemical data to identify a list of HCOPCs for which remediation objectives would be developed.

Screening Criteria Used in Pilot Study

Chemical	CAS #	Residential Screening Level[1,2]	Garden Screening Level[1,2]
Antimony	7440-36-0	31	31
Arsenic	7440-38-2	11.6[e]	11.6[e]
Barium	7440-39-3	15,000	15,000
Cadmium	7440-43-9	70	24[b]
Total Chromium	16065-83-1	120,000[c]/230[d]	120,000[c]/230[d]
Cobalt	7440-48-4	23	23
Copper	7440-50-8	3,100	3,100
Iron	7439-89-6	55,000	55,000
Lead	7439-92-1	400	400
Manganese	7439-96-5	1,800	1,800
Mercury	7487-94-7	23	23
Thallium	7440-28-0	6.3[a]	6.3[a]
Zinc	7440-66-6	23,000	10,000[b]

Notes:
All concentrations in milligrams per kilogram (mg/kg)
1 = Lesser value of Residential and Construction Worker exposure scenarios.
2 = USEPA's Residential Regional Screening Level (November 2013) except where otherwise noted.
a = TACO Criteria
b = Part 5, Appendix G of the Soil Screening Guidance Technical Background Document (USEPA, 1996)
c = Chromium (III) screening levels used for Chromium (total)
d = Chromium (VI) TACO Criteria
e = Site-specific background (Arcadis, 2011)

A summary of the results for those metals that exceeded screening criteria is provided below:

Range of Concentrations for Metals that Exceeded Pilot Study Screening Criteria in Yards and Gardens

	Range of Detected Concentrations that Exceed Screening Criteria (mg/kg)	Screening Criteria (mg/kg)
Arsenic	11.8 -- 87.3	11.6
Cadmium	74.3 -- 113 24.1 -- 62.8	70 24 (gardens)
Cobalt	40.1 – 56.4	23
Iron	64,000 – 198,000	55,000
Lead	403 -- 4,960	400
Manganese	1,810 -- 4,650	1,800

The extent of contamination on non-residential public properties such as the parks, alleys, and school is as yet unknown. Other than visual reconnaissance, no sampling has yet been conducted on these properties.

No hazardous wastes as defined by the Resource Conservation and Recovery Act (RCRA) are anticipated to be present. Contaminated soil generated through excavation activities is considered solid waste pursuant to RCRA and Illinois regulation. As generated solid waste, the soil and SRM will need to be properly characterized in the same manner as all generated wastes.

The total volume of wastes to be excavated is currently unknown, but several assumptions were made for purposes of evaluating remedial options. These assumptions and volume estimates are discussed in detail in Section 2.9.1.

Other findings from the Pilot Study indicated that no statistically significant difference in metal concentrations was present between the 0-1 inch and 1-6 inch bgs depth intervals. Results from sieved samples used to determine whether or not the fine soil fraction was more highly contaminated than the total soil sample were inconclusive. For the forthcoming remedial action, the 0-1 inch and 1-6 inch bgs depth intervals will be combined as a 0-6 inch bgs depth interval and soil samples will not be sieved.

Groundwater was not evaluated during the Pilot Study or any of the other previous efforts that focused on OU4, because exposure to Site contaminants through groundwater is not a complete exposure pathway for residents in OU4. Instead, groundwater contamination within the Village has been evaluated as part of the remedial investigation for OU3. Based on the Pilot Study data, most OU4 contamination occurs within the upper 18 inches of soil. The extent of soil contamination is unlikely to extend to groundwater.

2.6 CURRENT AND POTENTIAL FUTURE LAND USE

The current land uses of OU4 include primarily agricultural, industrial, and residential, with commercial, recreational, open space, and institutional[3] uses also present. The scope of the remedial action described in this ROD addresses the residential and recreational lands as well as select commercial and institutional properties. Lands adjacent to and surrounding the residential and recreational lands include the FPSA and other open space property previously owned by the PRPs which are now of unknown ownership, and extensive agricultural property.

Reasonably anticipated future uses are likely to remain the same as current use. The Village of DePue's Comprehensive Plan (NCICG, 2014) identifies areas directly west of High Street and north of Haines Street as likely areas of future residential use. Both of these areas are designated as vacant parcels in the Scoping Document and will be included in the scope of the effort described in this ROD. A large area north of Della Street and east of White City Park is designated as future institutional use. This area is not currently planned to be addressed in the scope of the effort described in this ROD.

Currently, groundwater that is affected by the Site (i.e., OUs 2 and 3) and that occurs within OU4 is not used by the Village as a drinking water source, (see Sections 2.5.2 and 2.5.4.) but flows toward Lake DePue where it discharges through seeps and springs associated with the wetlands just north of Lake DePue and along the north shore of Lake DePue.

2.7 SUMMARY OF SITE RISKS

2.7.1 Human Health Risks

Conceptual Site Model

The human health Conceptual Site Model is presented in Figure 4. The portions of OU4 subject to this ROD are assumed to be residential in the future, or are currently properties where children congregate and may be exposed, such as parks, alleys, the school, and select commercial properties. Therefore, the exposed populations are children and adults who live within OU4 and construction workers.

The principal sources of contamination within the residential area are from direct placement of fill material and emissions and particulates from historical Site operations where air flow patterns may have resulted in deposition within yards. Such sources have contaminated the surface and shallow subsurface soils. In some cases, deeper soils may be affected by placement of fill material (Ramboll Environ, 2015). From these sources, people can be exposed through ingestion and skin contact with surface and subsurface soils, from inhalation of particles suspended in air, and from ingestion of produce grown in contaminated soils.

As indicated previously, groundwater monitoring wells installed within the Village as part of the OU3 investigation do not indicate contamination of shallow groundwater, and Site contamination

[3] "Institutional" properties include those public properties such as the school, public works, library, as identified in the Village of DePue Comprehensive Plan 2014.

has not affected the Village's potable water supply. Exposure to Site contaminants through groundwater is not a complete exposure pathway for OU4.

Exposure to contaminated sediments and surface water from Lake DePue may occur, and the same people who live within OU4 may be exposed to additional sources of contamination within Lake DePue. These exposures, while not captured in the Conceptual Site Model for OU4, are included in the human health Conceptual Site Model for OU5 and were taken into consideration in developing the RGs for OU4 presented later in this ROD.

Evaluation of Site Risks

Human health risks were evaluated by comparing results from the Pilot Study to conservative human health screening criteria. The comparison of OU4 sampling results to human health screening criteria serves as a human health baseline risk assessment and provided an indication of current and potential future risks to adults, children, and construction workers potentially exposed to soils in OU4.

Screening criteria were based on the most sensitive endpoint for that metal. All metals were evaluated for appropriate screening criteria as non-carcinogens. Arsenic and cadmium were also evaluated as carcinogens, and lead was evaluated through the Integrated Exposure Uptake Biokinetic (IEUBK) model (USEPA, 2010) and Adult Lead Model (USEPA, 2009).

For non-carcinogens, the screening criteria (with the exception of lead) represented a non-cancer HI of 1.0. The screening criteria generally were based on USEPA's RSLs, with the exception of chromium and thallium. For chromium, the screening criterion was based upon the non-cancer endpoint. USEPA is currently evaluating the toxicity information for hexavalent chromium in order to determine whether it should be considered a carcinogen by the oral route of exposure. Until USEPA releases their evaluation, Illinois EPA uses the lowest remediation objective from 35 Ill. Adm. Code Part 742 for the residential receptor (i.e., 230 mg/kg based upon non-cancer hazard) as an appropriate screening criterion. Based on the high degree of uncertainty associated with USEPA's thallium RSL, Illinois EPA selected the screening value from 35 Ill. Adm. Code Part 742.

For the list of preliminary chemicals of potential concern for OU4, the only non-carcinogens that impact the same target organ are cadmium and barium. Both of these non-carcinogenic metals may have deleterious effects on the kidneys. The screening criteria for barium and cadmium were not adjusted to account for potential additive effects to kidneys. During the risk assessment screening process (and when contaminants of concern are determined), Illinois EPA does not require responsible parties to apportion hazards. Screening of contaminants is conducted against conservative criteria developed through the use of default conservative exposure inputs. The screening criteria used for the OU4 Pilot Study are the lowest value from Illinois EPA's Tier 1 corrective action objectives (35 Ill. Adm. Code Part 742) and USEPA's RSLs. Illinois EPA deems these values conservative enough that apportionment or accounting for mixtures does not need to occur (Illinois Pollution Control Board (IPCB), 1997). Any exceedance of the screening criteria for non-carcinogens in the Pilot Study data indicated a potential hazard above the chronic HI of 1.

For lead, a screening criterion of 400 mg/kg was used, as provided in Illinois regulation and as determined by the IEUBK model, using default inputs. Any exceedance of this value in the Pilot Study data represented a greater than 5 percent probability of exceeding a BLL of 10 µg/dL.

For the list of preliminary chemicals of potential concern for OU4, only arsenic and cadmium are considered carcinogens. Cadmium is considered to be carcinogenic by the inhalation route of exposure only. A screening criterion based on a 1×10^{-6} cancer risk level for cadmium is 2,100 mg/kg (USEPA, 2016). The noncancer endpoint of kidney toxicity is the more sensitive endpoint for cadmium, with a lower criterion of 70 mg/kg in residential yards and 24 mg/kg for gardens. Because the cadmium non-carcinogen-based criterion is lower, it is more protective, and would also be protective of any potential carcinogenic risk. Therefore, the more conservative non-cancer screening criteria were used to evaluate cadmium data. Any exceedance of the cadmium non-cancer screening criteria indicated that an unacceptable human health hazard may be present.

For arsenic, carcinogen-based screening criteria representing 1×10^{-6} ELCR, are below background. Therefore, the screening criterion selected for arsenic was the site-specific background concentration of 11.6 mg/kg. The site-specific background concentration equates to a cancer risk of 4×10^{-5}, near the mid-point of the CERCLA acceptable cancer risk range of 1×10^{-4} to 1×10^{-6}. For comparison, Illinois' state-wide background value for arsenic is 11.3 mg/kg and represents the same level of cancer risk. In contrast to the other metals, an exceedance of the arsenic screening criteria did not necessarily indicate unacceptable cancer risk. But, based on the maximum concentrations detected at certain OU4 properties, (i.e., concentrations above 67 mg/kg), cancer risks above 1×10^{-4} were possible indicating the potential for unacceptable cancer risks.

<u>Contaminants of Concern</u>

During the Pilot Study, soil samples were analyzed for antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, thallium, and zinc[4]. Based on the approximately 1,300 samples analyzed during the Pilot Study, the only metals that exceeded screening criteria were arsenic, cadmium, cobalt, iron, lead, and manganese. Of these six metals, arsenic or lead was detected above screening criteria at most properties. Cadmium was detected above its screening criteria in 9 yard samples from two properties, and above its garden screening criterion in 37 garden samples from 14 properties. Cobalt was detected above screening criteria in only two of the Pilot Study samples from two different properties. Manganese was detected above its screening criteria in 15 samples from 11 different properties.

Due to their overall prevalence and frequent occurrence above screening criteria in the Pilot Study results, and their strong association with zinc smelters and other DePue plant operations, arsenic, cadmium, lead, and manganese are designated COCs. Iron has been eliminated from further consideration in OU4 sampling and remediation because it is not a CERCLA hazardous substance.

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[4] Antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, thallium, and zinc were detected in shallow soil in OU3 at concentrations greater than the conservative human-health based screening values. As such, these constituents were identified as preliminary HCOPCs for off-site soils and soil samples were analyzed for these metals during the Pilot Study.

Cobalt was detected above its PRG in only two of the more than 1300 samples taken during the Pilot Study and was not detected above the PRG in the 68 laboratory samples taken during the RAL assessment. Based on the Pilot Study data, cobalt occurred above its PRG at a frequency of about 0.1%. In the two cases cobalt was detected above its PRG, it was co-located with other contaminants above their PRGs (i.e., arsenic and lead). Based on an extremely low occurrence rate, and its general co-location with other metals that will require excavation, cobalt will not be carried forward as a final COC.

In summary, based on the Pilot Study data, Illinois EPA has determined that the appropriate final COCs for the OU4 Village soils remediation are arsenic, cadmium, lead, and manganese based on their occurrence above conservative health-based criteria. No sampling of an additional 20 properties as was described in the Proposed Plan is necessary to determine the final COC list. The RGs for the COCs are presented in Section 2.8.1 of this ROD.

2.7.2 Ecological Risks

Ecological risks were not evaluated for the residential area. Individual residences are maintained primarily for non-ecological habitat. The other residential-like properties that are the focus of this ROD (i.e., parks, alleys, and the school) are maintained in such a way as to discourage wildlife. The parks are recreational-oriented parks, with playground equipment and ball fields and without restored natural areas or areas set aside for nature. A screening level ecological risk assessment (SLERA) is planned for other ecological areas and open spaces of OU4, and a baseline ecological risk assessment (BERA) will be performed for those areas, as warranted, based on the results of the SLERA. For purposes of the SLERA, risks to soil invertebrates, plants, and terrestrial wildlife, including birds, mammals, reptiles, and amphibians, will be assessed. Relevant receptors and contaminants of concern will be further refined during the SLERA and BERA process consistent with USEPA ecological risk assessment guidance (Ramboll Environ, 2015).

Basis for Action

Based on the presence of contaminant concentrations within Village soils above concentrations that represent potential unacceptable risks and hazards, the response action selected in the ROD is necessary to protect the public health or welfare from actual or threatened releases of hazardous substances into the environment.

2.8 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are chemical-specific, medium-specific, or site-specific goals for protecting human health and the environment. RAOs are developed to address the contaminant levels and exposure pathways that present unacceptable current or potential future risk to human health and the environment. The RAOs specify the exposure routes, receptors, and acceptable risk concentrations for the COCs.

One RAO was developed for OU4, based on the contaminant levels determined during the RAL effort and Pilot Study and to address the estimation of unacceptable risk to resident children, adults, and construction workers. The RAO was developed based on the current and reasonably anticipated future land use, relevant site-specific exposure pathways, including ingestion of produce grown in contaminated soil that could result in unacceptable risk to human health.

The following RAO has been identified for OU4 residential soils:

- Prevent ingestion, inhalation, and dermal contact of OU4 soils contaminated with COC concentrations above the designated remediation goals (RGs) for the resident child, resident adult, and construction worker.

2.8.1 Remediation Goals

RGs are risk-based or based on chemical-specific applicable or relevant and appropriate requirements (ARAR) that help further define the RAOs. PRGs were presented in the Proposed Plan. The ROD establishes the final RGs and/or cleanup levels. RGs are used to define the extent of contaminated media requiring remedial action.

The COCs for OU4 soils are arsenic, cadmium, lead, and manganese. The RGs were developed for all potential OU4 receptors, and are listed in the table below:

Remedial Goals for OU4 Soils

COC	CAS Number	Remedial Goal Residential[a]	Remedial Goal Gardens	Remedial Goal Construction Worker
Arsenic	7440-38-2	21 mg/kg[b]	21 mg/kg[b]	140 mg/kg
Cadmium	7440-43-9	70 mg/kg	24 mg/kg[c]	280 mg/kg
Lead	7439-92-1	400 mg/kg[d]	400 mg/kg[d]	940 mg/kg [e]
Manganese[f]	7439-96-5	1,800 mg/kg	1,800 mg/kg	6,200 mg/kg

a) Residential RSLs (June 2015) used except where noted.
b) Residential PRG for arsenic was agreed upon by Illinois EPA and the DePue Group.
c) Part 5, Appendix G of the Soil Screening Guidance Technical Background Document (USEPA, 1996)
d) Tiered Approach to Corrective Action Objectives (Title 35 of the Illinois Administrative Code, Part 742) criteria and current RSL. This is an interim RG until OLEM Directive 9200.2-167 is considered in the remedial design phase.
e) Based upon Adult Lead Model and a blood lead benchmark of 10 µg/dL.
f) Supplemental sampling may occur in support of Remedial Design to more fully determine the background level of manganese. If this sampling is not completed or, if completed and background levels are shown to be consistent with the current site-specific background values that are lower than the health-based RG, the RG will be as indicated above. If this additional background sampling does occur and background levels are shown to be greater than the health-based RG, consistent with USEPA guidance, the new manganese background level will be established as the RG.

The RGs for the combination adult/child receptor for carcinogenic chemicals and the RGs for the child receptors for non-carcinogenic chemicals will be applicable to all areas addressed by this action. The RGs for cadmium and manganese are based on the USEPA Regional Screening Levels (RSLs, USEPA, 2015) and the cadmium garden RG is based on USEPA's Soil Screening Guidance (USEPA, 1996). The interim lead RG is based on the RSL and 35 Ill. Adm. Code Part 742. The arsenic RG is based on a site-specific derivation.

Since the RGs for the residential child and the residential child/adult combination are more stringent than the construction worker RGs, the RGs controlling the need for excavation will be based on the residential receptors for yards, parks, alleys, the school, and miscellaneous properties. The garden RGs will control the need for and extent of remedial actions in gardens. The construction worker RGs will be used in determining the acceptable management of excavated soil.

Based on the results of the Pilot Study, 36 of the 41 properties tested during the Pilot Study (or roughly 88%) may require some degree of remediation. Assuming the Pilot Study properties accurately represent other properties within the Village of DePue, approximately 716 residential properties could require remediation[5], in addition to alleys, parks, the school, and miscellaneous properties which have not yet been sampled.

Arsenic RG: Arsenic is the only carcinogenic chemical identified through the direct soil contact pathway. For residential exposure, a RG of 21 mg/kg for arsenic has been established for both residential soil and garden soil. The RG for arsenic is based on both protection of noncancer endpoints of toxicity (i.e. HI < 1.0) and cancer endpoints of toxicity (i.e., within the USEPA acceptable risk range of $l \times 10^{-4}$ to $l \times 10^{-6}$). The derivation of this RG included exposure through direct contact with soil via incidental ingestion, dermal contact, and inhalation of particulates, as well as through the consumption of vegetables and fruits grown in potentially-impacted soil. The derivation of the arsenic RG also took into consideration exposure of a young child to sediment and surface water in Lake DePue using a lake-wide swimming scenario. The arsenic RG of 21 mg/kg represents an ELCR of 6×10^{-5} and a HI of <1.0. This RG is also protective of a child or adult resident in DePue that would not be exposed to Lake DePue. The calculation of the RG for arsenic was conducted using input factors listed in USEPA's Exposure Factors Handbook (EFH, USEPA, 2011). All inputs used to derive the arsenic RG can be found in the Scoping Document, Appendix G.

Illinois EPA prefers that a background-based RG is used for site cleanups since a background-based cleanup goal is the most protective RG that can be achieved for any given cleanup. While many cleanups for arsenic in Illinois have been conducted using a site-specific or state-wide background value as the RG, many have not, for different reasons. Illinois EPA attempted to gain agreement from the DePue Group on use of the site-specific background value of 11.6 mg/kg arsenic as the appropriate cleanup value for OU4.

Because the DePue Group and Illinois EPA failed to reach agreement, Illinois EPA developed a risk-based value of 18.8 mg/kg, calculated with appropriate exposure inputs. This value was driven by the non-cancer HI of 1.0. Because the home grown produce pathway proved to be a sensitive pathway, inclusion of this pathway caused the non-cancer endpoint to be the more sensitive endpoint. The corresponding cancer risk, 6×10^{-5}, was only slightly higher than the cancer risk represented by a background value (Illinois EPA, 2015)[6].

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[5] For planning purposes, a 90 percent return rate on access agreements is assumed. Based on this rate of return, approximately 640 residential properties could require remediation.

[6] The cancer risk associated with the background value of 11.6 mg/kg, 4×10^{-5}, based on a calculation including a 95th percentile produce consumption rate (USEPA, 2011). To determine the appropriate arsenic RG, Illinois EPA

However, after Illinois EPA proposed this risk-based compromise, the DePue Group invoked the formal dispute resolution provision as allowed in the 1995 ICO regarding the arsenic RG, and specifically regarding Illinois EPA's use of the 95th percentile value to represent a reasonable maximum exposure (RME, Illinois EPA, 2015a). The DePue Group supported the use of an average value (i.e., a "central tendency" value) to represent this input (Bryan Cave, 2015).

The dispute was resolved during a meeting between the Illinois EPA and the DePue Group on May 28, 2015. During this dispute negotiation meeting, Illinois EPA proposed using the 90th percentile to represent the RME for the produce ingestion rate. Although using the 90th percentile for the homegrown produce ingestion rate is not as conservative as using the 95th percentile, it is significantly more conservative than the average value proposed by the DePue Group, and is still considered by USEPA to be representative of a RME (USEPA, 1989).

The agreement was finalized in a Memorandum of Agreement to resolve the dispute (IAGO, 2015). The final calculation – based on default exposure factors in the 2011 EFH and the 90th percentile for produce ingestion – resulted in a calculation of 21.4 mg/kg, which Illinois EPA and the DePue Group rounded down to 21 mg/kg. This value equates to a non-cancer HI of 1.0 and a carcinogenic risk of 6×10^{-5}, as explained in the Scoping Document.

<u>Lead RG:</u> An interim RG of 400 mg/kg has been established. The RG of 400 mg/kg is provided in Illinois' TACO regulations and is based on the resulting soil concentration using default inputs for the IEUBK model to achieve a threshold of no more than a 5 percent chance of a child's BLL exceeding 10 µg/dL. It is also the RSL default value. During remedial design, Illinois EPA will review the lead RG based on the considerations presented in Office of Land and Emergency Management (OLEM) Directive 9200.2-167.

Any changes to the lead cleanup level will be addressed in an appropriate future decision document. Investigatory and confirmatory results for properties already investigated or cleaned up would need to be reevaluated. If results from those properties exceeded the new value, additional evaluation could occur, including formal risk assessment for those properties or additional cleanup, if warranted.

Should USEPA issue new guidance or a directive after remedial action has been completed, the protectiveness of the remedy and the RGs will be evaluated through the CERCLA Five Year Review process. The Superfund Lead Contaminated Residential Sites Handbook (USEPA, 2003) suggests that Five Year Reviews can include exposure studies of residents, resampling of properties, and evaluation of the effectiveness of institutional controls.

It is important to note that current data from the IDPH suggests that elevated BLLs are generally not observed in children in the DePue zip code. Of the 31 children who had BLLs analyzed in 2015, none of those children exhibited BLLs greater than 10 µg/dL and one child exhibited a BLL between 5 and 9 µg/dL. The results from 2014 and 2013 indicated no children (of 31 evaluated each year) with BLLs above 5 µg/dL.

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has accepted a 90th percentile consumption rate, but has not re-calculated the risk represented by 11.6 mg/kg based on this rate. It is assumed to be within the same risk level of 4×10^{-5} to 5×10^{-5}.

Cadmium RG: The cadmium RG of 70 mg/kg is based on the RSL for noncancer effects at a HI of 1.0 for a residential exposure. The RG of 24 mg/kg for gardens is selected from USEPA's Soil Screening Guidance (USEPA 1996). Cadmium is considered to be carcinogenic by the inhalation route of exposure only. A PRG based on a 1×10^{-6} cancer risk level for cadmium is 2,100 mg/kg (USEPA 2016). The noncancer endpoint of kidney toxicity is the more sensitive endpoint for cadmium, with a lower PRG of 70 mg/kg and 24 mg/kg for gardens. Because the non-carcinogen-based PRGs are lower, they are more protective, and would also be protective of any potential carcinogenic risk. The residential RG of 70 mg/kg and the garden RG of 24 mg/kg are considered the most health-protective for cadmium.

Manganese RG: The manganese RG is 1,800 mg/kg, based on the RSL for noncancer effects at a HI of 1.0 for a residential exposure. It is possible that naturally-occurring concentrations of manganese may be present in area soils at approximately the same level as the RG. Not all soil types present in the East Subarea of the Village were represented in the site-specific background study. Therefore, additional sampling may be conducted to determine if elevated manganese levels are indicative of background levels in certain soil types. If this sampling is not completed or, if completed and background levels are shown to be consistent with the current site-specific background values that are lower than the health-based RG, the manganese RG will be 1,800 mg/kg. If this additional background sampling does occur and background levels are shown to be greater than the health-based RG, consistent with USEPA guidance, the new manganese background level will be established as the RG.

Construction Worker RGs: The RGs for the Construction Worker (adult) will be applicable to all areas addressed by this action. RGs were calculated for the construction worker using standard USEPA and TACO inputs and the typical equations for the defined exposure pathways (i.e., ingestion, dermal contact, and inhalation), the exposure parameter values specific to the construction worker receptor (i.e., particulate emission factor, body weight, soil ingestion rate, exposed surface area, adherence factors, exposure frequency, exposure duration, averaging time), and the toxicity and chemical parameters specific to each COC. The carcinogenic RG (arsenic) was based on the same cancer risk level for residential receptors. The non-cancer RGs were based on a HI of 1.

The lead RG for the Construction Worker was developed using the Adult Lead Model (ALM, USEPA, 2009). The only modifications made to the model defaults were the soil ingestion rates and exposure frequencies that are specific to the potential off-site receptors.

2.9 DESCRIPTION OF ALTERNATIVES

SUMMARY OF REMEDIAL ALTERNATIVES

Since Superfund's inception in 1980, USEPA remedial and removal programs have found that certain categories of sites have similar characteristics, such as the types of contaminants present, sources of contamination, or types of disposal practices. Based on the information acquired from

evaluating and cleaning up these sites, the Superfund program has developed presumptive remedies to accelerate cleanups at certain categories of sites with common characteristics. Presumptive remedies are preferred technologies or response actions for sites with similar characteristics. The selection of presumptive remedies is based on patterns of historical remedy selection practices, USEPA scientific and engineering evaluation of performance data on remedy implementation, and USEPA policies. Use of presumptive remedies streamlines the remedy selection process by narrowing the universe of alternatives considered in the Feasibility Study.

The presumptive remedies considered for OU4 are included in the USEPA Presumptive Remedy for Metals-in-Soil Sites directive (OSWER Directive 9355.0-72FS, 1999) and are consistent with the intention of the ICO. Consistent with this guidance and the Superfund Lead-Contaminated Residential Sites Handbook (USEPA, 2003), the presumptive remedy options considered are containment of soils on the Site and containment of soils in an off-site disposal facility.

The Scoping Document, which is the basis of the Proposed Plan and this ROD, is the functional equivalent of the Feasibility Study and meets the ICO's requirement as an element of the Design Study for a Presumptive Remedy. The Scoping Document includes a detailed analysis of alternatives, a comparison of each alternative against the NCP's nine criteria for evaluation of remedial alternatives (see Section 2.10), a relative comparison of the alternatives to each other as required by the NCP, and also includes elements of remedial design.

Remedial alternatives for OU4 are discussed below. The alternatives are numbered to correspond with the numbers in the Scoping Document, and are further explained in that document. Three remedial alternatives (one of which has two scenarios) have been evaluated, and include:

Alternative 1: No Action

Alternative 2: Excavation and Management of Soils on the Former Plant Site Area

Alternative 3A: Excavation and Off-Site Disposal (as non-hazardous waste)

Alternative 3B: Excavation and Off-Site Disposal (as hazardous waste)

Illinois EPA selects Alternative 2 as the remedy for OU4.

2.9.1 Assumptions used in Developing the Remedial Alternatives

Several assumptions were made to estimate soil volume, SRM volume, time required to conduct investigation and remediation activities, and associated costs. The Pilot Study provided the source of information for most estimates.

Laboratory soil sample data obtained during the Pilot Study were compared to PRGs. A conservative estimate of the soil volume potentially requiring removal for the Pilot Study properties was calculated by identifying areas at each of the properties where soil testing indicated the presence of one or more HCOPCs at concentrations greater than PRGs and/or the

presence of a continuous layer of SRM, and a maximum depth of remediation of 18 inches bgs.

There are approximately 814 residential properties within the Village, including vacant properties. For the purposes of volume estimates, it is assumed that access will be granted to 90 percent of the properties. Based on visual observations, it is also assumed that approximately 50 percent of each property is covered by a residence, garage, sidewalk, driveway, or other barriers to soil exposure. Based on these assumptions, a total of 27,000 cubic yards of soil and SRM is estimated to require removal from residential yard areas within OU4. The average remedial volume per property is estimated to be approximately 33 cubic yards[7].

In addition to the residential properties, there are approximately 22 acres of public parks and 16 acres of alleys within OU4. Since no analytical data has been obtained from these areas, the volume of soil to be removed from these areas was estimated by dividing the total acreage of parks and alleys into quarter-acre sections. Each quarter-acre section was considered similar to a residential yard area, and the average excavation volume determined per property was applied to these areas. Based on these assumptions, approximately 28,000 cubic yards of soil and SRM from the public park and alley areas are estimated to require remediation.

Other assumptions used to determine waste volumes, costs, and schedule include:

- Based on estimated maximum removal depths, an estimated 55,000 cubic yards of soil will be removed from residential properties and special use areas.
    - Of these 55,000 cubic yards, 39,000 cubic yards may exceed residential RGs, but will be below construction worker RGs and without SRM;
    - Of these 55,000 cubic yards, 16,000 cubic yards may exceed construction worker RGs or include SRM;

- Excavation and restoration activities at the residential properties will be completed within two days per property;

- Investigative samples prior to excavation work will determine the extent of needed remediation. The need for the collection of additional confirmation samples may rarely occur. However, for cost estimating purposes, it is assumed that collection of confirmation samples will be required at 10% of the excavated properties to supplement the existing data; and

- The excavation and restoration activities to be performed on the residential properties, parks, and alleys addressed by this ROD will be accomplished in approximately 2.5 years.

[7] The average of 33 cubic yards per property was arrived at through a Monte Carlo simulation (Ramboll Environ 2015).

2.9.2 Common Elements

Components that are common to all the alternatives except the "no-action" alternative are presented here as a group in order to limit redundancy in the subsequent discussion of the individual alternatives. These common components are:

A. Access agreements with current property owners will be obtained to allow for sampling and cleanup work. Separate access will be sought for investigation and for cleanup;

B. Soil sampling will be conducted in general accordance with the Superfund Lead-Contaminated Residential Sites Handbook.
   a. It is anticipated that composite samples will be collected in six-inch increments as follows:
      i. For residential yards, samples will be collected at depths of 0-6 inches, 6-12 inches, 12-18 inches, and 18-24 inches bgs, though the 18-24 inch sample may not be analyzed, depending on the results of the 12-18 inch sample; and,
      ii. For parks and alleys, samples will be collected at depths of 0-6 inches, 6-12 inches, and 12-18 inches, though the 12-18 inch sample may not be analyzed, depending on the results of the 6-12 inch sample;
   b. For gardens, discrete samples will be collected and analyzed in six-inch increments to 24 inches;

   If the described sampling cannot be completed for any individual property, changes to the sampling plan can be accommodated on a case-by-case basis.

C. Where necessary, contaminated soils and SRM will be removed by excavation[8]. Excavation will generally occur to a maximum removal depth of 18 inches bgs for residential properties, 24 inches bgs for gardens, and 12 inches bgs for parks and alleys. Deeper excavation may occur on a case-by-case basis, for instance if deeper excavation is determined to be more cost effective than installing a marker barrier and implementing institutional controls as described below;

D. Residential properties and parks will be restored using soil from an off-site source, and vegetated with grass seed or sod where excavation occurs (as determined on a case-by-case basis). A landscape contractor will maintain the yards until vegetation is established up to a maximum of one year. Landscaping removed or destroyed as part of the cleanup activities will be replaced with comparable landscaping, if requested by the owner. Backfill soils will be evaluated prior to implementation of the remedial action to

[8] Consistent with OLEM Directive 9200.2-167, Illinois EPA will attempt to work with other agencies to address other sources of lead that may be present. As described in the Scoping Document, if lead is detected above its RG on a property solely within the drip zone and with the exclusion of any other COCs above their RGs on that property, then the house will be evaluated for the presence of exterior lead-based paint. Contamination due to the presence of lead-based paint will not be addressed by the activities in this OU, unless incidental to the remediation of other COCs and/or other locations within a yard.

verify the off-site backfill meets residential RGs for the COCs and TACO Tier 1 soil remediation objectives for non-COC chemicals;

E. Alleys will be restored to their original condition using gravel or other suitable aggregate;

F. Institutional controls (ICs) and/or a visual marker barrier may be required at some properties. If soil with COC concentrations greater than RGs or if potential continuous SRM are left in place below the applicable maximum excavation depth, a permanent, permeable marker barrier will be installed to visually mark the maximum depth of the excavation and distinguish the deeper impacted soil from the clean backfill soil above. The ICs will provide notification to the property owner that soil with concentrations greater than RGs is present at depth. If the marker barrier is encountered during future excavation work at a property, assistance will be provided to facilitate proper handling of the soil removed from below the marker barrier and subsequent placement into a repository to be constructed in OU3 as part of a Construction Support Program. The same ICs and Construction Support Program proposed for private properties would be used on public properties;

G. As appropriate, contaminated soil and SRM will require characterization testing using the toxicity characteristic leaching procedure (TCLP) to determine whether the materials are characteristically hazardous before final disposition or to determine appropriate management options.

H. A soil repository will be constructed in OU3 to accept future property-specific soil and/or SRM removed from below a marker barrier;

I. Certification letters will be provided to the participating property owners from Illinois EPA, including the data results, a description of the completed remedial actions, and any ICs that may be warranted for that property;

J. Each property will be restored as close as practicable to its original conditions; and

K. Future land use for OU4 is assumed to remain the same as the current property use.

2.9.3 Description of Remedial Alternatives

Alternative 1: No Action

The NCP (40 CFR 300.430(e)(6)) requires that a No Action alternative be incorporated into the evaluation and selection of a remedial action. The No Action alternative serves as a point of comparison to the other alternatives under consideration at the Site. Under this alternative, no action would be taken at OU4 to prevent exposure to the contaminated soil. The No Action alternative would leave affected soils in place at OU4. Since the NCP requires Five-Year Reviews as long as hazardous substances remain at the Site at concentrations that do not

allow for unlimited use and unrestricted exposure, there would be periodic costs associated with Five-Year Reviews for this alternative, but these costs would be minimal.

Estimated **Total Present Value** of Alternative: $0
Estimated **Capital Cost**: $0
Estimated Remedy Implementation Cost: $0
Estimated **Periodic Cost**: $0
Remedial Action Construction Timeframe: 0

Alternative 2: Excavation and Management of Soils on the Former Plant Site Area

Alternative 2 includes excavation of contaminated soil and SRM from residences, parks, and alleys in OU4, backfilling with clean soil, and revegetation of the disturbed areas. Soils with COC concentrations exceeding construction worker RGs and residential RGs, or SRM would be excavated from OU4 properties and temporarily stockpiled on the FPSA. Based on an extrapolation of the Pilot Study data, approximately 16,000 cubic yards of excavated soil (10,000 cubic yards of soil from the residential properties and 6,000 cubic yards from the public parks and alleys) will exceed one or more construction worker RGs or contain SRM. Based on a comparison of the Pilot Study data to the RGs and extrapolation to OU4, approximately 39,000 cubic yards of excavated soil will exceed residential RGs, but will be below construction worker RGs and without SRM. A total of 55,000 cubic yards could be stockpiled.

Other methods to manage soil on OU3 may be adopted if they are determined to be more efficient or cost effective and do not result in releases to the environment or otherwise negatively impact OU3. As an example, such a method could include utilizing the existing CAMU, which contains stabilized sediment from OU1.

Contaminated soil and SRM will require characterization testing using the TCLP to determine appropriate management consistent with a final remedy for OU3 when a final remedy is determined.

Best management practices will be used to control potential leaching, dust, and run-on/run-off from the stockpiles. Run-on and run-off controls such as silt fence or earthen berms will be utilized in conjunction with a cover system and other possible methods such as liners to control potential wind and water dispersal and leaching. The specifics will be provided in the Remedial Design Plan.

Estimated Total Present Value of Alternative: $13,132,000[9]
Estimated Capital Cost: $170,000
Estimated Remedy Implementation Cost: $12,662,000
Estimated Periodic Cost: $300,000

[9] The costs, as presented, use terminology included in the Scoping Document. In general, the Capital Costs and Remedy Implementation Costs can be considered capital costs; periodic costs are costs associated with Operation and Maintenance after the remedy is completed. A discount rate of 1.4 percent, consistent with Office of Management and Budget Circular A-94, was used to calculate the Total Present Value of each alternative.

Estimated Remedial Action Construction Timeframe: 2.5 years

Alternative 3: Excavation and Off-Site Disposal

Alternative 3 includes excavation of contaminated soil and SRM from residences, parks, and alleys in OU4, disposal in an appropriate off-site landfill, backfilling with clean soil, and revegetation of the disturbed areas. Excavated soils would require additional TCLP testing prior to being accepted for disposal at a landfill. Since no TCLP analytical data has been obtained for OU4 soils, exact disposal volume estimates for hazardous and nonhazardous wastes cannot be made at this time. Therefore two scenarios are associated with this alternative to provide the potential range of Alternative 3 costs. For Alternative 3A, all of the excavated soil is assumed to pass TCLP testing and would be disposed of at an off-site municipal solid waste (RCRA Subtitle D) landfill. For Alternative 3B, all of the excavated soil is assumed to fail TCLP testing and require more expensive treatment and disposal at an off-site hazardous waste (RCRA Subtitle C) landfill. One area would be established in the FPSA to temporarily stockpile soils for approximately one week until the soils are removed and transported to an off-site disposal facility. It is possible that some of the excavated soil would pass TCLP testing and some of it would fail. The cost associated with that situation would fall somewhere between 3A and 3B.

Alternative 3A
Estimated Total Present Value of Alternative: $21,172,000
Estimated Capital Cost: $170,000
Estimated Remedy Implementation Cost: $20,702,000
Estimated Periodic Cost: $300,000
Estimated Remedial Action Construction Timeframe: 2.5 years

Alternative 3B
Estimated Total Present Value of Alternative: $30,582,000
Estimated Capital Cost: $170,000
Estimated Remedy Implementation Cost: $30,112,000
Estimated Periodic Cost: $300,000
Estimated Remedial Action Construction Timeframe: 2.5 years

2.9.4 Expected Outcomes

Upon achieving the RGs at each property, risk will be reduced to acceptable levels on that property. Full land use will be restored to those private properties where full remediation is achieved as soon as backfill and restoration is completed, which is likely to be within the same construction season for most properties. Public properties will be restored as soon as practicable to return to full recreational or public use. Alternatives 2 and 3 will return full use of residential and Village property within the same time frame.

Alternative 2 will increase the amount of soil to be controlled and managed on the FPSA until such time as a remedy for OU3 is developed. Alternative 3 will transfer this long term stewardship to another party.

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section explains Illinois EPA's rationale for selecting an alternative. §121(b)(1) of CERCLA presents several factors that the Illinois EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives (40 CFR §300.430(e)(9)). The purpose of this evaluation is to promote consistent identification of the relative advantages and disadvantages of each alternative, thereby guiding selection of remedies offering the most effective and efficient means of achieving site cleanup goals. While all nine criteria are important, they are weighed differently in the decision-making process depending on whether they evaluate protection of human health and the environment or compliance with federal and state requirements, standards, criteria, and limitations (threshold criteria); consider technical or economic merits (primary balancing criteria); or involve evaluation by non-Illinois EPA reviewers that may influence an Illinois EPA decision (modifying criteria).

The detailed analysis of alternatives consists of an assessment of individual alternatives against each of nine evaluation criteria, as well as a comparative analysis that focuses on the relative performance of each alternative against the other alternatives. Each of the nine evaluation criteria is described below, followed by a discussion of how each alternative meets or does not meet each criterion. More details regarding the evaluation and comparison of the cleanup alternatives against the nine criteria can be found in the Scoping Document for Presumptive Remedy OU4: Off-site Soils (Ramboll Environ, 2015). In addition, Table 1 provides a qualitative summary of how each cleanup alternative ranks against each of the nine criteria.

Explanation of the Nine Evaluation Criteria

Threshold Criteria

The two threshold criteria are statutory requirements that must be met. If either of the threshold criteria is not met by an alternative, that alternative cannot be selected as the remedy.

1. **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed by the site are eliminated, reduced, or controlled through treatment, engineering, or institutional controls.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether a remedy meets §121(d) of CERCLA and the NCP (40 CFR §300.430(f)(1)(ii)(B)) that requires remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, known as ARARs, unless such ARARs are waived under §121(d)(4) of CERCLA. Applicable requirements are those that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at the Site. Relevant and appropriate requirements are those that address problems or situations sufficiently similar to those encountered at the Site that their use is well suited to the

situation or circumstances. Other advisories, criteria, or guidance may be identified as "to be considered" (TBC) for a particular situation.

Primary Balancing Criteria

The five primary balancing criteria weigh major tradeoffs among alternatives.

3. **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.

4. **Reduction of Toxicity, Mobility, or Volume Through Treatment** addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances as their principal element. This preference is satisfied when treatment is used to reduce the principal threats at the site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

5. **Short-Term Effectiveness** 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 of the remedy until cleanup levels are achieved. This criterion also considers the effectiveness of mitigative measures and time until protection is achieved through attainment of the remedial action objectives.

6. **Implementability** addresses the technical and administrative feasibility of a remedy from design through construction, including the availability of services and materials needed to implement a particular option and coordination with other governmental entities.

7. **Cost** includes estimated capital costs, annual operating and maintenance (O&M) costs, and net present value of capital and O&M costs, including long-term monitoring.

Modifying Criteria

The two modifying criteria can be evaluated to the extent such information is available, but are fully evaluated following the public comment period on the Proposed Plan and addressed in the ROD.

8. **Support Agency Acceptance** considers whether the support agency, in this case the USEPA, supports the preferred alternative presented in the Proposed Plan and concurs with the selected remedy.

9. **Community Acceptance** addresses the public's general response to the remedial alternatives and the preferred alternative presented in the Proposed Plan.

Each of the nine evaluation criteria are discussed below with respect to the alternatives considered for this remedial action.

1. Overall Protection of Human Health and the Environment

Alternative 1, No Action, would provide no improvement over current conditions, would provide no risk reduction, and would not be protective of human health or the environment. Thus, this alternative cannot be selected as the remedy and is not discussed further.

Alternatives 2 and 3 provide adequate and equal protection of human health and the environment within OU4. These alternatives would prevent direct contact exposure by removing soil containing metals at concentrations above RGs to a maximum depth of 18 inches bgs from residential properties, 24 inches bgs from gardens, and 12 inches bgs from parks and alleys, and by backfilling the excavated areas with clean soil. Excavated soils and SRM under Alternative 2 would be stockpiled on the FPSA, and the final disposition of the OU4 stockpiles would be determined as part of the final remedy for OU3. Excavated soils under Alternative 3 would be temporarily stockpiled on the FPSA prior to transport and disposal at an appropriate off-site facility.

Alternatives 2 and 3 are protective; however, if soil with COC concentrations greater than RGs or if potential continuous SRM is left in place below the applicable excavation depth, a permanent, permeable marker barrier would be installed to visually mark the maximum depth of the excavation and distinguish the impacted soil below from the clean backfill soil. This would occur under both alternatives. Institutional controls would be put in place and would be applicable on the remediated properties in these cases, and a Construction Support Program would be implemented for properties where a marker barrier is placed. If the marker barrier is encountered during future excavation work at a property, assistance will be provided to facilitate proper handling of the soil excavated from below the marker barrier and subsequent placement into a repository to be constructed in OU3. Five-Year Reviews would also be conducted at these properties.

2. Compliance with ARARs

The alternatives have common ARARs associated with excavation activities within OU4. The ARARs for the alternatives differ regarding requirements to be met for soil management within OU3 and for final disposal off-site. Alternatives 2 and 3 would be capable of meeting all potential ARARs.

3. Long-term Effectiveness and Permanence

Since contaminated soils and SRM would be excavated and removed from OU4 and replaced with clean fill, the long-term effectiveness and permanence of Alternatives 2 and 3 would be equivalent for the properties addressed by the remedial action. Alternatives 2 and 3 would manage soils and SRM to prevent further release, either on site or by disposal off-site as part of a final remedy for OU3. For Alternative 3, it is assumed that the off-site disposal facility would

dispose of the waste in a manner that prevents future migration of contaminants to the environment.

For Alternatives 2 and 3, if soil exceeding the RGs is left in place (e.g., below the applicable maximum excavation depth), and identified with a marker barrier, then the long term-effectiveness would depend on the implementation and adherence to the certification letters, the Construction Support Program and soil repository, institutional controls, and Village and property owner participation, to prevent future exposure to construction workers and residents.

Alternatives 2 and 3 would require reviews every five years to evaluate the ongoing effectiveness of the remedial action because hazardous substances may remain on some properties above the RGs. If any change occurs to the lead model or the manner in which risks from lead are assessed or addressed, such changes would be subject to evaluation in the five year reviews under each alternative.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternatives 2 and 3A would not decrease the toxicity, mobility, or volume of contaminated soil through treatment. For Alternative 3B, hazardous soils would be treated to reduce toxicity prior to being landfilled in accordance with the Land Disposal Restrictions of 35 Ill. Adm. Code Part 728. However, it is unlikely that all of the OU4 excavated soil is hazardous. Alternatives 2 and 3A do not satisfy USEPA's statutory preference for remedial actions that employ treatment technologies as their principal element, but Alternative 3B (which assumes all of the soil is hazardous) would satisfy this statutory preference by employing treatment technologies before final soil disposal. The soil contamination at OU4 is considered low-level threat material because the toxicity and mobility of the contaminants that are present pose a low potential risk. Low-level threat material does not lend itself to cost-effective treatment.

5. Short-term Effectiveness

Alternatives 2 and 3 would present short-term implementation risks over a 2.5-year period. However, the excavation portion of Alternatives 2 and 3 would not subject residents or construction workers to any unusual implementation risks as these remedies can be conducted using conventional construction techniques. Engineering controls, such as dust suppression, storm water controls, construction scheduling, and appropriate containment at the FPSA would be implemented to reduce potential short-term exposures. All workers would require training and medical monitoring in accordance with 29 CFR 1910.120. For these alternatives, construction workers could be required to utilize personnel protective equipment as established in a site-specific Health and Safety Plan, and operation controls (i.e., work zones, decontamination facilities, etc.) would be established to protect workers during the construction period. Exposure to these short-term risks under Alternatives 2 and 3 is further reduced due to the short estimated average length of time for individual property remediation (approximately two days), and the short travel distance to the FPSA stockpile areas (temporary stockpiling in the case of Alternative 3). Alternative 3 presents a greater degree of short-term implementation risk due to the additional handling required to remove the temporarily stockpiled soils from the FPSA and transport them to the off-site disposal facility. The double-handling, increased truck traffic,

and longer transport distances increase the risk of vehicle accidents and extend the risk of exposure to residents, the environment and communities outside of the Village of DePue.

6. Implementability

Both Alternatives 2 and 3 are readily implementable assuming access is granted by the property owners, although Alternative 3 includes additional tasks associated with short-term storage, and possible treatment of soil before being moved off-site for final disposal. Excavation methods, backfilling, and revegetation are common remedial activities. For Alternative 2, a suitable area exists on the FPSA with sufficient capacity to handle the anticipated soil volumes with minimal advance preparation. For both scenarios of Alternative 3, materials would be transported to the FPSA, temporary stockpiles would be constructed, and the soil handled a second time for loading into long-haul trucks for transport to off-site disposal. Maintenance of the stockpile on the FPSA prior to off-site disposal would require additional waste management considerations, but is readily implementable. Landfills in the vicinity of the Site have capacity to handle the estimated soil quantities and assumed soil characteristics, so implementation of the off-site disposal scenarios is considered viable.

7. Cost

Of the two eligible alternatives, the total present value cost for Alternative 2 is significantly lower than the range of total present value costs for Alternative 3. The final cost estimates for the selected remedial action will be developed and refined during the remedial design process.

8. Support Agency Acceptance

The support agency, USEPA, concurs with the Selected Remedy.

9. Community Acceptance

Public comments were received during the public comment period from members of the public, Village of DePue, USEPA, and CBS. The public and Village expressed concerns about the final COCs; the protectiveness of the RGs, specifically arsenic and lead; stockpiling soil within OU3; and the use of institutional controls. The local community is generally supportive of the need for remedial action and wants a remedy implemented as soon as possible, but prefers Alternative 3, off-site disposal of OU4 soils and SRM. This ROD includes a Responsiveness Summary that summarizes the public comments and Illinois EPA's responses to those comments. The Responsiveness Summary is included as Part III of this ROD.

2.11 PRINCIPAL THREAT WASTES

The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that acts as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Principal threat wastes are those

source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would represent a significant risk to human health or the environment should exposure occur. The NCP (40 CFR 300.430 (a)(1)(iii)(A)) indicates principal threat wastes are most likely to include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials.

Illinois EPA has not identified any principal threat wastes at OU4. Contaminant levels in soils tend to be below removal management levels, are at levels that are not expected to exhibit hazardous waste characteristics, and constitute wastes that can be reliably contained, are not highly mobile, and would present a relatively lower threat in the event of exposure. SRM, while generally expected to exhibit higher concentrations at levels that may exhibit hazardous waste characteristics, can be reliably contained and is not likely to be highly mobile.

2.12 SELECTED REMEDY

2.12.1 Summary of the Rationale for the Selected Remedy

Summary of Rationale for the Selected Remedy

Based on information currently available, Illinois EPA believes the Selected Remedy, Alternative 2, meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. Illinois EPA expects the Selected Remedy to satisfy the following statutory requirements of §121(b) of CERCLA: 1) Be protective of human health and the environment; 2) Comply with ARARs; 3) Be cost-effective; 4) Utilize permanent solutions; and 5) Satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met.

Alternative 2 is the Selected Remedy because it achieves the same level of risk reduction on individual properties at a lower cost than Alternative 3, and presents less short-term implementation risk because it does not include Alternative 3's additional handling and off-site transportation of excavated contaminated materials. Under the Preferred Alternative, contaminated soil and SRM will be temporarily managed at the FPSA and permanent management will be addressed as part of the final remedy for OU3.

2.12.2 Description of the Selected Remedy

Illinois EPA is proposing Alternative 2: Excavation and Management of Soils on the Former Plant Site Area as the Selected Remedy. This remedy will achieve substantial risk reduction by removing the source of exposures at impacted OU4 properties and consolidating waste on the FPSA where it can be efficiently remediated as part of OU3. This alternative is preferred because it will achieve the remedial action objective of preventing ingestion, inhalation and dermal contact of OU4 soils contaminated with COC concentrations above the designated RGs for the resident child and adult and construction workers at a lower cost than Alternative 3 and with less risk to the community and workers during remedy implementation.

The elements of the Selected Remedy are:

A. Access agreements with current property owners will be obtained to allow for sampling and cleanup work. Separate access will be sought for investigation and for cleanup;

B. Soil sampling will be conducted in general accordance with the Superfund Lead-Contaminated Residential Sites Handbook.

   a. It is anticipated that composite samples will be collected in six-inch increments as follows:
      i. For residential yards, samples will be collected at depths of 0-6 inches, 6-12 inches, 12-18 inches, and 18-24 inches bgs, though the 18-24 inch sample may not be analyzed, depending on the results of the 12-18 inch sample; and
      ii. For parks and alleys, samples will be collected at depths of 0-6 inches, 6-12 inches, and 12-18 inches bgs, though the 12-18 inch sample may not be analyzed, depending on the results of the 6-12 inch sample;
   b. For gardens, discrete samples will be collected and analyzed in six-inch increments to 24 inches;

   If the described sampling cannot be completed for any individual property, changes to the sampling plan can be accommodated on a case-by-case basis.

C. Contaminated soil and SRM will require TCLP testing to determine whether the materials are characteristically hazardous;

D. Where necessary, remediation will occur via excavation of SRM and of affected soils with concentrations exceeding the RGs, generally to a maximum depth of 18 inches bgs on residential property, 24 inches for gardens bgs, and 12 inches bgs for parks and alleys. Affected soil below these depths may be excavated as determined on a case-by-case basis, for instance if deeper excavation is determined to be more cost effective than installing a marker barrier and implementing institutional controls as described below;

E. Compliance with RGs will be demonstrated by results from investigative samples, adjacent samples, confirmatory sampling, or a combination of these samples;

F. Excavated soils and SRM will be transported to the FPSA for stockpiling and management. SRM and soils with concentrations above construction worker RGs and residential RGs will be stockpiled separately at OU3[10];

G. Best management practices will be established for the stockpiles to prevent leaching, run-on, run-off, wind dispersion, and direct contact of placed soils;

[10] A remedy for OU3, the former plant site, has not yet been determined. Final disposition and/or use of the stockpiles will be determined during the Feasibility Study to be conducted for OU3.

H. Residential properties and parks will be restored using soil from an off-site source and vegetated with grass seed appropriate for the climate zone; sod may be placed on a case-by-case basis. A landscape contractor will maintain the yards until vegetation is established up to a maximum of one year. Landscaping removed or destroyed as part of the cleanup activities will be replaced with comparable landscaping, if requested by the owner. Backfill soils will be evaluated prior to implementation of the remedial action to verify this soil meets residential RGs for the COCs and TACO Tier 1 soil remediation objectives for non-COC chemicals;

I. Alleys will be restored to their original condition using gravel or other suitable aggregate;

J. Institutional controls will be implemented as necessary. If soil with COC concentrations greater than RGs or if potential continuous SRM are left in place below the applicable maximum excavation depth, a permanent, permeable marker barrier will be installed to visually mark the maximum depth of the excavation and distinguish the deeper impacted soil below from the clean backfill soil above. The Certification letters and ICs will provide notification to the property owner that soil with concentrations greater than RGs is present at depth. If the marker barrier is encountered during future excavation work at a property, assistance to facilitate proper handling of the soil removed from below the marker barrier and subsequent placement into a repository to be constructed in OU3 as part of a Construction Support Program will be provided. The same ICs and Construction Support Program proposed for private properties will be used for public properties;

K. Certification letters will be provided to the participating property owners from Illinois EPA, including the data results, a description of the completed remedial actions, and any ICs that may be warranted for that property;

L. Each property will be restored as close as practicable to its original conditions.

2.12.3 Summary of Estimated Remedy Costs

A detailed summary of the cost estimate associated with the Selected Remedy is provided in Table 2. This information in the summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the costs elements are likely to occur as a result of new information provided during remedial design and any data collected. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or a ROD amendment, as warranted. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.12.4 Expected Outcomes of the Selected Remedy

The Selected Remedy, Alternative 2, will reduce risks to human health and the environment to acceptable levels by achieving the RAO and removing contaminated soil from affected areas. This risk reduction is expected to occur within 2.5 years from initiation of the action. Land use is expected to remain residential. Groundwater usage is not expected to change; the Village does not access groundwater impacted from the site as its drinking water source.

Soil Cleanup Levels for Contaminants of Concern

Chemical	Cleanup Level (mg/kg)	Basis for Cleanup Level	Carcinogenic Risk or Non-Carcinogenic Hazard at Cleanup Level
Arsenic	21	Site-specific	Cancer Risk = 6×10^{-5} Non-carcinogenic HI = 1.0
Cadmium	70/yards 24/gardens	RSL SSL	Non-carcinogenic HI = 1.0
Lead	400*	35 Ill. Adm. Code Part 742 and RSL	Less than 5% probability of exceeding a blood lead level of 10 µg/dL
Manganese	1,800	RSL	Non-carcinogenic HI = 1.0

* This is an interim cleanup level until OLEM Directive 9200.2-167 is considered in the remedial design phase.

2.13 STATUTORY DETERMINATIONS

Under §121 of CERCLA and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets those statutory requirements.

2.13.1 Protection of Human Health and the Environment

The Selected Remedy, Alternative 2, provides overall protection of human health and the environment from impacted soil and SRM. Protection of human health and the environment will be achieved by meeting the remedial action objective, through excavation, consolidation, and containment of low-level threat waste. Exposure levels will be reduced to those levels deemed acceptable, at a cancer risk level of 6×10^{-5} and below a HI of 1 for non-carcinogens. There are no short-term risks that cannot be controlled and no cross-media impacts are expected.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy will attain chemical-specific, location-specific, and action-specific ARARs. TBCs will be considered as appropriate. ARARs and TBCs are listed in Table 3.

2.13.3 Cost-effectiveness

In Illinois EPA's judgment, the Selected Remedy, Alternative 2, is cost effective. The NCP (§300.430(f)(1)(ii)(D)) states that, "A remedy is cost effective if its costs are proportional to its overall effectiveness." To judge cost effectiveness, overall effectiveness was evaluated by considering three of the five balancing criteria in combination (long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness).

The estimated present worth cost of the Selected Remedy, Alternative 2, is $13,000,000. By storing the excavated soil and SRM on the OU3 property until it can be handled as part of the future OU3 remedy, the RAO for OU4 is met at less cost and less risk than Alternative 3 which includes off-site disposal of excavated soil.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

Illinois EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at OU4. Of those alternatives that are protective of human health and the environment and comply with ARARs, Illinois EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site disposal of untreated wastes and considering state and community acceptance.

The Selected Remedy, Alternative 2, presents a final remedy for OU4 properties for which access is granted and presents a permanent solution to address risks present in the residential area. It satisfies the criteria for permanence and long-term effectiveness by removing contaminated soil above risk-based levels from the residential areas of the Village and replacing it with clean soil. Excavated soils will be consolidated and managed in a controlled manner on the former plant property. The contaminated soils are considered low-level threat wastes that do not readily lend themselves to treatment. The selected remedy is consistent with the presumptive remedy of containment for soil that represents a low-level threat.

2.13.5 Preference for Treatment as a Principal Element

The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy, because the relatively low-level soil contamination that is being addressed does not readily lend itself to treatment.

2.13.6 Five Year Review Requirements

Because the remedy will result in hazardous substances, pollutants, or contaminants remaining in OU4 properties above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years of the initiation of remedial action to ensure the remedy continues to be protective of human health and the environment.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

2.14.1 Contaminants of Concern

The Proposed Plan was released for public comment in June 2016. The Proposed Plan did not identify COCs, but identified contaminants of potential concern. Certain potential COCs, such as cobalt and manganese were detected relatively infrequently compared to arsenic and lead, and Illinois EPA and the PRPs agreed to evaluate investigative samples from an additional 20 properties to determine the final list of COCs.

In order to respond to comments from USEPA, the PRPs, and the public regarding this issue, and based on a detailed review of the PRP's position in regard to the occurrence of manganese, Illinois EPA re-evaluated the approach outlined in the Scoping Document and Proposed Plan.

After a thorough consideration of the PRP's position, a review of information within Illinois EPA's files regarding facility operations, and review of the data from the RAL effort and Pilot Study, Illinois EPA has determined that the data generated thus far provide sufficient information to determine a final list of COCs. Those COCs are arsenic, cadmium, lead, and manganese.

However, to address concerns raised by the PRPs that manganese may be naturally elevated in local soils, Illinois EPA provides the opportunity to the PRPs to demonstrate background manganese levels in those soil types present within the Village that were not represented in the original background soil study. If this sampling is not completed or, if completed and background levels are shown to be consistent with the current site-specific background values that are lower than the health-based RG, the manganese RG will be the same as the PRG presented in the Proposed Plan, 1,800 mg/kg. If this additional background sampling does occur and background levels are shown to be greater than the health-based RG, consistent with USEPA guidance, the new manganese background level will be established as the RG. No sampling of an additional 20 properties as was described in the Proposed Plan is necessary to determine the final COC list.

The other COCs for the site, arsenic, lead, and cadmium are retained as COCs throughout the OU4 properties that are the focus of this ROD. Their RGs are the same as the PRGs presented in the Proposed Plan and as summarized in Section 2.8.1 of this ROD.

2.14.2 Lead Remediation Goal

The Proposed Plan proposed a PRG of 400 mg/kg for lead. That value is being adopted as the interim RG in this Record of Decision, until OLEM Directive 9200.2-167 is considered in the remedial design phase. See Section 2.8.1.

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ABBREVIATIONS

ALM	Adult Lead Model
ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BLL	Blood Lead Level
CAG	Community Advisory Group
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
ELCR	Excess Lifetime Cancer Risk
ESI	Expanded Site Inspection
FPSA	Former Plant Site Area
HCOPCs	Human Contaminants of Potential Concern
HHRA	Human Health Risk Assessment
HI	Hazard Index
HRS	Hazard Ranking System
ICO	Interim Consent Order
IDPH	Illinois Department of Public Health
IEUBK	Integrated Exposure Uptake Biokinetic Model
Illinois EPA	Illinois Environmental Protection Agency
IWTP	Interim Water Treatment Plant
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OLEM	Office of Land and Emergency Management
OU	Operable Unit
PRGs	Preliminary Remediation Goals
PRPs	Potentially Responsible Parties
RAL	Removal Action Levels
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RG	Remediation Goals
RML	Removal Management Levels
ROD	Record of Decision
SLERA	Screening Level Ecological Risk Assessment
SRM	Site-Related Material
TACO	Tiered Approach to Corrective Action Objectives
TAL	Target Analyte List
TBC	To Be Considered
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	United States Environmental Protection Agency
UWBZ	Upper Water Bearing Zone
WWTP	Waste Water Treatment Plant

XRF	X-ray Fluorescence

TABLE 1

Comparison Summary of Alternatives to the Nine Superfund Remedy Selection Criteria

Evaluation Criteria	Alternative 1 No Action	Alternative 2* Excavation and Management at the FPSA	Alternative 3 Excavation and Off-Site Disposal
Overall Protection of Human Health and the Environment	Not Protective	Protective	Protective
Compliance with ARARs	Not Compliant	Compliant	Compliant
Long-term Effectiveness and Permanence	N/A	Yes	Yes
Reduction of Toxicity, Mobility, or Volume Through Treatment	N/A	No	3A: No 3B: Yes
Short-term Effectiveness	N/A	Yes	Yes
Implementability	N/A	Yes	Yes
Cost	$0	$13.1 M	$21.1 to $30.5 M
Support Agency Acceptance	Concurs		
Community Acceptance	Limited Acceptance		

Note:
* Illinois EPA's preferred alternative

TABLE 2
Detailed Cost Estimate

Site: New Jersey Zinc/Exxon-Mobil Superfund Site (OU4)
Location: DePue, IL
Date: August 28, 2015

Excavation of contaminated soil and plant material from residences, parks and alleys in OU4, backfill with clean soil and revegetate the disturbed areas. Place soil with metals concentrations exceeding RGs on the former plant site for future management or use. Assumes maximum removal depth to 18 inches for residential parcels, 24 inches form gardens, and 12 inches at parks and alleys. Assumes 100% of homes participate (814 homes). Assumes 85% of homes, 100% of parks areas, and 85% of alleys will require remedial action.

ESTIMATED CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Preparation					
Mobilization	1	LS	$2,000	$2,000	ENVIRON Estimate (2%)
Site Preparation	1	LS	$50,000	$50,000	ENVIRON Estimate
Soil Repository Construction	1	LS	$50,000	$50,000	ENVIRON Estimate
SUBTOTAL				$102,000	
Contingency	25%			$25,500	Source 3 (10% Scope + 15% Bid)
SUBTOTAL				$127,500	
Project Management	8%			$10,200	Source 3
Remedial Design	15%			$19,125	Source 3
Construction Management	10%			$12,750	Rounded to the nearest $1,000
TOTAL				$170,000	

ESTIMATED ANNUAL REMEDY IMPLEMENTATION COSTS (TWO YEARS OF IMPLEMENTATION)

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Excavation, Restoration & On-Site Disposal Per Year (Year 0-1)					
Mobilization	1	LS	$64,000	$64,000	ENVIRON Estimate (2%)
Excavate and haul to FPSA (Residence)	13,550	CY	$103	$1,395,650	ENVIRON Estimate & Source 1, 2
Excavate and haul to FPSA (Park/alleys)	13,921	CY	$27	$375,867	Source 1, 2, vendor quote
Confirmation Sampling	73	Property	$1,300	$94,900	ENVIRON Estimate and vendor quote
Place in adjacent to Slag Pile	8,000	CY	$5	$40,000	Source 1, 2
Backfill (Residences)	13,550	CY	$30	$406,500	ENVIRON Estimate and vendor quotes
Backfill (Parks)	2,950	CY	$30	$88,500	ENVIRON Estimate and vendor quotes
Seed and landscape (Residences)	60,908	SY	$5	$304,540	Source 1, 2
Seed and landscape (Parks)	8,779	SY	$2	$17,558	Source 1, 2
Repave with gravel (alleys)	10,971	CY	$45	$493,695	Source 1, 2
Institutional Controls	195	EA	$5,000	$975,000	ENVIRON Estimate (24% of properties)
SUBTOTAL				$4,256,210	
Contigency	25%			$1,064,053	Source 3 (10% Scope + 15% Bid)
SUBTOTAL				$5,320,263	
Project Management	5%			$266,013	Source 3
Remedial Design	8%			$425,621	Source 3

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Construction Management	6%			$319,216	Source 3
TOTAL ANNUAL COST				**$6,331,000**	Rounded to the nearest $1,000
TOTAL IMPLEMENTATION COST (TWO YEARS)				**$12,662,000**	

ESTIMATED PERIODIC COSTS (Includes 25% Contingency and 10% Project Management Fees)

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	5	1	LS	$50,000	$50,000	ENVIRON Estimate
5-Year Review	10	1	LS	$50,000	$50,000	ENVIRON Estimate
5-Year Review	15	1	LS	$50,000	$50,000	ENVIRON Estimate
5-Year Review	20	1	LS	$50,000	$50,000	ENVIRON Estimate
5-Year Review	25	1	LS	$50,000	$50,000	ENVIRON Estimate
5-Year Review	30	1	LS	$50,000	$50,000	ENVIRON Estimate
TOTAL					**$300,000**	

ESTIMATED PRESENT VALUE ANALYSIS

DESCRIPTION	YEAR	TOTAL COST	TOTAL COST PER YEAR	1.4% DISCOUNT FACTOR	PRESENT VALUE	NOTES
Capital Cost	0	$170,000	$170,000	1.000	$170,000	
Remedy Implementation Cost	0	$6,331,000	$6,331,000	1.000	$6,331,000	
Remedy Implementation Cost	1	$6,331,000	$6,331,000	0.986	$6,243,590	
Periodic Cost	5	$50,000	$50,000	0.933	$46,642	
Periodic Cost	10	$50,000	$50,000	0.870	$43,510	
Periodic Cost	15	$50,000	$50,000	0.812	$40,588	
Periodic Cost	20	$50,000	$50,000	0.757	$37,863	
Periodic Cost	25	$50,000	$50,000	0.706	$35,320	
Periodic Cost	30	$50,000	$50,000	0.659	$32,948	
TOTAL		**$13,100,000**			**$13,000,000**	Rounded to the nearest $1,000

ESTIMATED TOTAL PRESENT VALUE OF ALTERNATIVE **$13,000,000**

SOURCE INFORMATION

1. RS Means, Environmental Remediation Cost Data – Unit Price, 11th Annual Edition, 2005
2. US Department of the Interior Bureau of Reclamation Construction Cost Trends (http://www.usbr.gov/pmts/estimate/cost_trend.html)
3. USEPA. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study (EPA 540-R-00-002 2000) July 2000.
4. A 30-year discount rate of 1.4% was applied for the discounted costs in accordance with the Office of Management and Budget (OMB) Circular No. A-94, as revised in December 2014.

TABLE 3
Chemical-Specific, Location-Specific, and Action-Specific ARARs and Guidance To Be Considered

Standard, Requirement or Limitation	Citation	Status	Description
Chemical-Specific			
Superfund Lead- Contaminated Residential Sites Handbook	OSWER 9285.7-50	TBC	Developed by the USEPA to promote a nationally consistent decision-making process for assessing and managing risks associated with lead- contaminated residential sites.
Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities Clarification to the 1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities	OSWER Directive 9355.4-12 OSWER Directive 9200.4-27P	TBC	This interim directive and clarification establishes a streamlined approach for determining protective levels for lead in soil at CERCLA sites and RCRA facilities that are subject to corrective action under RCRA section 3004 (u) or 3008 (h).
Updated Scientific Considerations for Lead in Soil Cleanups	OLEM Directive 9200.2-167	TBC	This directive highlights current science and risk assessment tools that should be considered when addressing lead-contaminated soils at CERCLA sites.
USEPA Regional Screening Levels	United States Environmental Protection Agency Regions 3, 6, and 9. June 2015. Regional Screening Levels for Chemical Contaminants at Superfund Sites.	TBC	Risk-based concentrations based on exposure information assumptions and USEPA toxicity data that are considered by the USEPA to be protective for humans over a lifetime.

Standard, Requirement or Limitation	Citation	Status	Description
Illinois Environmental Protection, Title 35, Subtitle G, Waste Disposal, Chapter 1: Pollution Control Board, Subchapter f: Risk Based Cleanup Objectives	35 Ill. Adm. Code Part 742, Tiered Approach to Corrective Action Objectives, Appendices A and B	TBC	Illinois cleanup goals for soils and groundwater, including for different receptors and land uses
Location Specific			
Fish and Wildlife Coordination Act	16 USC §§661-666	ARAR	Requires federal agency or permitted entity to consult with the USFWS and appropriate state agency prior to modification of any stream or other water body. The intent of this requirement is to conserve, improve, or prevent the loss of wildlife habitat and resources. This act is applicable to any non-game fish or wildlife species that have been or may in the future be adversely affected by site-related contamination
National Historic Preservation Act	54 USC §3001 et. seq.	ARAR	The National Historic Preservation Act requires that historically significant properties be protected. The National Register of Historic Places is a list of sites, buildings, or other resources identified as significant to United States history. An eligibility determination provides a site the same level of protection as a site listed on the National Register of Historic Places. The requirements of this federal law are potentially applicable based on a determination of whether such properties occur on the Site.

Standard, Requirement or Limitation	Citation	Status	Description
Migratory Bird Treaty Act of 1972	16 USC §§703-712	ARAR	Establishes federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that the cleanup of the Site does not necessarily impact migratory birds.
Endangered Species Act	16 USC §§1531-1544, 50 CFR Part 402	ARAR	The purpose of this act is to conserve endangered, threatened, and rare species of wildlife and plants. This regulation prohibits federal agencies from jeopardizing habitat for endangered or threatened species. No endangered species have been documented at the Site but this would become an ARAR if any endangered species were to be encountered.
Clean Water Act Section 404	40 CFR Part 230 33 CFR Parts 320-330	ARAR	These sections of the CWA and associated regulations prohibit discharge of dredge or fill material to United States' waters including wetlands as defined by the U.S. Army Corps of Engineers.
Regulation of Construction within Floodplains	17 Ill. Adm. Code Part 3706	ARAR	Requires a permit for work in the floodplain. In order to obtain the permit, the construction must be shown not to have significant flood damage risk, nor increase flood damage risk to surrounding areas. Permittees must also assume full liability for flood damages caused by the existence of temporary fills, including soil staging areas.
Illinois Endangered Species Protection Act	520 ILCS §10/1 et seq.	ARAR	The purpose of this act is to conserve endangered, threatened, and rare species of wildlife and plants. This regulation prohibits state and local agencies from jeopardizing habitat for endangered

Standard, Requirement or Limitation	Citation	Status	Description
Fish and Wildlife Conservation Act	16 USC §§2901-2912	ARAR	Requires Federal agencies to utilize their statutory and administrative authority to conserve and promote conservation of non-game fish and wildlife species. Not expected to be an ARAR based on ecological risk evaluations but will be considered, if necessary.
Executive Order on Protection of Wetlands	Executive Order No. 11990, 40 CFR Part 6.302(a) and Appendix A	TBC	Requires Federal agencies to avoid, to the maximum extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid new construction in wetlands, if a practical alternative exists. Action in wetlands is possible and this citation will be met if wetlands are encountered.
Executive Order on Floodplain Management	Executive Order No. 11988, 40 CFR Part 6.302(b) and Appendix A	TBC	Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the maximum extent possible, the adverse impacts associated with direct and indirect development of a floodplain.
Action Specific			
National Ambient Air Quality Standards	42 USC §§7401 et seq.; 40 CFR Part 50	ARAR	These regulations establish ambient air quality for emissions of particulate matter. Remedial actions taken under any of the alternatives (except no action) could potentially result in release of contaminants in soil or particulate matter. Those regulations are applicable to "major sources" as defined under the Clean Air Act. Although remedial actions at the Site are not expected to result in major emission sources, these regulations would be relevant and appropriate.
Resource Conservation and Recovery Act: Subtitle C, Identification and Listing of Hazardous Wastes	40 CFR Part 261, Identification and Listing of Hazardous Waste	ARAR	Identifies solid wastes which may be subject to regulation as hazardous waste.

Standard, Requirement or Limitation	Citation	Status	Description
Resource Conservation and Recovery Act	40 CFR Part 257 Criteria for Classification of Solid Waste Disposal Facilities and Practices	ARAR	The regulations define solid waste which includes both smelter residues and the localized materials. They contain requirements related to solid waste cover designs and disposal. Among other things, those regulations require that facilities be maintained to prevent wash-out of solid wastes and that the public not be allowed uncontrolled access.
Department of Transportation (DOT) Hazardous Materials Transportation Regulations	49 CFR Parts 107, 171-177	ARAR	This section regulates transportation of hazardous materials and is only considered ARARs for materials deemed characteristically hazardous. If any materials are transported off-Site and are deemed characteristically hazardous, these substantive requirements will be met in order to protect the local community and public roads while the waste materials are being hauled.
Federal Clean Water Act - National Pollutant Discharge Elimination System (NPDES)	40 CFR Part 122.	ARAR	This section requires a Construction General Permit and Notice of Intent (NOI) associated with managing storm water discharges from large construction activities (more than 5 acres of land disturbance) and would be relevant and appropriate for remedial actions involving excavation, management and/or consolidating soil materials.
Occupational Safety and Health Administration (OSHA)	29 CFR Part 1910	ARAR	Specifies minimum requirements to maintain worker health and safety for hazardous waste sites. Includes specific training, monitoring, respiratory protection and personal protective equipment (PPE) requirements based on site specific conditions.

Standard, Requirement or Limitation	Citation	Status	Description
Illinois Environmental Protection Act, Title 35: Ill. Adm. Code, Subtitle C: Chapter I, Illinois Pollution Control Board	General NPDES Permit Number ILR10	ARAR	Enforces the Federal CWA General Construction Permit program in Illinois and establishes specific requirements for Illinois sites
Title 35: Environmental Protection, Subtitle G:Waste Disposal, Subchapter c: Hazardous Waste Operating Requirements	35 Ill. Adm. Code Part 720; Hazardous Waste Management System: General	ARAR	The Illinois hazardous waste management regulations incorporate much of the federal RCRA regulations as incorporated by reference. These regulations provide definitions and references.
Title 35: Environmental Protection, Subtitle G:Waste Disposal, Subchapter c: Hazardous Waste Operating Requirements	35 Ill. Adm. Code Part 721; Identification and Listing of Hazardous Waste	ARAR	These regulations identify solid wastes that are subject to regulation as hazardous wastes.
Title 35: Environmental Protection, Subtitle G:Waste Disposal, Subchapter c: Hazardous Waste Operating Requirements	35 Ill. Adm. Code Part 722; Standards Applicable to Generators of Hazardous Waste	ARAR	These regulations identify standards applicable to generators of hazardous wastes, and requires a generator of solid waste to determine if the waste is hazardous.
Illinois Environmental Protection Act, Definition of Special Waste	415 ILCS §5/3.475 (2014)	ARAR	Defines special waste as used in Illinois Environmental Protection Act and throughout IAC (by reference). Under the definition, excavated soil would be considered special waste
Illinois Environmental Protection Act, Certification of Non-special Waste	415 ILCS §5/22.48 (2014)	ARAR	Establishes the criteria under which a generator may certify a waste as non- special.
Title 35: Environmental Protection, Subtitle B: Air Pollution, Subchapter c: Emission Standards and Limitations for Stationary Sources	35 Ill. Adm. Code Part 212.301, Fugitive Particulate Matter	ARAR	Prohibits the generation of visible fugitive particulate matter.

Standard, Requirement or Limitation	Citation	Status	Description
Title 35: Environmental Protection, Subtitle G:Waste Disposal, Subchapter c: Hazardous Waste Operating Requirements, Part 724, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	35 Ill. Adm. Code Part 724.650-724.655, Special Provisions for Cleanup	ARAR	Establishes requirements for the design and operation of CAMUs, temporary units and staging piles.
Title 35, Environmental Protection, Subtitle H: Noise	35 Ill. Adm. Code Parts 900-902	ARAR	Sound emission standards and limitations that will be applicable or relevant and appropriate during implementation of the remedy. Construction activities as defined in 35 IAC Section 900.101 are exempt from 35 IAC Sections 901.102 through 901.106 under 35 IAC Section 901.107(d).
Presumptive Remedy for Metals-in-Soil Sites	OSWER Directive No. 9355.0-72FS	TBC	This guidance clarifies the definition of high volume low-toxicity risk wastes as "contaminated source material of low to moderate toxicity that generally are relatively immobile to air or groundwater (i.e. non-liquid, low volatility, low leachability contaminants such as high molecular weight compounds) in the specific environmental setting; and low toxicity source materials, such as soil and subsurface soil contamination not greatly above reference dose levels or that present an excess cancer risk near the acceptable risk range.
Illinois Hazardous Substances Pollution Contingency Plan	35 Ill. Adm. Code Part 750	TBC	Establishes procedures for assessing and remediating Illinois State Superfund sites. While this is a CERCLA Superfund Site, these state- Superfund regulations may be considered.

Standard, Requirement or Limitation	Citation	Status	Description
Uniform Environmental Covenants Act	765 ILCS §122/1 et. seq.	TBC	Establishes requirements for certain land use controls.

Abbreviations and Acronyms:

ARAR	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOT	Department of Transportation
IAC	Illinois Administrative Code
ILCS	Illinois Compliance Statutes
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupation Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PA	Public Act
RCRA	Resource Conservation and Recovery Act
TBC	To Be Considered
USC	United States Code

PARTE III: RESUMEN DE LA RECEPTIVIDAD

Descripción

De acuerdo con la sección 117 de la Ley Integral de Respuesta Ambiental, Compensación y Responsabilidad de 1980 y sus enmiendas (CERCLA o Superfondo), 42 U.S.C. sección 9617 (2015), la Agencia de Protección Ambiental de Illinois (EPA de Illinois) llevó a cabo un período abierto a los comentarios del público desde el 14 de junio de 2016 hasta el 15 de agosto de 2016 para permitir que las partes interesadas ofrecieran sus comentarios sobre el Plan propuesto (junio de 2016) para OU4. La EPA de Illinois, la agencia líder para las actividades en el sitio, emitió el Plan propuesto (EPA de Illinois, 2016) que identificaba las alternativas de limpieza y la opción preferida para la reparación definitiva para los suelos fuera del sitio en DePue, Illinois. La EPA de Illinois, en consulta con la USEPA, ha seleccionado la reparación definitiva para el sitio sólo ahora que ha concluido el período abierto a los comentarios del público y se han analizado los comentarios escritos y orales. La reparación se detalla en el Registro de Decisión (ROD) de la EPA de Illinois, con el cual está de acuerdo la Agencia de Protección Ambiental de los Estados Unidos (USEPA).

El objetivo de este resumen de receptividad es documentar las respuestas de la EPA de Illinois a las preguntas, inquietudes y comentarios recibidos durante el período abierto a los comentarios del público y durante la reunión pública. Estos comentarios e inquietudes fueron analizados antes de la selección de la alternativa de remediación definitiva para el sitio. Se encuentran disponibles copias completas del Plan propuesto, el Registro administrativo y otra información pertinente en The Selby Township Library, 101 Depot Street, DePue, Illinois, 61322.

Ubicación e historia del sitio

El sitio de DePue/New Jersey Zinc/Mobil Chemical es una antigua fundición de zinc primario y secundario. En distintos momentos, también produjo ácido sulfúrico, litopón y fertilizante de fosfato diamónico. El sitio se encuentra dentro del pueblo de Duque en el Condado de Bureau, Illinois (Figura 1). El sitio incluye la fundición y el área de la planta de fertilizantes y el risco, una pila de fosfoyeso y elementos asociados, áreas ribereñas que incluyen una zanja de drenaje y un área de desagüe, el lago DePue, y partes del terreno aluvial asociado al lago DePue. El sitio ha sido organizado en cinco Unidades operables (OU) diferentes para su investigación y remediación.

La OU4 incluye suelos afectados por las operaciones del sitio más allá de los límites de la planta, dentro del pueblo de DePue. Las áreas residenciales, los terrenos públicos, los parques, los callejones, la escuela y propiedades diversas dentro de OU4 son el foco del ROD y de este Resumen de receptividad. Otras áreas de OU4 serán evaluadas y abordadas más adelante.

El pueblo de DePue es fundamentalmente residencial, con una población estimada de 1852 habitantes (Censo de los EE.UU., 2015). También cuenta con propiedades comerciales y una escuela. El 54,7 por ciento de la población del pueblo es de origen hispano o latino as propiedades (Censo de los EE.UU., 2010). El 27 por ciento de la población del pueblo tiene menos de 16 años de edad (Censo de los EE.UU., 2010).

El sitio se encuentra en la parte centro-norte del pueblo y está rodeado por propiedades residenciales hacia el oeste y el este. Hay propiedades residenciales y comerciales ubicadas hacia el sur. Al norte de la planta hay una gran área de riscos y la pila de fosfoyeso del sitio.

La contaminación en OU4 se debe posiblemente a dos fuentes: la deposición aérea de contaminantes que emanan del área de la planta como emisiones de las operaciones de la antigua planta o partículas transportadas por el viento o el agua, y material relacionado con el sitio (SRM) tomado directamente desde el sitio y colocado en patios, callejones y otras áreas como material de relleno.

Mineral Point Zinc inició sus operaciones alrededor de 1905 en lo que habían sido tierras de cultivo. La fundición primaria producía planchas de zinc, polvo de zinc y ácido sulfúrico. A la fundición se añadió una planta de producción de litopón en 1923, que fue cerrada en 1956. Hacia finales de la década de 1930, New Jersey Zinc compró Mineral Point Zinc y hacia mediados de la década de 1950 operaba el sitio como New Jersey Zinc. En 1971, la fundición primaria fue cerrada. La planta de polvo de zinc siguió funcionando. A principios de la década de 1980, Horsehead Industries adquirió algunos activos de la New Jersey Zinc Company, para luego cambiar su nombre a Zinc Corporation of America. La producción de polvo de zinc cesó en 1989, y Zinc Corporation of America completó la demolición de la mayor parte de las estructuras restantes en 1990 y 1991.

A mediados de la década de 1960, Gulf & Western compró New Jersey Zinc y comenzó a operar una planta de fertilizantes de fosfato diamónico en 1967. Las plantas de fertilizante y ácido dejaron de funcionar en 1971. Luego las plantas fueron arrendadas a la División fósforo del Minerals Group of Mobil Chemical Company, una división de la Mobil Oil Corporation, en 1972. Mobil Chemical Company compró las plantas de fertilizante y ácido en 1975. Las operaciones de fabricación finalizaron en 1978. Mobil Chemical Company transfirió la propiedad a Mobil Mining and Minerals Company en 1985. Más tarde, Mobil operó la planta como una terminal de fertilizantes hasta diciembre de 1990. Las estructuras de la planta de MObil fueron demolidas a principios de la década de 1990.

En noviembre de 1995, el Estado de Illinois firmó una Orden de Consentimiento Provisional (ICO, por sus siglas en inglés) con Horsehead Industries, Inc., Mobil Oil Corporation y Viacom Internacional, Inc., para llevar adelante algunas actividades de remediación, para determinar la naturaleza y el alcance de las sustancias peligrosas emitidas desde el sitio y para identificar y evaluar alternativas para una acción de remediación. En la ICO se especificaron muchas medidas provisionales y acciones de respuesta.

A través de una serie de cambios de nombre, adquisiciones y fusiones, la propiedad finalmente pasó a ser propiedad de CBS Operations, Inc. y ExxonMobil Oil Corporation. Estas empresas son las Partes Potencialmente Responsables (PRP, por sus siglas en inglés) del sitio, conocidas colectivamente como el DePue Group.

Resumen de la reparación definitiva

A partir de la información reunida hasta la fecha, la EPA de Illinois está seleccionado la Alternativa 2: Excavación y gestión de suelos en el área del sitio de la antigua planta como la reparación para OU4. Esto incluye la excavación del suelo contaminado y el SRM de las residencias, parques y callejones en OU4, volver a rellenar con suelo limpio, y reforestar las áreas afectadas. Esta alternativa logrará una reducción significativa de los riesgos al remover la fuente de las exposiciones en las propiedades afectadas de OU4 y consolidar los desperdicios en el área de la antigua planta, donde pueden ser remediados de manera eficiente como parte de OU3. El objetivo de la acción de remediación para los suelos de OU4 es evitar la ingesta, inhalación y el contacto dérmico de los suelos contaminados de OU4 que poseen concentraciones de contaminantes preocupantes (COC) que se encuentran por encima de las metas de remediación (RG) designadas para los niños residentes, los adultos residentes y los obreros de la construcción.

Se cree que la Alternativa 2 posibilita el mejor equilibrio entre todas las alternativas con respecto a los nueve criterios de evaluación que se presentaron en el Plan Nacional de Contingencia para la Contaminación por Petróleo y otras Sustancias Peligrosas (NCP, 40CFT 300.1 y siguientes (2015))[11]. La alternativa aborda requisitos legales y aspectos técnicos, de costos e institucionales adecuados para las acciones de remediación en los sitios del Superfondo. La Alternativa 2 ha sido seleccionada porque logrará el objetivo de remediación, ofrecerá un reparación definitivo para las propiedades en OU4 a las cuales se ha concedido el acceso, brindará una efectividad a largo plazo al remover el suelo contaminado y reemplazarlo por suelo limpio, y cumplirá con el requisito de la rentabilidad del Plan Nacional de Contingencia.

Antecedentes de la participación de la comunidad

Un Grupo Asesor de la Comunidad (CAG, por sus siglas en inglés) se reúne para debatir sobre el sitio cada seis semanas, aproximadamente. La EPA de Illinois participa en estas reuniones, y ofrece presentaciones en diversas reuniones de la Comunidad hispana sobre el sitio y los progresos logrados en OU4.

Antes de la selección de la reparación definitiva, el NCP exige que la agencia líder ofrezca un período abierto a los comentarios del público durante un mínimo de 30 días, para alentar la participación del público en el proceso de selección de la reparación[12]. El período abierto a los comentarios del público tuvo lugar entre el 14 de junio de 2016 y el 14 de julio de 2016, para permitir que las partes interesadas hagan sus comentarios acerca del Plan propuesto (EPA de Illinois, 2016) para este sitio. Por solicitud del pueblo de Duque, y de conformidad con el NCP[13], el período abierto a los comentarios del público se prorrogó hasta el 15 de agosto de 2016.

La EPA de Illinois llevó a cabo una sesión de disponibilidad el 22 de junio de 2016 en el gimnasio de la escuela de DePue para hablar informalmente sobre el Plan propuesto con los integrantes de la audiencia. Una reunión pública más formal tuvo lugar el 29 de junio de 2016,

[11] NCP, 40 CFR sección 300.430(e)(9)(iii) (2015)
[12] NCP, 40 CFR sección 300.430(f)(3)(i)(C) (2015)
[13] NCP, 40 CFR sección 300.430(f)(3)(i)(C) (2015)

en el gimnasio de la escuela de DePue, para explicar el Plan propuesto y aceptar los comentarios orales.

El 7 de junio de 2016 se publicaron en el LaSalle News Tribune y el Bureau County Republican un aviso de disponibilidad del Plan propuesto para su revisión y comentario, la sesión de disponibilidad y la reunión pública. Se enviaron copias del Plan propuesto y el aviso de la reunión a legisladores y otros funcionarios electos. También se envió una hoja informativa resumiendo el Plan propuesto, las alternativas y las fechas de la reunión pública a los residentes, medios de comunicación y funcionarios locales. Un aviso público anunciando la prórroga del período abierto a los comentarios del público fue publicado en el Bureau County Republican los días 13, 14 y 19 de julio de 2016 y en el LaSalle News Tribune los días 16 y 17 de julio de 2016.

Diez personas enviaron sus comentarios sobre el Plan propuesto. Muchas de estas personas también se desempeñan en el CAG. La asesoría legal del pueblo envió comentarios en nombre del pueblo de Duque. Estos comentarios fueron acompañados por 389 formularios individuales firmados por residentes de Duque, expresando su apoyo a los comentarios del pueblo. Los comentarios del pueblo también estaban acompañados por comentarios del contratista del programa de Servicios de Asistencia Técnica para Comunidades (TASC, por sus siglas en inglés), quien asesora al CAG. CBS Operations, una de las PRO, envió comentarios sobre el Plan propuesto e incorporó como referencia una carta enviada a la EPA de Illinois el 11 de mayo de 2016. La USEPA, Región 5, también envió comentarios.

Un resumen breve de las cuestiones planteadas por las partes interesadas fundamentales y el público y las respuestas de la EPA de Illinois se presenta como un Resumen de las cuestiones principales. Las respuestas detalladas a todos los comentarios se presentan después de la sección Resumen. Todos los cambios en el ROD del Plan propuesto basados en los comentarios del público u otras cuestiones, se describen en el ROD y en las respuestas correspondientes a continuación.

Resumen de las cuestiones principales

Los comentarios recibidos se referían a diversos aspectos de las alternativas consideradas y la reparación elegida. Junto con sus comentarios, el pueblo de DePue envió solicitudes que indicaban "Apoyo los comentarios del Pueblo de DePue. Soy residente del pueblo de DePue, Illinois. Estoy preocupado por el plan propuesto de limpiar las propiedades residenciales, parques, campos de juego y patios escolares de DePue. El Plan Propuesto NO ES JUSTO y NO PROTEGE a los residentes de DePue. Apoyo los comentarios de DePue donde se solicita: limpieza completa de todas las propiedades residenciales, los estándares más seguros posible para la limpieza de plomo y arsénico, retiro de todos los suelos contaminados de DePue, limpieza más rápida de DePue. Hemos esperado demasiado tiempo. Por favor, háganlo bien. Firmo debajo para respaldar los comentarios del pueblo de DePue: firma"

Debajo, se ofrece un breve resumen de las respuestas de EPA de Illinois a los cuatro puntos específicamente indicados en la solicitud. EPA de Illinois brinda respuestas completas y detalladas al pueblo, incluyendo los temas tocados en la solicitud, luego del Resumen de Cuestiones Principales, comenzando en la página 10.

Limpieza completa de todas las propiedades residenciales

La investigación y limpieza de sitios Superfondo se realiza bajo la autoridad de CERCLA. Este estatuto federal dispone la limpieza de sitios que presenten un nivel inaceptable de riesgo para la salud humana y el medio ambiente. Debido a que la necesidad y el alcance de la limpieza dependen del nivel de riesgo asociado con las concentraciones de contaminantes, no existe obligación, conforme a CERCLA de retirar *toda* la contaminación. El objetivo de esta acción de remediación es reducir el riesgo debido a la exposición a químicos relacionados con el sitio que sean mayores que las concentraciones de fondo y que excedan los objetivos de limpieza basados en la salud humana. Simplemente porque una concentración química exceda el valor de fondo, esto no significa que todos los químicos deban ser retirados, y tampoco significa que esto suponga una amenaza inaceptable para la salud humana. Los contaminantes que representen un riesgo inaceptable o riesgos potenciales serán abordados por la acción OU4.

Para mitigar los riesgos inaceptables provenientes de la contaminación en propiedades residenciales, se necesitará de la cooperación de los propietarios residenciales. Sólo se tratará a aquellas propiedades en las que el dueño de la propiedad brinde acceso para permitir la toma de muestras y toda acción de limpieza necesaria. EPA de Illinois anticipa un trabajo con el pueblo y la comunidad para alentar a los propietarios a participar en la investigación y las tareas de limpieza. Cuantos más propietarios brinden acceso, más propiedades serán investigadas y limpiadas y mayor será el beneficio en general para el pueblo.

Si la limpieza de una propiedad individual no incluye el retiro de todos los contaminantes, dichas propiedades estarán sujetas a Controles Institucionales (IC) para controlar todo riesgo restante. USEPA describe a los IC como instrumentos sin diseño técnico, tales como controles legales y administrativos, y dispositivos de información. Los IC también pueden incluir barreras físicas y de ingeniería, tales como cercas u otro tipo de barreras. Los IC ayudan a minimizar el potencial de exposición a la contaminación y protegen la integridad de una acción de respuesta. [14]

En OU4, los IC son necesarios para preservar la salud pública y garantizar gestión adecuada de parte de las PRP en caso de que los suelos que hayan sufrido impacto deban salir a superficie en el futuro. EPA de Illinois desea evitar que los IC y toda otra condición molesten al propietario y requiera de una gestión a largo plazo de los suelos residenciales o públicos de parte de los PRP. EPA de Illinois alentará y trabajará con el grupo de DePue para remover la totalidad de los contaminantes sobre RG de modo que el uso de barreras de marcación y controles institucionales se minimice o elimine por completo.

Durante una limpieza, ciertas circunstancias imprevistas pueden exigir que se usen IC, de modo que los IC son un componente de, virtualmente, todas las acciones de remediación de CERCLA a gran escala, incluyendo otras iniciativas de limpieza de fundiciones/propiedades residenciales realizadas en Illinois y otros lugares.

Los IC diseñados para OU4 incluyen una barrera de marcación para aquellas propiedades en las que no se ha eliminado toda la contaminación en su totalidad. Esta barrera consiste en una

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[14] Ver Controles Institucionales: Una guía para planificar, implementar, mantener y exigir el cumplimiento de Controles Institucionales en Sitios Contaminados. OSW

barrera permeable, como por ejemplo una cerca anaranjada u otro material similar que permita que el agua se infiltre y no impida el crecimiento de las plantas. Tal y como otras limpiezas de fundiciones en Illinois, se tomarán las decisiones sobre si se instalará una barrera de marcación o no, en cualquier propiedad y caso por caso. La presencia de una barrera no restringe ni prohíbe actividad alguna, simplemente sirve como precaución para quienes acceden al suelo que está debajo de dicha barrera. Descubrir o afectar este suelo generará la inmediata asistencia de un Programa de Apoyo a la Construcción, el cual ayudará a los propietarios a controlar el suelo que está bajo la barrera de marcación.

Además de la barrera de marcación, se usarán otros IC informativos para ayudar a implementar el Programa de Apoyo a la Construcción y llevar un seguimiento del estado de las propiedades del pueblo. Puede usarse el sistema de llamada única de Illinois, una base de datos o el registro de propiedades, u otras herramientas y técnicas similares. Ninguno de estos métodos supondrá una restricción sobre la escritura de propiedad del propietario. Se brindarán detalles adicionales en el plan de Diseño de la remediación.

Estándares más seguros para limpieza de plomo y arsénico

Los estándares seguros para la limpieza son aquellos que protegen la salud de los seres humanos. En el caso de los químicos que producen cáncer, conocidos como carcinógenos, CERCLA dispone valores de limpieza y riesgos aceptables dentro de un rango de valores, que va desde 1 en un millón a 1 en 10.000. Para comparar, el riesgo vitalicio de desarrollar cáncer para alguien que vive en los Estados Unidos es de 1 en 2 en el caso de los hombres, y de 1 en 3 en el caso de las mujeres (ACS, 2016). Esto significa que los valores de limpieza o metas de remediación (RG) pueden representar 1 caso adicional de cáncer en una población de 1.000.000 a 1 caso de cáncer adicional en una población de 10.000 generado por la exposición a químicos en el sitio, por encima del riesgo ya sufrido (1 en 2, o 1 en 3), para quienes viven en los Estados Unidos.

En el caso del arsénico, un carcinógeno, puede considerarse más de un valor de limpieza como aceptablemente seguros o protectores debido a que los valores de limpieza aceptables para sitios Superfondo en el caso de carcinógenos se basan en un rango de riesgos aceptables, desde 1 en un millón a 1 en 10.000. Un valor de limpieza que represente el extremo inferior del rango, 1 en 1.000.000 está por debajo de los niveles de arsénico de fondo, y es poco práctico como valor de limpieza.

La EPA de Illinois desarrolló un valor basado en el riego, más alto que el valor de fondo pero aun así dentro del rango aceptable para una acción de remediación de acuerdo con la CERCLA. Tras negociaciones con las PRP, la EPA de Illinois y las PRP llegaron a un acuerdo sobre una RG. La RG incluida en el ROD ha sido desarrollada de acuerdo con la Guía de Evaluación de Riesgos para el Superfondo (RAGS, por sus siglas en inglés) y las prácticas de la EPA de Illinois, y cumple con los requisitos del Superfondo en cuanto a la protección de la salud humana. La EPA de Illinois ha usado ideas y métodos técnicamente sólidos y defendibles para desarrollar el valor de limpieza para el arsénico. Es una RG aceptablemente protectora.

El valor de limpieza para el plomo, 400 miligramos por kilogramo (mg/kg o parte por millón (ppm)), cumple con los requisitos de protección y fue desarrollado usando un modelo basado en los riesgo a actuales para calcular los valores de limpieza del plomo. La EPA de Illinois también

incluye 440 ppm como su objetivo de remediación predeterminado (es decir, valor de Nivel 1) para el plomo en terrenos para uso residencial en sus regulaciones en 35 Ill. Adm. Code. Parte 742[15]. Para OU4, el valor de limpieza del plomo se considera una meta provisional.

El Modelo Biocinético de Exposición Integral al Plomo (IEUBK, por sus siglas en inglés) de la USEPA es la principal herramienta para determinar los niveles de limpiezas basados en el riesgo en sitios contaminados con plomo. Todas las aportaciones sobre exposición usadas en este modelo se encuentran actualmente bajo revisión de de los expertos técnicos de la USEPA, y aún no se han adoptado las ideas revisadas. Durante el diseño de remediación, la EPA de Illinois revisará la RG de plomo tomando en cuenta las consideraciones presentadas en la Directiva 9200.2-167 (diciembre de 2016) de la Oficina de Gestión de la Tierra y las Emergencias (OLEM) y para determinar si se precisan cambios a la RG sobre plomo.

Si se realiza un cambio a la RG sobre plomo, este cambio será comunicado al público en un documento de decisión futura adecuado. Los resultados de las investigaciones y los resultados confirmatorios para las propiedades ya investigadas o limpiadas en el sitio deberán ser reevaluados. Si los resultados de esas propiedades superan al nuevo valor, se podrían producir nuevas evaluaciones, incluida una evaluación de riesgos formal de esas propiedades o una limpieza adicional, si se justifica.

Si la USEPA emite una directiva adicional después de que se haya completado la acción de remediación, la protección del reparación y la RG serán evaluadas a través del Proceso de revisión cada cinco años de la CERCL. El Manual para Sitios Residenciales Contaminados con Plomo del Superfondo (USEPA, 2003) sugiere que las Revisiones cada cinco años pueden incluir estudios de exposición de los residentes, la toma de muestras nuevas de las propiedades, y la evaluación de la efectividad de los controles institucionales.

Con respecto a la limpieza se ha adoptado un método general conservador. Las decisiones sobre la limpieza se tomarán a pequeña escala. Un patio será evaluado a través de porciones de muestreo de cada patio que represente áreas diferentes del patio, tales como el patio trasero, el jardín delantero y los patios laterales. La ubicación de cada muestra incluirá muestras de cada uno de los intervalos de profundidad especificados. Cada área del patio y cada intervalo de profundidad muestreado serán comparados con la RG para las sustancias químicas preocupante. Las áreas con contacto del suelo potencialmente más alto, como las áreas sin vegetación y las áreas de juego serán muestreadas y evaluadas de manera separada del resto del patio. Los jardines también serán muestreados de manera separada del resto del patio. Se trata de un método cuidadoso y conservador que brinda protección adicional.

Remoción de todos los suelos contaminados de DePue

La consolidación y gestión de los suelos removidos de las áreas fuera del sitio hacia el sitio de la planta o la fábrica que era la fuente de la contaminación fuera del sitio es una práctica común en sitios del Superfondo. La cantidad de material a añadir en OU3 y las concentraciones en los

[15] Estas regulaciones de Illinois no son un requisito aplicable o relevante y adecuado (ARAR) para este sitio del Superfondo, pero tienen el estatus de regulación “A ser analizada” de la misma manera que una guía o política.

suelos de OU4 y SRM en comparación con las cantidades y concentraciones que ya están presentes en el área de la planta son bajas.

La EPA de Illinois reconoce que los comentarios de la comunidad expresan una preferencia por llevar el suelo contaminado en camiones fuera de DuPue. Las principales inquietudes de quienes enviaron sus comentarios (las emisiones constantes hacia el agua subterránea y la posible recontaminación del pueblo) pueden ser controladas con métodos confiables ya establecidos. La NCP desalienta el desecho de los desperdicios sin tratar fuera del sitio, y los suelos contaminados y SRM no se prestan fácilmente al tratamiento. El desecho fuera del sitio presenta un riesgo de implementación a corto plazo más alto para el público, a un mayor costo general, y no aumenta la eficacia, permanencia o protección a largo plazo de OU4.

La EPA de Illinois no tiene un motivo imperioso para apoya la Alternativa 3 por sobre la Alternativa 2, y ha seleccionado a la Alternativa 2 para la reparación de OU4.

Una limpieza más rápida

La EPA de Illinois reconoce el ritmo lento de los avances y que su eficiencia prevista no se ha manifestado en la práctica a causa de las prolongadas negociaciones que han sido necesarias con una de las PRP para llegar a un acuerdo sobre cómo se debería limpiar e investigar OU4. Muchos aspectos de estos proyectos no se rigen por una regulación específica y exigen de cierta negociación con las PRP. Dos aspectos de la limpieza de OU4, la RG del arsénico, y la interpretación de los resultados de la muestra del suelo por debajo de un pie de profundidad, fueron disputados formalmente por CBS, una de las PRP. Las negociaciones ampliadas que se precisaron para resolver la disputa y otras cuestiones han hecho más lentos los avances en OU4, y el trabajo en otras OU.

Antes de que el trabajo en el terreno pueda llevarse adelante, aún se deben cumplir muchos pasos en el proceso del Superfondo. Estos pasos son exigidos por la CERCLA, y no son discrecionales. Después de la finalización, la firma y la divulgación al público del ROD, el Diseño de remediación estará finalizado. Mientras se desarrolle el Diseño de remediación, tendrán lugar negociaciones entre las PRP, USEPA, y la EPA de Illinois, que tendrán como resultado una orden de consentimiento para la implementación de la acción de limpieza. Después de que la nueva orden esté finalizada, el trabajo en el terreno puede iniciarse. La EPA de Illinois sigue comprometida con cumplir estos nuevos pasos lo más rápidamente posible para que la investigación y la limpieza de las propiedades del pueblo puedan comenzar.

Detailed Responses

Superfund guidance does not require that comments be presented individually or verbatim. Comments from each stakeholder are presented by commenter and each comment is presented separately, including the Village of DePue, USEPA, and CBS. Illinois EPA has paraphrased or summarized lengthy comments. Comments from the public that address the same topic have been summarized and grouped for a single response.

Comments from the Village of DePue

These comments include those from the Village of DePue and the TASC contractor, which submitted comments on behalf of the Village and CAG. In cases where the TASC contractor comments raise the same points as the Village's comments, they are not repeated; otherwise the TASC comments are specifically identified.

Village Comment #1. The Remedial Goals for Lead and Arsenic Are Not Sufficiently Protective. The Village asserts that Illinois EPA has not determined site-specific factors, such as the bioavailability of metals that are COCs for OU4; and therefore, there are no site-specific cleanup goals in OU4. Adequately conservative RGs must be used because site-specific safety criteria were not included in the development of the RGs.

Illinois EPA Response: The Village states, "Lacking site-specific safety criteria, in order to accomplish the fundamental goal of health protection, adequately conservative PRGs must be used." Using adequately conservative PRGs is what Illinois EPA has done.

Site-specific factors are often used to provide a justification for less stringent RGs (less conservative, or higher values). Site-specific inputs to the calculations used to develop RGs can be related to exposure or can be related to the specific chemical of interest. Exposure inputs that are changed usually are those having to do with exposure frequency (how many days per year someone is exposed) and exposure duration (when someone is exposed, for how long). Typically, site-specific RGs are developed for those receptors for which exposure inputs can be easily and justifiably modified. While exposure inputs are often adjusted for industrial workers, construction workers, and vary widely for trespassers and recreationalists, in Illinois EPA's experience, exposure inputs for residential exposures are not modified because they represent adequately conservative inputs, drawn from USEPA guidance that result in protective RGs for residential receptors.

Site-specific RGs were developed for arsenic (through the incorporation of exposures from OU5, and inclusion of produce ingestion in OU4). Non-site-specific RGs are being used for all other COCs, i.e., cadmium, lead and manganese. The non-site specific RGs are calculated based on conservative default inputs documented in USEPA's Regional Screening Levels (USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites. https://www.epa.gov/risk/regional-screening-levels-rsls) and Illinois EPA's 35 Ill. Adm. Code Part 742.

A detailed discussion about the bioavailability factor, which the Village commented on extensively, is provided below.

Bioavailability

The term bioavailability refers to the percentage of an ingested dose, for example, of arsenic that is absorbed into the systemic circulation (USEPA Office of Solid Waste and Emergency Response (OSWER, now Office of Land and Emergency Management (OLEM), 9200.1-113). Bioavailability is generally considered to be 100 percent for metals, though there are exceptions. For cadmium and manganese, bioavailability is taken into account in the reference dose and is not subject to site-specific modification. For arsenic and lead, PRGs are developed using USEPA recommended conservative default values for bioavailability of 60 percent.

For lead, the interim RG of 400 mg/kg is derived from use of the USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children (described in more detail below). The model incorporates several exposure inputs. The default value for bioavailability currently used in the model is 60 percent. USEPA guidance states that, "It is acknowledged that this value has significant variability and uncertainty, but it is the estimate under which the IEUBK model was validated with comprehensive blood lead study results" (USEPA, 1999). Default values used in models are purposely developed to be conservative and to represent reasonably maximum exposures. The default bioavailability value for lead is sufficiently conservative that its use results in a protective PRG.

Recently the USEPA conducted a site-specific bioavailability study at the Matthiessen & Hegeler (M&H) Zinc Company Superfund site in LaSalle, Illinois. At M&H, site-specific bioavailability values for lead were measured in ten soil samples with results ranging from 6 percent to 62 percent and a mean value of 51 percent. Although the site-specific bioavailability value (51%) was lower than the default value (60 percent) used in the model, the USEPA elected to use the default value because it resulted in a potentially more health-protective (lower) soil RG of 400 mg/kg (USEPA, 2015).

A recent USEPA memorandum, entitled *Updated Scientific Considerations for Lead in Soil Cleanups* (OLEM Directive 9200.2-167, December 22, 2016), highlights the current science and risk assessment tools that should be considered when addressing lead-contaminated soils at CERCLA sites. In light of this new memorandum, Illinois EPA will re-evaluate the lead cleanup level for this Site during the remedial design phase, prior to initiating the remedial action. Any changes to the lead cleanup level will be addressed in an appropriate future decision document.

USEPA also recommends a default bioavailability value for arsenic of 60 percent (USEPA, 2012). In an effort to provide a more accurate default bioavailability value for arsenic in soil, the USEPA's Technical Review Workgroup (TRW) for Metals and Asbestos Bioavailability Committee recently compiled all available estimates of soil arsenic relative bioavailability values (USEPA, 2012). USEPA concluded that the empirical distribution of bioavailability values in this data set suggests that values for arsenic exceeding 60 percent are relatively uncommon (i.e., less than 5 percent of the estimates exceed 60 percent), and that it is reasonable to expect that

future relative bioavailability estimates exceeding 60 percent would also be uncommon, if samples were to be drawn from a collection of similar types of sites and soils.

As was done for lead, site-specific bioavailability values for arsenic were also measured by USEPA at the M&H site. For five soil samples the results range from 27 percent to 37 percent, with a mean value of 31 percent. These values are approximately half the default bioavailability value for arsenic of 60 percent recommended by USEPA. Again however, the USEPA selected the default value of 60 percent to calculate the arsenic RG, citing the fact that the site-specific values could: 1) theoretically underestimate the actual bioavailability values due to the size of the sample data set; and 2) use of the higher default EPA-recommended bioavailability value would result in a more health-protective (lower) soil PRG (USEPA, 2015).

There is an inverse relationship between lead or arsenic bioavailability and the calculation of a remediation objective. The lower the bioavailability, the higher the remediation objective, and the higher the bioavailability, the lower the remediation objective. Given the existing guidance from USEPA and the recent empirical data from the M&H site, Illinois EPA recognizes that site-specific bioavailability values for soils at OU4, if measured, could likely be lower than the default value of 60 percent. If a value for bioavailability is used that is lower than 60 percent, and all other inputs remain the same, a higher lead or arsenic RG would result. Illinois EPA has chosen to use the default bioavailability value for both arsenic and lead to determine the RG because the default value is technically defensible, is protective, and results in a conservative cleanup goal.

Village Comment 1a, regarding Lead: The Village asserts that the PRG for lead is not protective because it is based on a default lead bioavailability value of 60 percent and a blood lead level (BLL) of 10 micrograms per deciliter (µg/dL), and not the 5 µg/dL BLL recently proposed by the Centers for Disease Control. The Village states, "There is no evidence or site-specific data showing that lead bioavailability rates at DePue are significantly less than would be expected in a default setting. Accordingly, the 400 ppm PRG…is unlikely to be sufficiently protective…" While the Village acknowledges current USEPA guidance supports a RG of 400 ppm (based on a BLL of 10 µg/dL), the Village states that Illinois EPA has authority to select a more protective standard, and the RG should be lowered to reflect current science.

The Village also states that if USEPA guidance includes a revision to a lower RG while remedial action is ongoing, the lower RG should be used for all residential properties in OU4. The Village's TASC contractor asks what would occur should USEPA modify its screening lead level prior to, during, or after remedy implementation.

<u>Illinois EPA Response:</u>

<u>In response to the Village's assertion that a target blood lead level of 10 µg/dL results in a lead PRG that is not protective:</u> There are no mandated Federal or State soil standards for lead, nor is there a mandated blood lead level. USEPA provides a Regional Screening Level (RSL) of 400 mg/kg to be used as a site screening value and as an initial cleanup goal. Generally, no further action or study is needed at a site where site concentrations are below the RSLs. The Illinois Pollution Control Board also established 400 mg/kg as the default remediation objective (i.e.,

Tier 1 value) for lead for residential land use in Illinois EPA regulations at 35 Ill. Adm. Code Part 742.

The USEPA IEUBK Model is the primary tool used in determining risk-based cleanup levels at lead contaminated sites. The IEUBK model is used to predict the risk of elevated blood lead (BLL) levels in children (under the age of seven) that are exposed to environmental lead from many sources. The model also predicts the risk (e.g., the probability) that a typical child, exposed to specified media lead concentrations, will have a BLL greater or equal to a reference level, or in this case the level associated with potential adverse health effects. The USEPA currently uses a BLL reference level of 10 µg/dL. The IEUBK model was calibrated against two different community BLL and environmental lead studies (USEPA, 2002). Subsequent comparisons involving well-conducted blood and environmental lead studies have demonstrated reasonably close agreement between mean observed and predicted BLL concentrations, and between observed and predicted exceedances of 10 µg/dL, for children with adequate exposure characterizations.

In January of 2012, the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Childhood Lead Poisoning Prevention issued a report entitled Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. The 2012 report recommended that a reference value of 5 µg/dl be used to alert parents and medical professionals that a child has experienced an exposure to lead. The reference value is to be used to trigger counseling, environmental assessments, blood lead monitoring, and nutritional interventions. The level at which the CDC recommends medical intervention has not changed; this level remains at 45 µg/dL. The new reference value is based upon a 97.5 percentile of the National Health and Nutrition Examination Survey (NHANES)-generated blood lead level distribution in children 1-5 years old. As blood lead levels continue to drop in the U.S. over time, the BLL reference value is anticipated to continue to drop. While the BLL reference value is important, it is not a standard that requires compliance, nor was it developed to be used in that way. USEPA has not yet adopted this value for use as the BLL reference value in the IEUBK model.

However, in response to the CDC's recommendation that a new reference value be used, USEPA is currently in the process of reviewing and potentially revising a specific list of default inputs in the IEUBK model, in addition to the target blood lead level. USEPA continues to accept 400 ppm lead as an appropriate RG, based on the default bioavailability value. (USEPA, 2014a). The interim RG of 400 mg/kg lead is based on a target BLL of 10 µg/dl and a default lead bioavailability value of 60%.

While the Village rightly observes that Illinois EPA has no evidence that site-specific bioavailability would be lower than the default, neither does the Village have evidence that site-specific bioavailability would be higher than the default. Had USEPA elected to use the site-specific bioavailability value at M&H, it would have generated a cleanup value higher than 400 mg/kg. Illinois EPA continues to use the default bioavailability value because of its adequately conservative nature.

Due to the uncertainties surrounding how the IEUBK model may ultimately be revised, lowering the RG value at this time is not technically or regulatorily defensible. Default values currently

used in the model are purposely developed to be protective. Illinois EPA is waiting for additional guidance from USEPA about all the model inputs before proposing any changes to the Tier 1 lead value in 35 Ill. Adm. Code Part 742 to the Illinois Pollution Control Board.

It is important to note that current data from the Illinois Department of Public Health suggests that children in the DePue zip code are not generally experiencing elevated exposures to lead. Of the 31 children who had blood lead levels analyzed in 2015[16], none of those children exhibited blood lead levels greater than 10 µg/dL and one child exhibited a BLL between 5 and 9 µg/dL. The results from 2014 and 2013 indicated no children (of 31 evaluated each year) with BLLs above 5 µg/dL.

Additionally, an overall conservative approach is being taken toward cleanup. The decisions for cleanup will occur on a small scale. A yard will be evaluated through sampling portions of each yard that represent different areas of the yard, such as a back yard, front yard, and side yard. Each sample location will include samples from each of the specified depth intervals. Samples from each area of the yard and each depth interval will be compared to the RG for lead and the necessary action taken if the RG is exceeded. Areas with potentially higher soil contact, such as bare areas and play areas will be sampled and evaluated separately from the rest of the yard. Gardens will also be sampled separately from the rest of the yard. This is a careful and conservative approach that provides additional protectiveness.

<u>In response to the Village's comment that Illinois EPA should use its authority to lower the RG value</u>: In its comment, the Village states, "The Village understands that the 400 ppm lead PRG in the Proposed Plan follows current USEPA guidance. However, Illinois EPA has the authority to require a more protective standard in order to protect residents at a Superfund Site. (42 U.S.C. §9614(a))."

<u>Illinois EPA Response:</u> The Village references a section and subsection of CERCLA known as a savings clause, which reads:

> *Relationship to other law:*
>
> *(a) Additional State liability or requirements with respect to release of substances within State:*
>
> > *Nothing in this chapter shall be construed or interpreted as preempting any State from imposing any additional liability or requirements with respect to the release of hazardous substances within such State.*

This section simply defines CERCLA's relationship to other promulgated State laws or regulations, including non-preemption of State tort or environmental law beyond the liability CERCLA imposes, and coordination with other Federal laws. The CERCLA clause is different from the savings clauses found in other environmental statutes, as it applies to the entirety of CERCLA.

[16] Data from 2015 is the latest data currently available from the Illinois Department of Public Health.

Congress did not intend CERCLA to preempt any State remedies or laws regarding contamination. The CERCLA statute and implementing regulations cannot impose on or void existing promulgated State regulations regarding remediation values, even if those regulations are more stringent than federal regulations. It does not mean that a State can impose whatever standard it wants. Illinois has not promulgated a remediation goal lower than 400 ppm for lead. The Illinois Pollution Control Board cannot establish different standards without going through the rulemaking process, a process which may take several years.

In response to the Village's questions about what will occur if there is a change in guidance while remediation is ongoing: During remedial design, Illinois EPA will consider USEPA guidance, including OLEM Directive 9200.2-167. Any guidance issued while remediation is ongoing will also be considered. If the interim RG of 400 mg/kg changes, the ROD would be modified through an appropriate decision document. Investigatory and confirmatory results for properties already investigated or cleaned up would need to be reevaluated. If results from those properties exceeded the new value, additional evaluation could occur, including formal risk assessment for those properties or additional cleanup, if warranted.

Should USEPA issue new guidance after remedial action has been completed, the protectiveness of the remedy will be evaluated through the CERCLA Five Year Review process. The Superfund Lead Contaminated Residential Sites Handbook suggests that Five Year Reviews can include exposure studies of residents, resampling of properties, and evaluation of the effectiveness of institutional controls. In any Five Year Review, the continued protectiveness of remediation objectives is also evaluated.

Village Comment 1b regarding Arsenic: Both the Village and the CAG's TASC contractor express several concerns about the arsenic RG and its derivation and basis. Points made in the comments are:

- The arsenic PRG is higher than background and higher than that proposed for a nearby site; no explanation is provided for the differences.
- The derivation of 21 mg/kg is not clearly explained in the Proposed Plan or Scoping Document, and therefore, is not supported by actual data or clear assumptions.
- The arsenic PRG should be based on background and should be 11.6 mg/kg, the background value for DePue.
- The M&H arsenic PRG selected by USEPA is 18 mg/kg, and was selected "to be within the acceptable cancer risk range and to achieve a hazard index equal to 1."
- The derivation used some insufficiently conservative assumptions and some wrong assumptions, namely
    - an incorrect relative bioavailability factor
    - days at the lake vs. days at home
    - an incorrect assumption that many DePue residents will be away from home 14 days a year
- 21 ppm is minimally protective and because its derivation is questionable, the risk level is unacceptable.
- 21 ppm based on aggregate exposures (to the lake and a residence) may be overestimated because it does not account for residents who do not use the lake.

Illinois EPA Response:

In response to the Village's assertion that a background level for the arsenic RG should be used: Illinois EPA agrees that a background-based RG is the most protective RG that can be achieved for any given cleanup. While many cleanups in Illinois have been conducted using a site-specific or state-wide background value as the RG, many have not, for different reasons. As the Village is aware, it is Illinois EPA's preference that a background-based RG be used for arsenic and that Illinois EPA attempted to gain agreement from the DePue Group on use of the site-specific background value of 11.6 mg/kg.

After three years of negotiation, the DePue Group refused to agree to a background based PRG. Illinois EPA proposed 18.8 mg/kg as an acceptable risk-based value, calculated with appropriate exposure inputs. From a risk perspective, this value fell within the CERCLA carcinogenic risk range, near the midpoint of the range, and was less than a hazard index of 1.0. According to CERCLA guidance regarding the risk range, this would be an acceptable PRG even though this value represents a small increase in the cancer risk calculations over the cancer risk represented by background (Illinois EPA, 2015).

However, after Illinois EPA proposed this risk-based value, the DePue Group invoked formal dispute resolution over the arsenic PRG. Ultimately, the slight change from 18.8 mg/kg to 21 mg/kg was the result of a negotiated settlement of the formal dispute invoked by the PRPs. The calculation of 21 mg/kg was a result of a change in one exposure input in the risk calculation equations, as discussed below.

The RG put forth in the ROD has been developed according to Risk Assessment Guidance for Superfund (USEPA, 1989) and Illinois EPA practices, meets a hazard index of 1.0 and is within the CERCLA risk range. It is an acceptably protective RG. Additional detail is provided later in this response.

Comparison to Matthiessen & Hegeler

The M&H remedial goal of 18 mg/kg was developed using certain input factors from older versions of USEPA's Exposure Factors Handbook (1997), USEPA's 1991 OSWER Directive 9285.6-03 on Default Exposure Factors, and from USEPA's 2005 Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (HHRAP-HWCF) which accounts for the difference in the final calculated PRG. Some of these exposure factors have since been replaced and superseded by newer guidance and newer data on exposure patterns compiled in the latest version of USEPA's Exposure Factors Handbook (USEPA, 2011). The arsenic PRG derived for OU4 at DePue was based on this newer exposure data from the 2011 Exposure Factors Handbook (EFH).

In addition, the final arsenic RGs derived for each site were highly sensitive to the input factors used to estimate exposure from consumption of homegrown produce. At the M&H site USEPA used a model developed for estimating exposure to emissions from a hazardous waste incinerator, the HHRAP-HWCF, while Illinois EPA directed the New Jersey Zinc PRPs to use a model available from the Risk Assessment Information System (RAIS) Chemical Calculator developed by the Department of Energy's Oak Ridge National Laboratory (ORNL) and the University of Tennessee. The RAIS model uses input factors - consumption rates and fraction of

produce derived from a contaminated source – based on information from USEPA's 2011 EFH[17]. Overall, the differing inputs for residential soil exposure and garden produce consumption resulted in a calculated arsenic PRG for the OU4 that is slightly greater than the PRG calculated for the M&H site.

It should be noted that the cancer risk associated with 18 mg/kg at M&H equates to 8×10^{-5} (USEPA, 2015), which is actually a higher cancer risk value than that for DePue. This illustrates that there is a degree of uncertainty to such inputs and resulting calculations. The calculations are driven by the inputs used and some inputs affect the calculation more than do others.

<u>In response to the Village's request for a more detailed explanation of the Arsenic RG Derivation</u>: The commenters request a more fully articulated rationale for why 21 mg/kg is deemed protective and was selected rather than a background value, and that this rationale is introduced into the Proposed Plan and Administrative Record. The TASC contractor states, *"If the PRG is not based on EPA-approved risk assessment techniques, as is sometimes the case at Superfund sites, TASC suggests providing the rationale for why background was not chosen…"*

The PRG was calculated using Risk Assessment Guidance for Superfund principles and procedures and USEPA and Illinois EPA protocols. It addresses exposure from ingestion, inhalation, dermal contact, and the intake of garden produce grown in potentially contaminated soil. The PRG accounts for potential exposure to arsenic in a residential yard and during recreational use in and around Lake DePue. The PRG for arsenic is based on both protection of noncancer endpoints of toxicity (i.e. hazard index < 1.0) and cancer endpoints of toxicity (i.e, within the USEPA acceptable risk range of $l \times 10^{-4}$ to $l \times 10^{-6}$). In addition, the calculation of the PRG for arsenic was conducted using input factors listed in the latest USEPA EFH (USEPA, 2014b). The recent updates to the Standard Default Exposure Factor values in the latest EFH were largely based on consideration of newer information about some of the physical characteristics and activity patterns of the US population like body weight and skin surface area, and the amount of drinking water consumed.

Illinois EPA made a risk management decision to deviate from a background remedial goal and presented a detailed derivation of an acceptable arsenic PRG and its comparison to a background-based PRG in its conditional approval of the Scoping Document (Design Study) in February 2015. Illinois EPA used exposure inputs that were based on defaults from the Exposure Factors Handbook, exposures/risks calculated for OU5, and included a default conservative ingestion rate for produce consumption. This resulted in a calculation of 18.8 mg/kg. The DePue Group would not accept this PRG, and invoked dispute pursuant to the ICO (Bryan Cave, 2015a.)

[17] The two models classify produce items differently for the purpose of estimating consumption rates (e.g. the HHRAP model uses above and below ground categories while the RAIS model uses fruits and vegetables as does EPA's 2011 EFH), and use different soil-to-plant uptake factors, and fraction of total fruit and vegetable intake assumed to be homegrown (and therefore potentially contaminated). For example, the M&H HHRA assumed that 50% of all fruits and vegetables consumed were homegrown whereas the NJ Zinc arsenic PRG derivation assumes 13% is homegrown, based on data from EPA's 2011 EFH.

The input concerning the rate of homegrown produce ingestion proved to be a sensitive input factor (i.e., differences in this input factor greatly affect the calculation of the final RG). While the DePue Group supported the use of an average value to represent this input (i.e., much like a "central tendency" value), Illinois EPA supported using a 95th percentile value (i.e., to represent a "reasonable maximum exposure" or RME). It was the value associated with this single input (i.e., an average value versus a RME value) that was the basis of the formal dispute. Use of the 95th percentile resulted in a calculated arsenic value of 18.8 mg/kg according to Illinois EPA, while use of a central tendency value resulted in an arsenic value of 27.3 mg/kg, according to the DePue Group (DePue Group, 2015).

Illinois EPA and the DePue Group reached final agreement at a meeting on May 28, 2015. During this dispute negotiation meeting, Illinois EPA proposed using the 90th percentile to represent the produce ingestion rate. Although using the 90th percentile for the homegrown produce ingestion rate is not as conservative as using the 95th percentile, it is significantly more conservative than an average value proposed by the DePue Group, and is still considered by USEPA to be representative of a reasonable maximum exposure (USEPA, 1989). The DePue Group agreed and the agreement was finalized in a Memorandum of Agreement to resolve the dispute (IAGO, 2015). The final calculation – based on default exposure factors in the 2011 Exposure Factors Handbook and the 90th percentile for produce ingestion resulted in a calculation of 21.4 mg/kg, which Illinois EPA and the DePue Group rounded down to 21 mg/kg. This value equates to a non-cancer HI of 1.0 (0.98, rounded to 1.0) and a carcinogenic risk of 6×10^{-5} (5.77×10^{-5}, rounded to 6×10^{-5}), as explained in the Scoping Document.

The Proposed Plan describes the basis for the PRGs, but does not provide a detailed derivation. The ROD will include information about the relevant risk issues and derivation of the PRGs as described above, or include citations to where this information may be found.

<u>In response to the Village's comment that the derivation uses insufficiently conservative assumptions and wrong assumptions:</u>

- Bioavailability:

  In December 2012, USEPA released guidance entitled "Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil," which recommended a default RBA of 0.6 (or 60%) for arsenic in soil. This guidance replaced USEPA's previous recommendation of 80% bioavailability. USEPA now recommends use of 60% bioavailability as a conservative default and this value was used in developing the arsenic PRG.

  The DePue Group proposed to pursue *in vitro* studies to determine a bioavailability factor for use in developing a criterion for arsenic. However, Illinois EPA would not accept *in vitro* results because no method had yet been validated for conducting such tests. Illinois EPA also estimated that the proposed studies would have needed to demonstrate an arsenic bioavailability of less than about 4 percent in order to increase the arsenic criterion to values greater than background levels. Illinois EPA determined that such an outcome was highly unlikely; therefore, conducting bioavailability studies would be unproductive and time consuming.

- Days at the Lake vs. Days at Home

The commenter expresses concern that the formula used to derive the arsenic PRG assumes residents experience no home arsenic exposure on days when they use Lake DePue for recreational purposes, and that use of the lake PRG for these days, while more conservative, may still be insufficiently conservative.

Residents of the Village of DePue may be exposed to site related contaminants in various environmental media at multiple locations via multiple pathways. Therefore PRGs for residential soil were calculated to take into account multiple sources of exposure.

Residential soil PRGs were calculated that take into account:

1. Estimates of cancer risks and non-cancer hazards from exposure to environmental media in and around DePue Lake (OU5),
2. Ordinary contact with residential yard soil and house dust, and
3. Consumption of produce grown in the resident's yards.

The PRGs were calculated so that whatever target cancer risk and non-cancer hazard indices are adopted will remain protective for exposure to all three of these sources jointly. If the amount of soil or sediment a young child might ingest at the lake and at home could be known or reasonably estimated it would be appropriate to sum those exposures to calculate total exposure. However since that information is not available USEPA assumes daily contact (ingestion, dermal, inhalation) with soil and/or sediment to be a fixed total amount of 200 mg/day, a conservatively high values, from all sources combined (for example, young children are assumed to ingest soil and/or sediment as a result of incidental ingestion – contact with soil or sediment followed by hand-to-mouth contact, mouthing of objects, etc.) (USEPA, 2014b). Following this approach, any soil/sediment exposure assumed to occur at the lake would need to be deducted from that assumed to occur at the child's residence so the total exposure would remain 200 mg/day. The risks and hazards from such activities in and around Lake DePue (OU5) had already been calculated in the 2015 HHRA for OU5 using the standard residential soil exposure assumptions, so to avoid double counting potential soil exposures, (200 mg at the lake ***plus*** 200 mg at home), on the days residents visit OU5 and are assumed to be exposed to soil and sediment at that location, <u>all</u> soil exposure was assumed to occur in OU5 and none at their principal residences in OU4. The residential soil exposure frequency is therefore 350 days/year, the standard default assumption, minus 56 days/year, when exposure was assumed to occur in OU5, or 294 days/year. Homegrown produce consumption rates are average daily rates that are not related to where direct soil or sediment contact may occur on a given day. Because homegrown produce consumption rates are average daily rates (USEPA, 2011), homegrown produce consumption was assumed to occur 350 days/year. The commenter suggests that use solely of the Lake DePue PRG for 56 days per year may underestimate the actual level of exposure. Illinois EPA calculated the PRG for a child with no lake exposure and compared it to the PRG calculated for a child exposed at the lake for 56 days per year and found them to be virtually identical at 21.46 mg/kg and 21.42 mg/kg, respectively. This suggests that a child's potential exposure to arsenic in the lake soil and/or sediments calculated in the 2015 HHRA for OU5 is no different than the

arsenic exposure a child will receive when his or her residential soils are cleaned up using a PRG of 21 mg/kg.

- Residents in DePue do not spend 14 days away from home

The commenter states that it is improbable that all DePue residents can afford to take unpaid days away from work or take vacations away from home for two-weeks per year, and therefore the formula used to derive the arsenic PRG is not health protective.

The combined soil and dust ingestion rates and the exposure frequency rate of 350 days per year used to calculate the arsenic PRG are EPA default values found in the update of standard default exposure factors (USEPA, 2014b). The exposure frequency value of 350 days per year takes into account the effect of climatic variations (e.g., snow cover) as well as days away from home for various unspecified reasons, not necessarily vacations. USEPA considers this value to be appropriate and should be used unless alternate or site-specific values can be clearly justified by supporting data (USEPA, 1991). Illinois EPA has no data to support the use of another exposure frequency value, nor is Illinois EPA aware of other sources of information for such data. The use of 350 days per year is consistent with USEPA guidance and with calculating a reasonable maximum exposure (RME) estimate for a child residential receptor at the site.

<u>In response to the Village's assertion that 21 ppm is minimally protective:</u> Illinois EPA does not agree that 21 ppm is minimally protective. If it were minimally protective it would equate to a $1x10^{-4}$ cancer risk and calculated HI of 1.49. In actuality, 21 ppm equates to cancer risks below the upper bound of the risk range and noncancer hazards of 1.0; it is more than minimally protective.

While 21 ppm provides an inherently higher risk than background, it is on the order of about 6 in 100,000. In contrast, the lifetime risk of developing cancer for someone living in the US is 1 in 2 (for men) and 1 in 3 (for women) (ACS, 2016).

<u>In response to the Village's assertion that 21 ppm does not account for residents that do not go to the Lake</u>: As discussed above, the Lake DePue risk and hazard estimates are protective for any exposures the residents might have received on their residential properties if they had not visited the Lake. For a resident who does not frequent Lake DePue, the cancer risk represented by 21 mg/kg is essentially the same as for someone who does (i.e., 6×10^{-5} vs. 5.77×10^{-5}) and the non-cancer hazards for a child who does not frequent Lake DePue and for a child who does are both below 1.

Village Comment #2: Manganese Should Be Included in the Final List of Contaminants of Concern

The Village commented that manganese should be included as one of the COCs, and provided examples of manganese detections above its PRG on certain properties sampled during the Pilot Study.

Illinois EPA Response: Illinois EPA agrees with the comment and includes manganese as a COC. Manganese occurs above background concentrations in all sub-areas of the Village. In most of the cases where manganese is above its screening criterion, several other site-related metals exceed their background concentrations in the same sample. Manganese is associated with lithopone manufacturing that occurred at the DePue plant. Manganese concentrations are significantly elevated throughout the plant area, particularly in association with the Lithopone Ridges and Slag Pile area.

It is possible that naturally-occurring concentrations of manganese may be present in area soils at approximately the same level as the RG. Not all soil types present in the East Subarea of the Village were represented in the site-specific background study. Therefore, additional sampling may be conducted to determine if elevated manganese levels are indicative of background levels in certain soil types. If this sampling is not completed or, if completed and background levels are shown to be consistent with the current site-specific background values that are lower than the health-based RG, the manganese RG will be 1,800 mg/kg. If this additional background sampling does occur and background levels are shown to be greater than the health-based RG, consistent with USEPA guidance, the new manganese background level will be established as the RG. No sampling of an additional 20 properties as was described in the Proposed Plan is necessary to determine the final COC list.

Village Comment #3: The Proposed Plan proposes insufficient sampling for determining whether to exclude manganese, cadmium and cobalt as additional COCs.

The Village commented that sampling an additional 20 properties to determine the COCs was insufficient and without explanation.

Illinois EPA Response: Illinois EPA no longer considers it necessary to sample additional properties to determine the final COC list. Based on the results from the Pilot Study, and considering the results from the RAL sampling which were consistent with the Pilot Study results, Illinois EPA determines that the COCs are arsenic, cadmium, lead, and manganese.

The only other metals that exceeded their respective screening criteria were iron and cobalt. Iron has been eliminated from further consideration in OU4 sampling and remediation because it is not a CERCLA hazardous substance. Cobalt was detected above its PRG in only two of the more than 1300 samples taken during the Pilot Study and was not detected above the Pilot Study PRG in the 68 laboratory samples taken during the RAL assessment. Based on the Pilot Study data, cobalt occurred above its PRG at a frequency of about 0.1%. In the two cases cobalt was detected above its PRG, it was co-located with other contaminants above their PRGs (i.e., arsenic and lead). Based on an extremely low occurrence rate, and its general co-location with other metals that will require excavation, cobalt will not be carried forward as a final COC.

Language in the ROD has been modified from the Proposed Plan to address this.

Village Comment #4: The Proposed Plan Fails to Take Into Account Exposures at Multiple Operable Units and from Multiple Stressor Exposure Potentials.

The Village commented that the Proposed Plan fails to address how risks from other operable units are accounted for in the development of the PRGs.

Illinois EPA Response: Carcinogenic risks are additive, and PRGs developed for carcinogens must be considered in combination such that risks represented by the PRGs do not exceed the upper end of the risk range. Arsenic is the only carcinogen present in both OU4 and OU5. Carcinogenic risks from OU4 and OU5 were included within the calculation of the PRG, as explained above, and in Appendix G of the Scoping Document. See the response later in this Responsiveness Summary, under Public Comments, regarding how mixtures for carcinogens and non-carcinogens are addressed.

Village Comment #5: Use of Institutional Controls on Residential Properties Is Inappropriate for the Protection of Human Health in DePue.

Illinois EPA Response: The response to this comment is included in the response to Village Comment #6, below.

Village Comment #6: Cleanup to Only 18 Inches on Residential Property Is Insufficient to Protect DePue Residents' Health and Wellbeing

The Village and the Village's TASC contractor provided extensive comments on the planned depth of excavation and the potential use of Institutional Controls. Several members of the public expressed the same concerns. The Village's fifth and sixth comments and the TASC contractor's comments raised several concerns about the depth of excavation and ICs within the same comments. For clarity, Illinois EPA has addressed the depth of excavation and various concerns about ICs separately. The Village and the TASC contractor highlighted the following concerns:

- Cleanup to 18 inches is not sufficiently protective;
- Cleanup to 18 inches is not consistent with other sites in Illinois;
- ICs would be needed for everyday tasks;
- Proposed ICs are not consistent with USEPA guidance;
- Potential language barrier and high number of renters in DePue hinders compliance with ICs;
- ICs are impractical for the Village in conducting infrastructure repairs;
- ICs are unfair because they will negatively affect property values;
- Loss of value should be compensated;
- The community objects to ICs;
- The extent of ICs has not been projected in the Proposed Plan;
- Why has a remedial alternative removing all waste not been considered?
- Costs for subsequent Five Year Reviews should be included;
- How will ICs be documented in letters issued to property owners; and
- How will ICs be developed for those properties that do not grant access such that future property owners are informed and have an opportunity to have the property sampled.

Illinois EPA Response: There is no obligation pursuant to CERCLA to remove all contamination from all depth intervals. The purpose of a remedial action is to reduce risk from exposure to site–related chemicals that are greater than background concentrations and that exceed human health based cleanup goals. Simply because a chemical concentration exceeds background does not mean all of the chemical needs to be removed, particularly if present at levels below risk-based levels, or if exposure can be minimized. While removal of all contamination is desirable, the PRPs are not obligated through CERCLA, the NCP, state regulation, or any legal agreement to remove all contamination. In cases where exposure is minimized to an acceptable level, but not all contamination is removed, Institutional Controls (ICs) may be used.

Institutional Controls

ICs are administrative and/or legal controls that help to minimize the potential for human exposure to contamination and protect the integrity of a remedy (USEPA, 2012a). ICs, like the installation of a visual marker barrier are part of a balanced, practical approach to site cleanup and are generally designed to supplement engineering controls. At OU4, ICs are necessary to preserve the public health and to ensure proper stewardship by the PRPs if impacted soils should be brought to the surface in the future. Illinois EPA desires to avoid ICs and any conditions that might burden the property owner and require long term stewardship of residential or Village soils by the PRPs. Illinois EPA assumes the PRPs share this goal. To that end, Illinois EPA will encourage and work with the DePue Group to remove the full extent of contaminants above RGs such that the use of marker barriers and institutional controls is minimized or not needed at all.

Even so, institutional controls are a component of virtually all large scale CERCLA remedial actions, including at other smelter/residential cleanup efforts conducted in Illinois and elsewhere, regardless of the stated default excavation depth interval. Whether cleanup is conducted to 18 or 24 inches, a marker barrier and subsequent ICs may still be needed on a certain number of properties. Unforeseen circumstances may dictate the need for ICs, and the remedy selection process should provide for their potential use. As with other smelter/residential cleanups in Illinois, such decisions about whether or not a marker barrier will be required on any given property will be made on a case-by-case basis.

Depth of Remediation

Illinois EPA clarifies that general default depths of remediation are planned to occur to 18 inches on residential yards, 24 inches in gardens, and to 12 inches in public parks and alleys. According to USEPA guidance, a minimum of 12 inches of clean soil material is considered adequate to prevent exposure to contaminants at depth, and is protective of typical activities in residential yards. This same guidance indicates that 24 inches is adequately protective for gardens (USEUPA, 2003).

Illinois EPA clarifies that excavation will generally occur through the depth of contamination, with a maximum depth of 18 inches as proposed in the Scoping Document. If contamination only occurs to 12 inches, only 12 inches will be excavated. The minimum excavation depth will be six inches. This is described in detail in the Scoping Document, Section 12.2.4. (Ramboll Environ, 2015).

Illinois EPA supports a general default excavation depth of 18 inches because most of the soil contamination and SRM, as demonstrated by the results of the Pilot Study, appears to occur within the top 18 inches. For those instances where soil contamination and SRM occurs below 18 inches, Illinois EPA will work with the PRPs on a case-by-case basis to conduct removals to deeper depths such that the need for a marker barrier and future implementation of ICs is minimized.

On April 20, 2015, the DePue Group invoked a formal dispute with Illinois EPA over two issues regarding the OU4 cleanup. One issue concerned the arsenic RG (discussed elsewhere in this Responsiveness Summary) and one issue concerned the interpretation of analytical results from 1-2 feet. The DePue Group proposed averaging sample results across an entire yard to determine compliance with the RGs in the 1-2 foot depth interval. The DePue Group proposed this within their formal statement of dispute (Bryan Cave, 2015b). Illinois EPA disagreed with the proposal and found the averaging of all sample data from a one-foot interval across an entire yard to be unacceptable (Illinois EPA, 2015a). Details of the DePue Group's proposal and Illinois EPA's review may be found in the Administrative Record.

As a means to resolve the formal dispute and avoid additional significant delays, Illinois EPA and the DePue Group compromised on the default depth of excavation on yards to 18 inches, and agreed to maintain the quadrant-by-quadrant data evaluation approach. Illinois EPA believes this to be a reasonable approach, because most of the soil contamination occurs within the top 18 inches, and is not distributed across the entire yard, but is typically isolated to a front yard, side yard or similar. Furthermore, backfilling an 18 inch excavation with clean soil exceeds the 12 inches of clean cover recommended in USEPA guidance.

It is important to remember that individual samples do not represent an entire yard, but that a sample represents only a portion of a yard (i.e., a front yard, a side yard, etc.) from a specific depth interval. Even if contamination is identified at 18-24 inches within a sample, such contamination is assumed to be present only at that depth in that portion of the yard represented by that sample. Once a clean soil cover is in place as backfill for excavated soils, everyday exposure to impacted soils below 18 inches is eliminated. Subsequent exposure to impacted deeper soils in that portion of a yard, even if the resident is engaged in activities such as planting a tree, installing play equipment, and burying a pet will occur at a duration and frequency much less than that assumed in calculation of the RGs. If deeper impacted soils are encountered (i.e., soils below a marker barrier), as long as they are handled in accordance with the anticipated Construction Support Program which will be detailed in the Final Design, the short-term risk associated with exposure to these soils is negligible.

Illinois EPA acknowledges that other similar types of cleanups in Illinois have been conducted to 24 inches. However, Illinois EPA reiterates that allowing 18 inches as the declared default depth in DePue is a direct result of a compromise reached with the DePue Group through formal dispute resolution. This was a risk management decision made by Illinois EPA based on the Pilot Study data that indicated contamination on most properties occurs at a depth of 18 inches or less. The Village and public should be aware that even with a cleanup conducted to 24 inches, the potential need for ICs would remain. ICs are a component of remedial action at other similar

residential cleanups in Illinois regardless of final depth of cleanup (e.g., Hegeler Zinc, Matthiessen & Hegeler).

In response to the Village's assertion that Institutional Controls would be needed for everyday tasks: A visual marker barrier will be needed only for those portions of properties where contaminated soil or SRM remains below 18 inches. ICs will only be "triggered" if contaminated soil below a marker barrier is encountered. Given the relatively low frequency at which a barrier will likely be needed throughout the Village and given that only a small portion of a yard typically may require a barrier, Illinois EPA disagrees that every-day tasks will become burdensome at these properties.

It is important to remember that the presence of a marker barrier does not prohibit any activities at a given property. If a homeowner wants to breach a barrier to access soils below, for example to plant a tree, install a swing set, or bury a pet, they can. The ICs to be put in place as part of the OU4 remedy will advise property owners of the requirements necessary to safely handle the impacted soils from below the barrier, and to define how and when soils are to be handled under the PRPs Construction Support Program.

Proposed ICs are not consistent with USEPA guidance

The commenter cites what they call three "requirements" from guidance (USEPA, 2012a) that the proposed ICs for the OU4 remedy fail to meet: 1) ICs "may not apply to a particular situation based upon the circumstances"; 2) ICs are not appropriate where they cannot be "put in place in a long-term protective manner"; and 3) ICs should be "narrowly tailored to meet the objectives for the site in a manner that does not unnecessarily restrict the reasonably anticipated future land use or resources".

First, Illinois EPA affirms that the circumstances at OU4 necessitate the use of ICs. Because under any reasonable excavation scenario (either excavation to 24 inches or to the negotiated depth of 18 inches) a small volume of impacted soil may be left behind, control measures are necessary to minimize future exposure and protect the integrity of the remedy. The ICs proposed for OU4 will provide guidelines for the village and property owners on how to deal with impacted soils that may be brought to the surface in the future, and will define the responsibilities of the PRPs regarding long-term stewardship of these soils. Without ICs, deeper impacted soils brought to the surface could re-contaminate the village and pose a long-term threat to village residents.

Second, the precise form of the ICs to be put in place will be determined during preparation of the final Remedial Design, through discussions between the Village, Illinois EPA, and PRPs. Current concepts include, but are not limited to, implementation of a one-call system similar to the Joint Utility Locating Information for Excavators (JULIE), use of village ordinances for building permits, or dig permits. Illinois EPA will not accept any IC that cannot be put in place in a long-term protective manner. We will also ensure that all entities that are party to the ICs will have the capacity and resources necessary to implement, maintain, enforce, and modify, the ICs in order to ensure their long-term protectiveness.

Third, ICs proposed for OU4 are narrowly tailored. The ICs will be triggered only when soil below a marker barrier is brought to the surface. If the marker barrier is encountered during future excavation work at a property, assistance will be provided to facilitate proper handling of the soil removed from below the marker barrier. These soils will be placed into a repository to be constructed in OU3 as part of the Construction Support Program.

In response to the Village's comment that a potential language barrier and high number of renters in DePue hinders compliance with ICs: Illinois EPA has produced bi-lingual documents to aid in communication with DePue residents, including previous letters concerning results from the Pilot Study, and will continue to do so. Any documentation regarding action taken or ICs will be provided to the property owner; Illinois EPA can consider providing copies to the current tenants and requesting owners to provide copies to future tenants. Renters are generally not allowed to conduct the kind of intrusive activities that would trigger the ICs without the knowledge or permission of the property owner.

In response to the Village's comment that ICs are impractical for the Village in conducting infrastructure repairs: The Illinois Underground Utility Facilities Damage Prevention Act, 220 ILCS 50/1 et.seq. (2014), requires that a one-call system such as the JULIE be used by residential owners, municipalities, or excavation contractors when conducting excavation or demolition, in both emergency and non-emergency situations. Regardless of the emergency nature or the frequency of needed repairs, compliance with the Act is not precluded. The Village should already be familiar with such a system.

It is not Illinois EPA's intent to impose a burdensome process on the Village and Illinois EPA does not desire to hamper emergency repairs. It will be incumbent on the PRPs to devise a method to address such situations so that needed activities that involve contaminated soils can occur quickly or on an emergency basis. Such details will be provided in Remedial Design.

In response to the Village's comment that ICs are unfair because they will negatively affect property values: Precisely how ICs will affect property values is unknown, particularly when compared to property values that may be depressed because no cleanup has yet occurred. Both USEPA and Illinois EPA routinely limit the depth of excavation at residential cleanups, and include provision for ICs at many Superfund sites.

In response to the Village's comment that loss of value should be compensated:
The Village cites to pages 16 and 17 of the USEPA guidance, *Institutional Controls: A Guide to Planning, Implementing, Maintaining and Enforcing Institutional Controls at Contaminated Sites*, OSWER 9355.0-89 (December 2012). The Village states that the guidance "advises negotiations with property owners to compensate them for loss of value attributable to ICs." Illinois EPA finds no such statement or concept in the guidance, except within the context of proprietary controls (see page 18 of the guidance).

The USEPA guidance, also at page 18, describes a proprietary control as "…a written agreement between the property owner (or grantor) and a second party (or grantee), where the grantor agrees to refrain from certain actions or to perform certain actions designed to protect the response action or human health and the environment." The compensation mentioned in the

USEPA guidance, and referred to by the Village, is not mandatory, but is a possible element of a bargaining process leading to an agreement between the grantor and grantee, which is documented in the proprietary control, and recorded in the chain of title for the grantor's property.

The Uniform Environmental Covenants Act, 765 ILCS 122/1 et. seq. (2014) (UECA) sets forth the framework for environmental covenants in Illinois. UECA does not include any requirement for direct compensation to property owners in exchange for entering into an environmental covenant, and Illinois EPA does not involve itself in negotiations for compensation between PRPs and municipalities or private property owners.

In regard to the Village's comment that the community objects to ICs: The commenter remarks that EPA guidance specifies the need for community acceptance of institutional controls, citing OSWER 9355.0-89, page 2. However, the guidance actually states that, "legal requirements for maintaining ICs and community acceptance of the need for ICs to provide protection from residual contamination often are important to the long-term effectiveness of ICs." Illinois EPA agrees with the guidance that the effectiveness of ICs will be dependent on cooperation from all entities, including the Illinois EPA, Village, and PRPs. Illinois EPA's interpretation of this guidance is that community acceptance is desirable, but not mandatory before Illinois EPA can institute ICs that are aimed at protecting the public and the integrity of the cleanup.

In response to the Village's comment that the extent of ICs has not been projected in the Proposed Plan: The extent of ICs was not specifically discussed in the Proposed Plan, but the projection was included within the cost estimates for the alternatives presented in the Scoping Document. For cost estimating purposes a rate of 24% of the properties was assumed to require a subsurface marker barrier in at least one portion of the yard. Illinois EPA will work with the PRPs to minimize the number of marker barriers that may be required.

In response to the Village's comment that a remedial alternative removing all waste should be considered: Because the maximum default depth of excavation (18 inches) was a compromise to settle the dispute brought by the PRPs, an alternative for removal of all waste was not a viable remedial alternative. Therefore its consideration was not necessary.

In response to the Village's request that costs for subsequent Five Year Reviews should be included: The cost estimates in the Scoping Document include a periodic cost of $50,000 for every five-year period over 30 years, for a total of $300,000. These costs are identified as "5-Year Reviews" in Tables 9-4, 9-5A, and 9-5B of the Scoping Document (Ramboll Environ, 2015).

In response to the Village's comment asking how ICs will be documented in letters issued to property owners: The certification letters will provide a description of the samples collected, data results, and what remedial actions were taken to address contamination, including the depth of excavation. Site maps and sketches, likely similar to those provided in the Pilot Study report will be included. If a property requires a marker barrier, a site map, indicating the location of the marker barrier will be included. Procedures to follow regarding compliance with ICs will also be described.

In response to the Village's comment asking how ICs will be developed for those properties that do not grant access such that future property owners are informed and have an opportunity to have the property sampled: Illinois EPA cannot unilaterally impose institutional controls on any property. Properties where access has not been granted for investigation and/or cleanup will be documented as part of the database or other informational tool developed for tracking the status of properties. Further details will be provided as part of Remedial Design.

Village Comment #7: Cleanup of Parks, Ball Fields and Schoolyards to Only 12 inches Is Insufficient to Protect Children's Health and Will Hamper Village Operations and Management.

The Village commented on the default depth of cleanup to 12 inches for parks and alleys as being insufficiently protective of children and will burden Village of DePue workers in maintenance activities.

Illinois EPA Response: As part of the informal negotiations which preceded the formal dispute resolution process described above, Illinois EPA and the DePue Group met on March 19, 2015 to discuss and attempt to resolve outstanding issues. During that meeting, the DePue Group proposed a default depth of investigation for parks and alleys of 12 inches.

Because Illinois EPA assumes that park users and residents should not be digging in parks and alleys, particularly at depths greater than 12 inches, Illinois EPA considered this proposal reasonable. Illinois EPA assumes exposure to contaminants in parks and alleys is primarily at the surface, so remediation of the top 12 inches is adequate to address risk from normal use of parks and alleys. RGs based on normal use of parks and alleys (that is, a recreational use or "trespasser" use) would be significantly higher than residential-based RGs, due to differences in the exposure frequency and other exposure factors. Illinois EPA is using residential-based RGs for parks and alleys, so this adds an extra measure of protectiveness compared to an RG based on the actual usage of these properties. Remediation to 12 inches is consistent with USEPA guidance for more stringent (i.e., residential) exposures, and therefore, is protective for the more limited exposures associated with normal park and alley use.

Construction workers or park maintenance workers are also a receptor of concern on these types of properties. Levels protective of construction workers are generally much higher than RGs used for residential properties. Since the RGs for parks and alleys will be residential RGs, construction workers will also be protected. Illinois EPA will work with the DePue Group to remove contaminated soils above construction worker RGs that exist at 12 inches or below. If the residential RGs are exceeded at 12 inches, a barrier may be placed, alerting future workers of the need to handle deeper soil in accordance with the Construction Support Program.

Village Comment #8: The Proposed Plan Improperly Eliminates Sampling of the 0 to 1 Inch and 1-6 Inch Soil Intervals

The Village expressed concern about eliminating the 0 to 1 inch depth interval from separate analysis, stating that this is discouraged by USEPA guidance and that the Proposed Plan does not explain why a combined 0 to 6 inch depth interval will be used.

In addition, the TASC contractor requested a description of the appropriateness of the sample locations and their representativeness in making such a determination.

Illinois EPA Response: The fact that this is a smelter site is one of the reasons Illinois EPA requested the PRPs to conduct the evaluation of soil horizons as part of the Pilot Study effort. Aerial deposition is one way in which contaminants of concern have come to be located on properties within the Village. And this is the likely release mechanism discussed in USEPA guidance (USEPA, 2003) where the guidance states, "Conversely, the 0-1" horizon may be far more contaminated that the 1-6" at smelter sites…" A second reason is that guidance also recommends that both intervals be tested at sites where contaminated material has been used as fill. At the New Jersey Zinc site, material from plant operations was used as fill material on private properties and within the Village, in places such as alleys. Discrete deposits of fill, and fill that may be transported from alleys to yards through normal traffic, and reworking of yards through normal maintenance are other release mechanisms not accounted for in the guidance. Due to the time since plant operations ceased and when fill material was likely obtained from the plant area, it is also likely that some property owners may have reworked soil and fill on their property, thus mixing or redistributing contaminants. These factors have likely contributed to a redistribution of contamination within the top few inches.

USEPA guidance indicates that if the 0-1 inch horizon is statistically similar to the 1-6 inch horizon, it is acceptable to conduct subsequent analysis on the 0-6 inch horizon. For the Pilot Study, statistical hypothesis tests using t-tests or Wilcoxon tests, depending on the distribution of the data, were used to compare the 0-1 inch and 1-6 inch horizons. The null hypothesis tested was that the difference between the means of the two horizons was greater than 20% of the soil criteria. The results from the tests indicated the null hypothesis could be rejected for all metals and for all areas (i.e., yard, dripzone).

Based on the Pilot Study results where no statistical difference was observed between the 0-1 and 1-6 inch depth interval, Illinois EPA considers a sampling plan that treats 0-6 inches as one depth interval to be representative of the surface depth interval.

The Proposed Plan (page 17) mentions the conclusion of the statistical evaluation as one of the findings of the Pilot Study. While the Proposed Plan itself does not provide a detailed description of the statistical evaluation, this information is available in the Administrative Record, in the Pilot Study Sampling Report. No change from the Proposed Plan to the ROD will be made to address this.

In regard to the TASC contractor's comment concerning sample locations and representativeness, all sample locations included the collection of 0-1 inch and 1-6 inch depth

intervals and the results from all samples were used in the statistical analysis of depth intervals. The sample representativeness reflects the representativeness of the properties chosen for the Pilot Study. About half of the Pilot Study properties were randomly selected and about half were volunteered. While the northwestern subarea was somewhat under-represented, roughly equal numbers of properties were included from the west, south, and east subareas.

Village Comment #9: Temporary Storage of OU4 Wastes at OU3 Is Not Appropriate Remedial Action

The Village expresses concerns about bringing contaminated soil from OU4 to the plant facility for storage, including:

- Additional soil from OU4 will reduce the flood storage potential of OU3, causing an increase in water flow from OU3 during heavy storms, with potential recontamination of OU4, as has occurred at OU1.
- Contaminated soils from OU4 will cause additional contamination of OU3 groundwater.
- Additional soil from OU4 will hamper testing at OU3 and will affect the timeframe for remediation of OU3.

Illinois EPA Response: Illinois EPA acknowledges and shares the Village's concern regarding the potential for flooding and the transport of contaminated soil off-site after heavy storms. The Proposed Plan specifies that best management practices will be used to control potential leaching, dust, and run-on/run-off from the OU4 soil stockpiles. Run-on and run-off controls such as silt fence or earthen berms will be utilized in conjunction with a cover system to control potential wind dispersal and potential flooding. These and other common, easily implemented and effective engineering controls will be evaluated and applied to manage the storage of soil in stockpiles. Since the stockpiles will be covered and controlled, contaminants from the stockpile will not be transported via surface water flow. The specifics of the stockpiles and control systems will be provided in the Remedial Design. Illinois EPA will not approve a Final Remedial Design that fails to address the potential for flooding or results in the off-site migration of any soils from OU3.

Flooding:

While the South Ditch may have become re-contaminated since its initial remediation, this is primarily due to ongoing groundwater discharge from various seeps and springs in the area. On rare occasions during extreme precipitation events, overland surface water flow may leave OU3. One such occasion that the Village references in its full comment, occurred in April 2013, while the Illinois River was approximately 15 feet above flood stage. This extreme storm event caused overland flow from OU3 to flood Marquette Street due to a breach in the berm on the south side of the slag pile. Some of the water came from surface flow off the sides of the slag pile, and some of this water came from surface flow from water that ponds between the slag pile and the berm inside the plant area fence. The photos the Village provided clearly showed a small breach or low spot in the berm and the location of pumps used by the DePue Group to control water on the sidewalk and street. As the Village is aware from Illinois EPA's July 3, 2013 response to the Village's concerns, the DePue Group repaired this berm south of the slag pile to prevent future surface run-off.

Impact to Groundwater:
The OU4 soil stockpiles will be managed appropriately to prevent any ongoing releases, including to groundwater. The stockpiles will be covered to minimize direct infiltration of precipitation into the stockpiles thereby mitigating the potential for the migration of contaminants from the stockpiles to the Lower Aquifer. Liners could also be employed to minimize the potential for leaching from the stockpiles. Precipitation that runs-off from the covered stockpiles will be clean and will be contained and managed to prevent flooding and impacts to groundwater flow.

It's not clear why the commenter believes that the weight of the soil may have a potential effect on the migration of contaminants into the groundwater. However Illinois EPA notes that the volume of soil in the stockpiles will be small, and the stockpiles will be constructed with a base that will be spread out to limit the height of the stockpiles thereby spreading the weight over a larger area. Illinois EPA has no concern that the weight of the stockpiles will compress the underlying aquitard, thereby allowing the stockpiles to come into contact with the Lower Aquifer. When placed on the ground surface, Illinois EPA anticipates the pile will have no effect on groundwater flows or groundwater quality in the area.

Impact on Future OU3 Work:
The Remedial Investigation has concluded and there are no additional sampling activities currently planned for OU3 in the plant facility. The ecological assessment at OU3 is focused on the Bluff Area. Therefore the addition of OU4 soil stockpiles to OU3 will not inhibit any future testing or groundwater investigations. The presence of stockpiles also should not affect the remediation timeframe. The PRPs will be able to conduct a Feasibility Study based on the currently estimated types and volumes of OU4 soil to be stockpiled, and can include contingencies for any slight variations that may result from implementation of the OU4 cleanup.

Village Comment #10: The Proposed Plan Wrongly Leaves Open the Possibility of Use of XRF Testing at OU4.

The Village states that field testing via X-Ray Fluorescence (XRF) is not suitable for any of the OU4 COCs, except lead, and the PRPs proposed methodology to use XRF lead results as an indicator of the levels of COCs is faulty. Further, the Village states that the use of XRF as a screening tool for arsenic, cadmium and manganese will systematically underestimate the amount of contaminated soils at OU4, resulting in failure to clean up contaminated properties.

Illinois EPA Response: Illinois EPA's preference is that all OU4 investigation and confirmation samples be sent to the laboratory for chemical analysis. Yet, Illinois EPA acknowledges that XRF technology, if properly used, can provide significant savings in time by allowing decisions about investigations and cleanup to be made more quickly. Illinois EPA uses XRF in its own site investigations and acknowledges USEPA's use of XRF in its site investigations, including residential yard investigations. XRF is a useful and efficient tool which has often been used in investigations and cleanups of CERCLA sites contaminated with metals other than lead. It is commonly used at smelter/residential cleanup sites, and it can have a role to play in the OU4 sampling.

XRF is often used as a "screening" tool to test soil samples before they are sent to a laboratory for confirmation. If the XRF indicates concentration levels are too high, then additional excavation can occur without incurring the time and expense of laboratory samples. If the XRF indicates concentrations levels have met the RGs, then confirmatory samples can be collected and sent to a fixed lab to confirm the result. The use of XRF saves time in the field, and saves effort and costs associated with packaging samples and laboratory analysis.

Illinois EPA agrees that the DePue Group's April 3, 2015 proposal on how to use the XRF is problematic and Illinois EPA does not intend to allow its use in precisely the way proposed by the PRPs. Illinois EPA does however see value in using XRF as a screening tool to guide initial decisions regarding the extent of soil excavations, and will work with the PRP to define the necessary laboratory confirmation analyses that will be required for each COC. The purpose for confirmation sample analyses will be to provide laboratory quality data to the property owner that defines the concentrations of COCs remaining at a property after remedial activities are completed.

The language included in the Proposed Plan was meant to provide flexibility in how the XRF could be used. The language is general and flexible enough to allow the use of XRF as is appropriate, but does not commit Illinois EPA to allow the use of XRF in any way it feels is inappropriate. No change from the Proposed Plan to the ROD is required. Further details about how the XRF will be used will be included in the Remedial Design.

Village Comment #11: The Alternative Options Considered Under the Proposed Plan Are Inadequate and the Comparison of the Considered Options is Flawed.

The Village provides an extended comment about the alternatives considered and the comparison of the alternatives presented. Their major points include:

- Only two alternatives were presented.
- Two alternatives are inadequate to protect health and more protective options should be considered.
- The two options considered fail to take into account significant costs and risks, therefore, are deeply flawed.

For clarity, Illinois EPA presents a summary of the comment and its response in three separate parts, as presented in the Village's comment.

The Village Asserts that Additional Options Must Be Considered.

The Village comments that other more protective options should be considered, and provides the following options for evaluation:

- Use of 5 ug/dL BLL in calculating the PRG;
- Use of background level as the PRG for arsenic;
- Removal of COCs at greater depths in order to avoid ICs; and
- Sampling at 0-1 and 1-6 inch intervals and soil removal based on these more appropriate sampling intervals.

Illinois EPA Response: Illinois EPA does not agree that these options should be evaluated as separate remedial alternatives.

Decisions regarding the appropriate depth intervals to sample and appropriate inputs to use in developing PRGs are decisions that are made during investigative planning, the risk assessment and risk management process, and in developing remedial action objectives. These options are not subject to cost analysis and comparative analysis as remedial alternatives. The decisions regarding lead and arsenic have been addressed in responses above.

Since the entire Village has not yet been sampled and the extent of contamination is unknown, it is not possible to fully evaluate an alternative that includes removal of COCs to greater depths in order to avoid use of institutional controls. Further, as explained in previous responses, the general default depth of excavation is the result of a settlement made during formal dispute negotiations between Illinois EPA and PRPs, which makes evaluation of such an alternative unnecessary. Based on Illinois EPA's previous experience with and professional knowledge of similar sites, and consistent with the USEPA's Lead Handbook (USEPA, 2003), provisions for placement of a marker barrier and ICs is included in the preferred alternative. This is because regardless of the depth of removal, it is likely that ICs will be necessary to protect the future public health and preserve the integrity of the remedy. To what extent and on how many properties a marker barrier will be required is as yet unknown. Illinois EPA does occasionally require the evaluation of an alternative for cleanup that obviates the need for ICs, but this is done in situations where the site is a clearly defined discrete area where the horizontal and vertical extent of contamination has been fully characterized. The very nature of residential cleanups – for which access must be granted by another party (and the rate of access cannot be predicted) and where unknown quantities of SRM have been used as fill material, makes an evaluation of such an alternative highly uncertain.

The Village Asserts There Are Flaws in the Comparison of Considered Alternatives

The Village asserts the cost comparisons are flawed because:

- The costs of final disposal of contaminated soils are considered only in the rejected alternative (Alternative 3) although there will be costs – that must be included in the comparison – for final disposal of contaminated soils under the preferred option (Alternative 2).

- The costs of excavating and moving the contaminated soils twice under Option 2 – first to OU 3 for temporary management and subsequently off-site (or elsewhere on OU 3 if that is subsequently considered) – are not considered.

- Additional costs or delays to OU 3 testing and remediation caused by the storage of OU 4 wastes on OU 3 are not considered.

- Assumed costs for off-site transportation are not supported by any data. Likewise, assumed risks of transport off-site are not supported by any data, particularly since the OU 4 soils have not even been classified as hazardous versus non-hazardous.

The Village's TASC contractor supports some of these assertions and comments that assumed efficiencies in managing OU4 soils on OU3 are unfounded and requests that additional justification be provided. In addition, the TASC contractor questions Illinois EPA's rationale that short-term implementation risk is less; that potential risk to communities outside of DePue would not be excessive; that increased risks from accidents and spills is not supported in the Proposed Plan; and that the Proposed Plan implies off-site disposal is essentially not safe.

Illinois EPA Response: See Illinois EPA's response above to Village comment #9 regarding impact to OU3 investigations and remediation. In regard to final disposal costs, since a remedy has not been selected for OU3, it is not known how OU3 soils (and stockpiled OU4 soils) will be handled, managed, treated, stored, or disposed in perpetuity; therefore, such costs cannot yet be included, nor are those costs appropriate to assign to OU4 but are more appropriately considered in context of the final remedy for OU3. Illinois EPA notes that the major difference in costs between Alternative 2 and Alternative 3A/B is the long-distance hauling cost and landfill tipping fees associated with off-site disposal. Depending on what type of landfill would be used to accept the OU4 soils, the cost for off-site disposal ranges from $5 million to $10 million dollars above the current cost estimated for stockpiling of OU4 soils on OU3. The costs for off-site transportation and disposal are based on vendor quotes.

Consolidation and management of soils removed from off-site areas onto a plant site or manufacturing facility that was the source of off-site contamination is a common practice at Superfund sites and reflects the statutory bias against off-site land disposal of untreated waste. As an example, this same action is proposed by USEPA for residential soils at the M&H site (USEPA, 2015). When evaluating alternatives Illinois EPA generally considered how the placement of OU4 soils on OU3 could impact the cost of remediation of OU3. Because of the much larger quantity of slag, wastes, and contaminated fill found on OU3, Illinois EPA determined that including the relatively small volume of OU4 soils in the final remedy for OU3 would result in only minor additional costs and would not affect any options that may be implemented as a remedy for OU3. Further, by applying proper engineering practices to the management of OU4 soil stockpiles, Illinois EPA concludes that potential contamination of groundwater and flooding originating on OU3 can easily be prevented during the interim period between stockpiling of OU4 soil and the implementation of a final remedy for OU3.

Illinois EPA acknowledges that statements regarding "efficient remediation" for OU3 may be confusing. Language in the ROD has been revised as follows, "This alternative will achieve substantial risk reduction by removing the source of exposures at impacted OU4 properties and consolidating wastes on the FPSA ~~for efficient remediation~~ *where they can be efficiently remediated as part* of OU3."

Illinois EPA does not agree that the Proposed Plan implies that off-site disposal is essentially not safe. The Proposed Plan indicates that Alternative 2 provides *less risk* to the community and workers than off-site disposal under Alternative 3. Under Alternative 3, soils removed from OU4 will be trucked to OU3 in the same manner as Alternative 2. However once on OU3 these soils will be dumped and consolidated for reloading (i.e., double handling) into potentially larger haul trucks that will travel again through the village on their way to disposal in a landfill, for example, Peoria Disposal Company's Peoria #1 Landfill, approximately 60 miles away. As the

commenter correctly mentions, additional travel naturally increases the risk of accidents and spills. Off-site disposal increases risk due to longer transport distance at higher speeds, and spreads the exposure risk to towns outside of DePue. Regardless of the hazardous or non-hazardous nature of the soils, any spill along the transport route would need to be handled with special precautions and specially trained contractors. Some of these risks could be mitigated to some degree by proper transport route selection or imposed lower speed limits. However Illinois EPA does not believe that an additional transportation risk assessment or further justification is needed to conclude that Alternative 2 provides less risk to residents in DePue and to others in distant areas of the state.

The Village Asserts that Significant Risks and Costs are not Considered

Finally, the Village comments that certain significant risks and costs posed by Illinois EPA's preferred alternative are not considered, including:

- Risk of flooding from placing OU4 soils on OU3;
- Risk from aerial deposition of OU4 materials during transportation to OU3 or location on OU3;
- Risks from additional groundwater contamination;
- Risks and costs of recontamination of OU4 properties from flooding;
- Risks and costs from hindering efforts at OU3;
- Alternative 2 does not meet the CERCLA statutory requirement for permanent solutions because it does not account for final disposal of OU4 soil.

Illinois EPA Response: In regard to flooding and impacts to groundwater, see Illinois EPA's response to Village comment #9. In regard to aerial deposition during transportation, all necessary precautions will be taken and state regulations governing release of particulate matter, will be complied with to ensure that contamination is not released through the trucking of soils through town, or from any remediation activity. Details of the transportation and dust control processes will be specified in the final Remedial Design.

The Village invokes CERCLA §121(b)(1), stating that the preferred remedial alternative does not provide for final and permanent disposal of OU4 soil and therefore does not satisfy the statutory requirement for selecting a permanent remedy. CERCLA §121(b)(1)discusses the statutory preference for treatment of wastes to permanently reduce the volume, toxicity, or mobility of hazardous substances. CERCLA §121(b)(1)(G) states that selected remedial actions should utilize permanent solutions and treatment "to the maximum extent practicable." This preference is reflected in the NCP's nine criteria as the criterion "Reduction of toxicity, mobility, or volume through treatment," for which the degree that wastes can be treated or recycled is assessed. The NCP stresses that *treatment* is the focus of this criterion (see Fed. Reg. Vol. 55, No. 46, March 8, 1990). Illinois EPA recognizes that neither alternative 2 or 3 (assuming soils are non-hazardous) employ treatment, therefore, in the strictest sense, neither alternative satisfies this statutory preference.

However, CERCLA also recognizes that certain types of wastes do not readily lend themselves to treatment. Partly in recognition of this, the metals-in-soil Presumptive Remedy guidance was developed (USEPA, 1999) wherein different presumptive remedies are described for metals in

soil, depending on the level of threat. The purpose of presumptive remedies is to streamline the screening and detailed analysis steps in evaluating alternatives. A limited number of alternatives are put forward for full evaluation. The presumptive remedies for metals-in-soil are treatment, immobilization, or containment. Treatment (in the form of reclamation/recovery) is the presumptive remedy when feasible for principal threat wastes[18] or when recoverable metals can be easily separated from soil. Immobilization is also a presumptive remedy for principal threat wastes and involves combining contaminated soil with a reagent to cause a chemical or physical change to immobilize the metals, as was done for the South Ditch sediments. Containment is the presumptive remedy for low-level threat wastes like the soils from OU4.[19]

Alternative 2 presents a final remedy for OU4 properties for which access is granted and presents a permanent solution to address risks present in the residential area. Soil will be stockpiled at OU3 and will be addressed as part of the permanent remedial action for OU3. CERCLA 121(b)(1) provides that remedial actions selected that are "not appropriate for a preference under this subsection, the President shall publish an explanation as to why a remedial action involving such reductions was not selected." The ROD includes additional clarifying language to explain how the selected remedy represents a permanent solution for OU4 residential properties and why the preference for treatment is not met.

The DePue community objects to storage of OU4 soil on OU3.
Finally, the Village summarizes their comment #11 by stating that the DePue community strenuously objects to storage of OU4 wastes on OU 3 and that Alternative 2 fails to satisfy Criteria 1, 3, and 9, at least.

Illinois EPA Response: The nine criteria include two threshold criteria, five balancing criteria, and two modifying criteria. In order for a remedial alternative to be eligible as a selected remedy, the two threshold criteria must be met: 1) overall protection of human health and the environment, and 2) compliance with applicable or relevant and appropriate requirements. These are essentially "pass/fail" criteria.

The five balancing criteria are 3) long-term effectiveness and permanence; 4) reduction of toxicity, mobility, or volume through treatment; 5) short-term effectiveness; 6) implementability; and 7) cost. These criteria must be evaluated for each remedial alternative, but may be met to varying degrees depending on site-specific circumstances and the individual characteristics of the technologies. The balancing criteria help to evaluate remedial alternatives relative to each

[18] CERCLA presumptive remedy guidance defines principal threat wastes as "source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. Examples include surface soil or subsurface soil containing high concentrations of contaminants of concern that are (or potentially are) mobile due to wind entrainment, volatilization, surface runoff, or sub-surface transport; and highly-toxic source material, such as soils containing significant concentrations of highly toxic materials. No "threshold level" of toxicity/risk has been established to equate to "principal threat." However, where toxicity and mobility of source material combine to pose a potential risk of 10-3 or greater, generally treatment alternatives **should be evaluated**. (emphasis in original)

[19] Based on CERCLA Presumptive Remedy guidance, low-level threat waste is described as, "contaminated source material of low to moderate toxicity, such as surface soil containing contaminants of concern that generally are relatively immobile to air or ground water (i.e., non-liquid, low volatility, low leachability contaminants such as high molecular weight compounds) in the specific environmental setting; and low toxicity source material, such as soil and subsurface soil concentrations not greatly above reference dose levels or that present an excess cancer risk near the acceptable risk range.

other and can highlight similarities, differences, and tradeoffs among the alternatives. These criteria are not judged as "pass/fail" but are evaluated relative to each other.

Finally, the two modifying criteria are 8) support agency acceptance, and 9) community acceptance. These criteria are not threshold criteria and are generally not formally considered until after the public comment period on the proposed plan is completed. These two criteria are not judged as "pass/fail" and are used along with the balancing criteria to help identify a preferred alternative.

As detailed in Illinois EPA's responses above, Illinois EPA does not agree that Alternative 2 fails overall protectiveness. The RGs are protective. Alternative 2 and 3 offer equal protection to residents by using the same methods and RGs to address contaminated soil and SRM. As long as the stockpiles on OU3 are managed appropriately to prevent releases, the stockpiles do not present threats to human health and the environment.

Illinois EPA acknowledges that community comments express a preference for trucking contaminated soil away from DePue, Illinois. However off-site disposal presents greater short-term implementation risk to the public at a greater overall cost that does not result in an increase in long term effectiveness, permanence, or protectiveness. The NCP discourages off-site disposal of untreated wastes. When balancing the acceptability of criteria 3 through 7, Illinois EPA supports Alternative 2 as the preferred alternative and selected remedy.

Village Comment #12: Knowing Consent Is Not Possible Because the Proposed Access Agreement Fails Even To Mention the Proposed Institutional Controls

The Village reiterates its assertion that ICs are inappropriate for residential properties, but if the ROD continues to include ICs, then the Access Agreement must be revised to include disclosure of ICs. The Village states that separate access agreements should be used for initial testing and for cleanup.

Illinois EPA Response: No access agreement was included in the Proposed Plan. During the public availability session, Illinois EPA presented the access agreement used during the Pilot Study as an example of what the access agreement might look like. Illinois EPA agrees that property owners are owed notification that ICs may be used on their property as part of the remedial action. This will be addressed in the Remedial Design Plan.

USEPA guidance provides for access agreements that are separate for testing and cleanup and also provides for single agreements that cover both testing and cleanup. Illinois EPA appreciates the Village's comments regarding the desire for two separate access agreements. Illinois EPA has modified the ROD from the Proposed Plan to indicate that access will be gained once for sampling, and once for remedial action. This may be accomplished with one agreement (i.e., with two sign-offs) or two separate agreements. Sample access agreement(s) will be provided in Remedial Design.

Village Comment #13: The Time Frame for Completion of the Proposed Plan Is Far Too Long

The Village comments that the three year time span provided in the Proposed Plan for cleanup of OU4 is too long and does not convey a sense of urgency. The cleanup can and must move faster. At the public meeting, the Village commented that the Proposed Plan does not prioritize cleanup based on risk or contamination patterns and suggested that more heavily contaminated areas should be prioritized for cleanup.

Illinois EPA Response: To clarify, the time provided in the Scoping Document and Proposed Plan for conducting the cleanup is an *estimate* made for initial planning purposes and is subject to change. The estimate is based on an assumed rate of return of access agreements of 90% (approximately 730 properties of the 814 residential lots in DePue) and based on a field season of six months and twenty-two work days per month. Illinois EPA acknowledges that the field season could be extended beyond six months, but the field season will be weather-dependent. There are several ways in which the field effort can be conducted to expedite the overall investigation and cleanup, including using additional sampling teams to investigate multiple properties simultaneously; use of an on-site laboratory or expedited turn-around times from an off-site lab. Such details will be evaluated during Remedial Design.

There are several ways in which field work and cleanup can be prioritized. Sampling, evaluation of results, and needed cleanup can be prioritized toward those properties with young children present, with properties with suspected higher levels of contaminants (i.e., the east and south parts of the Village), historically (i.e., the 57 properties included in the RAL study and Pilot Study), or in other ways. Each of these approaches has merit, and these approaches along with any others will be considered during Remedial Design.

Village Comment: While not expressed in their formal written comments, at the public meeting, the Village provided comment that the cost analysis was not sound because it did not consider the costs of storage on OU3 over time.

Illinois EPA Response: Illinois EPA believes the cost analysis is sound. Once OU4 soils are stockpiled and proper cover and runoff controls are in place, storage on OU3 over time will involve only routine maintenance and inspection activities, which will incur negligible costs.

The final disposition of soils at OU3, including those excavated from OU4, is not yet known. While it is probable that soils removed from OU4 and stockpiled on OU3 will need to be moved again as part of final remedial action for OU3, the OU4 soils will be consolidated with similar wastes from OU3. Because the overall volume of soil and SRM to be removed from OU4 is minor compared to the volumes that already exist on OU3, additional costs from the consolidation of OU4 soils with OU3 materials will be subsumed in the remedial costs required to cleanup OU3. These minor consolidation costs are more appropriately assigned to OU3.

Comments from the United States Environmental Protection Agency

Comment: United States Environmental Protection Agency, Region 5: The Proposed Plan does not identify the contaminants of concern (COCs) requiring cleanup, rather identifies "human contaminants of preliminary concern (HCOPC)" for 13 contaminants, and defers the determination of COCs to start of full scale implementation of the remedy after collection of additional information (see page 22 of the Proposed Plan)[20]. Further, the proposed cleanup levels (preliminary remediation goals or "PRGs") for most of the HCOPCs are EPA residential regional screening levels.

Although cleaning up to residential soil screening levels is a conservatively protective approach for setting cleanup goals, it could result in additional cleanup measures in addition to what is necessary for protectiveness, including cleaning up naturally-occurring metals at or below background concentrations that are not attributable to the site. Alternatively, a site-specific Baseline Human Health Risk Assessment and site-specific background study can help identify appropriate COCs and protective cleanup goals, which may result in remediating less contamination than the approach outlined in the Proposed Plan.

EPA recommends that Illinois EPA, as enforcement lead agency at the New Jersey Zinc/Mobil Chemical site, secure an agreement with the PRPs on the final site COCs in cases where the residential soil screening level is the cleanup goal. Without this full agreement from the PRPs, EPA cannot support the proposed remedy in the New Jersey Zinc/Mobil Chemical Proposed Plan. EPA recommends that the final site COCs and associated cleanup levels be determined before full scale implementation of the remedy and be identified in the ROD.

Illinois EPA Response: USEPA's comment raises several points with respect to the COCs and basis for the remedial goals. Illinois EPA addresses each point in turn:

Final COCs

Illinois EPA agrees that the discussion of the human contaminants of potential concern contained in the Proposed Plan can benefit from further clarification and Illinois EPA has modified the presentation of this information for the ROD in order to respond to the comments. Illinois EPA has determined that arsenic, cadmium, lead and manganese are final COCs for OU4 soil removal. As explained in the response to a Village comment, additional sampling to determine the background value of manganese may occur. If the PRPs elect to not conduct this sampling or the results indicate background levels consistent with those already determined, then the RG for manganese will be 1,800 mg/kg as presented in the Proposed Plan. If this additional background sampling does occur and background levels are shown to be greater than the health-based RG, consistent with USEPA guidance, the new manganese background level will be established as the RG.

[20] The proposed plan also states on page 22 that "*Based on the Pilot Study data, arsenic, cadmium, and lead, at a minimum, will be included in the list of final COCs*", suggesting that Illinois EPA may be identifying these contaminants as COCs in the proposed plan. This, however, is unclear. Further, the Proposed Plan Fact Sheet identifies PRGs for only five HCOPCs instead of the 13 HCOPCs listed in the Proposed Plan without making it clear why only these five were presented in the Proposed Plan Fact Sheet.

Site-specific background:
USEPA expresses a concern that using screening levels as remediation goals, while conservative, may cause cleanup to occur to levels similar to background which may not be attributable to the site. USEPA recommends that a site-specific background study can help identify appropriate COCs and cleanup goals.[21]

A site-specific background study was completed by the DePue Group in June 2007 and the final report approved by Illinois EPA was issued in December 2011. A copy of this study is in the Administrative Record. The background study was used to establish the appropriate initial screening criterion for arsenic. The arsenic screening criterion was based upon the site-specific soil background concentration of 11.6 mg/kg instead of the residential screening level of 0.67 mg/kg or Illinois' state-wide background value of 11.3 mg/kg. There are no preliminary remedial goals recommended for OU4 in the Proposed Plan that are at or below site-specific background. The role of site-specific background on the choice of preliminary remedial goals has been clarified in the ROD.

As noted in the response to the Village comment regarding manganese, certain soil types present in the eastern part of the Village were not represented in the background study. These soil types and their naturally occurring manganese concentrations may be further investigated to support Remedial Design.

The use of residential soil screening levels:
The use of USEPA residential soil screening levels as preliminary remedial goals was initially anticipated to provide a means for quick decision-making and to expedite the Superfund process for the residential areas while still achieving a protective cleanup process. Had there not been an extended dispute with the PRPs over the appropriate preliminary remedial goal for arsenic, this approach would have accomplished that goal. That said, the USEPA residential soil screening levels for the noncancer endpoint of toxicity represent a hazard index of 1.0. These screening levels have been developed consistent with Illinois EPA risk procedures and, therefore, are consistent with how Illinois EPA establishes remedial goals for residential areas. Illinois EPA believes that the preliminary remedial goals established in the Proposed Plan are protective and, therefore, appropriate for developing and evaluating the potential cleanup alternatives for OU4.

None of the PRGs (now the RGs) are below site-specific background and none of the PRGs for non-carcinogens represent a hazard index greater than 1.0. The cancer risk represented by arsenic is within the CERCLA risk range (as detailed in the Scoping Document and a subsequent response, below), and the lead RG is consistent with current guidelines (as detailed in previous Illinois EPA responses). These values and their development are consistent with Superfund Guidance for Risk Assessment, Illinois EPA's protocols and procedures, and the NCP.

[21] Illinois EPA recognizes that preliminary remedial goals based upon the protection of human health may be lower than site-specific background concentrations. Illinois EPA also recognizes that if a chemical's health-based screening level and/or the preliminary remedial goal are lower than a site-specific background concentration, it would be impracticable to remediate that chemical to that lower health-based level.

Securing agreement with PRPs:
Illinois EPA concurs that agreement with the PRPs is the desired state, and as suggested by the comment, Illinois EPA will attempt to secure an agreement with the PRPs on the final list of COCs and their respective RGs.

Comments From CBS

Several comments were submitted by CBS, one of the PRPs for the site. Due to the concise nature of the comments, most are presented verbatim; lengthier comments are paraphrased.

CBS Comment #1: CBS Operations conditionally concurs with Illinois EPA's selection of Alternative 2 as the preferred remedial alternative for OU4 soils subject to the clarifications provided in CBS' other comments.

Illinois EPA Response: Illinois EPA acknowledges this comment and provides no specific response.

CBS Comment #2: The site background section states that the contamination in OU4 is likely due to two sources: aerial deposition and site-related material used as fill. It should be clarified that there are also non-site related anthropogenic and natural sources for some of the contaminants of concern (COCs) for the site. For example, lead can be found in house paints and deposits from historical automotive exhaust, arsenic can be found in insecticides and manganese can have a high natural background in some Illinois soils. The natural background for manganese in some soils can be high enough to actually exceed PRGs in some circumstances.

Illinois EPA Response: Aerial deposition and site-related material used as fill are the major sources of contamination in OU4. A site-specific background study was conducted to determine the natural or anthropogenic concentrations of metals in soils similar to those found at the site. The background study and how background concentrations were considered in determination of PRGs is discussed in the Proposed Plan; therefore, no clarification regarding background concentrations is required in the ROD. Soils with metal concentrations that exceed their respective RGs will be excavated and stockpiled in OU3 to be included in the final remedy for OU3. The Final Remedial Design will contain provisions for informing property owners about those instances where lead in house paint appears to be the only exposure issue (e.g., lead is the only COC found and lead concentrations above the RG are present only in drip zone samples). Lead based paint issues are generally not addressed by Superfund. If Illinois EPA identifies a case where lead paint is the only issue at a property, this may be referred to the Illinois Department of Public Health and Bureau and Putnam County Health Department. Manganese concentrations in OU4 soils and their relationship to natural background conditions are addressed by Illinois EPA in the response to CBS Comment #6 in this Responsiveness Summary. An option for additional background sampling to refine the background value of manganese for those soil types not included in the initial background study is included in the ROD.

CBS Comment #3: The Proposed Plan indicates that site-related material (SRM) taken directly from the site and placed in yards, alleys, and other areas as fill material is a likely source of contamination in OU4. The ROD should acknowledge that the Village of DePue, and past and present residents of DePue, share in the responsibility for the removal of SRM from the site and placement of SRM within OU4.

Illinois EPA Response: CERCLA imposes joint and several liability for the cleanup of contamination caused by hazardous substances. Illinois EPA will continue to look to the DePue Group to address its obligations under the interim consent order and any subsequent consent order(s). If CBS is aware of a particular individual or party for which CBS wants to establish liability, it can bring an action for contribution. An acknowledgement of potential third-party responsibility and shared liability is irrelevant with respect to the remedy selection process. Illinois EPA will not include such language in the ROD.

CBS Comment #4: The upland portion of the southeast area should be described to reflect that it includes a municipal dump which contains some general refuse (mainly glass bottles).

Illinois EPA Response: Illinois EPA acknowledges that a few glass bottles were observed in test pits dug in the upland portion of the southeast area. However, the glass bottles were identified in only one of nine test pits (Environ, 2014). These bottles were associated in the same test pit with site-related slag, bricks, retort, paper, wood debris, and briquettes. A note on Table 4-8 indicates: *Bottles, other containers, plastic bags, etc were found however; majority appeared to be potentially plant related waste*. Although the Upland Portion of the Southeast Area (UPSEA) has taken on the name of "former municipal dump", based on the test pit data Illinois EPA concludes that a majority of the materials in this area are not general municipal refuse, but are site related waste and refuse. A detailed description of the UPSEA is not critical to the remedy selection process for OU4; therefore, no change from the Proposed Plan to the ROD has been made.

CBS Comment #5: The Proposed Plan should include clarifying statements that (1) the data from the 1992 Illinois EPA CERCLA Site Inspection and the 1992–1994 IDPH Toxicology Investigation have been superseded by data of higher quality, (2) the data quality level of the 2000 Illinois EPA XRF Soil Study could not be determined, and (3) the data has not been used as part of the OU4 data assessment.

Illinois EPA Response: The Scoping Document adequately describes the previous data sets with much of the same language as provided in the comment above. The ROD clearly indicates that the Pilot Study data have been used to support OU4 remedy selection.

CBS Comment #6: Based on the results of the 1,300 soil samples analyzed during the Pilot Study, we believe that there is sufficient data to allow for selection of final COCs to only include arsenic, lead, and cadmium for all the reasons discussed in our May 11, 2016 letter to Illinois EPA (which we incorporate by reference into these comments). However, CBS has agreed to Illinois EPA's request to collect data from an additional 20 properties to reevaluate Illinois EPA's final list of COCs (as set forth in the Proposed Plan), assuming that this approach will result in CBS, Illinois EPA, and USEPA entering into a federal consent decree for implementation of the remedy at OU4. The criteria presented in the ROD for the selection of final COCs should include the following criteria: (1) comparison to PRGs, (2) frequency of exceedance of the PRGs, (3) comparison to background concentrations, and (4) presence of other site-related COCs at concentrations greater than PRGs in the same sample or area.

Illinois EPA Response: Illinois EPA has reviewed CBS's May 11, 2016 letter regarding manganese and refers readers to the detailed discussion about manganese in Attachment 1 at the end of this Responsiveness Summary.

In regard to CBS's four criteria for designating COCs, it is unclear if these criteria are meant to be considered independently of each other or in conjunction with each other. Illinois EPA agrees that COCs should be those metals that exceed their respective PRGs and exceed their respective background concentrations. CBS's suggested criteria of "presence of other site-related COCs at concentrations greater than PRGs in the same sample or area" would restrict cleanup to those quadrants/areas/properties that have at least two or more COCs above PRGs present. This criterion is unacceptable and Illinois EPA rejects it.

The only contaminants that exceeded screening criteria in the Pilot Study were arsenic, cadmium, cobalt, iron, lead, and manganese. Iron is not a regulated hazardous substance, and will not be included in the remedial action. Cobalt was detected above its PRG at only 2 of the 1300+ samples taken during the Pilot Study and was not detected above the PRG in the 68 laboratory samples taken during the RAL effort. Based on the Pilot Study data, cobalt occurred above its PRG at a frequency of about 0.1%. In the two cases in which cobalt was detected above its PRG, it was co-located with other contaminants above its PRG and would be removed through remediation of those locations for other COCs (i.e., arsenic and lead). In regard to frequency of exceedance, Illinois EPA generally does not use frequency of exceedance as a screening mechanism to exclude contaminants of potential concern before assessing risk. However, Illinois EPA can and does consider frequency of exceedance in its decision making for remedial actions and will do so here in regard to cobalt. Based on an extremely low occurrence rate, and its general co-location with other metals that require excavation, cobalt will not be carried forward as a final COC.

Manganese is a designated COC for OU4 based on the conceptual site model which indicates the presence of site sources of manganese, potential release mechanisms, migration and transport mechanisms, and potentially complete pathways to relevant receptors. Therefore the presence of manganese above its RG may be attributable to site operations.

There is the possibility that elevated manganese concentrations may be naturally-occurring for certain soils. The PRPs will be provided an opportunity to sample these other soil types to determine if this is the case. If the PRPs elect to not conduct additional sampling or if the sampling is completed and background levels are shown to be consistent with the current site-specific background values that are lower than the health-based RG, then the manganese RG will be 1,800 mg/kg, the same as its PRG as presented in the Proposed Plan.

No sampling of an additional 20 properties is necessary to determine the final COC list. The RGs for the COCs, arsenic, cadmium, lead, and manganese will be the same as the PRGs presented in the Proposed Plan, and are listed in the ROD. The ROD has been modified from the Proposed Plan to reflect this response.

For completeness on this topic, the Agency's full response regarding manganese is included as an attachment to this Responsiveness Summary. The response applies specifically to CBS's

position regarding manganese, conveyed to Illinois EPA in correspondence of May 11, 2016. A copy of this correspondence is in the Administrative Record.

CBS Comment #7: The ROD should indicate that exceedances of risk-based criteria does not necessarily mean a health impact will or has occurred.

Illinois EPA Response: The last sentence on page 20 of the Proposed Plan states: *Exceedance of these screening criteria was used as an indication that unacceptable human health risks and hazards may be present and prompted development of site-specific PRGs.* The ROD states, "The comparison of OU4 sampling results to human health screening criteria serves as a human health baseline risk assessment and provided an indication of current and potential future risks to adults, children, and construction workers potentially exposed to soils in OU4." Illinois EPA believes this language adequately communicates the idea that exceedance of PRGs represents the **potential** that adverse health effects **may** exist.

CBS Comment #8 The Proposed Plan indicates that "residential properties and parks will be restored using soil from an off-site source…". Because the footprint of the site as shown on Figure 2 of the Proposed Plan is large and some soils within this area may meet the criteria for backfill soil, the ROD should clarify that backfill soil may be obtained from areas within the defined site boundaries (i.e., within OU2, OU3, and OU4) provided the results of soil testing confirm that the backfill soil meets residential PRGs for the HCOPCs and TACO Tier 1 Soil remediation objectives for non-HCOPC chemicals.

Illinois EPA Response: As described in the Illinois EPA approved Scoping Document, following completion of an excavation, excavations will be backfilled with soil from an Illinois EPA-approved off-site source. As the boundary of OU4 is not known, in this context, Illinois EPA intends "off-site" to mean beyond the boundaries of the OU4 subareas. In cases where previous testing indicates soil from shallow intervals is unimpacted and overlies impacted intervals at the same individual property, the shallow unimpacted soil may be reused as backfill. If unimpacted soil from a property is re-used, that soil will be placed at the bottom of the excavation to allow for placement of clean soil from 0 to 6 inches bgs from an approved off-site source. Details regarding an acceptable backfill borrow source area will be provided in the Remedial Design.

CBS Comment #9: CBS Operations: Page 26; Common Elements, Section D: The Proposed Plan indicates that "a landscape contractor will maintain the yards until vegetation is established (one year)." The ROD should indicate that a landscape contractor will maintain the yards until vegetation is established or up to one year, whichever is sooner.

Illinois EPA Response: The language used in the Proposed Plan is the same language used by the PRPs in their final Scoping Document which was approved by Illinois EPA. To clarify, Illinois EPA has modified the language from the Proposed Plan to the ROD to state, "a landscape contractor will maintain the yards until vegetation is established, up to a maximum of one year."

CBS Comment #10: CBS supports use of the Area of Contamination (AOC) concept, which treats contiguous areas of contamination as a single disposal unit. As a result, certain requirements under the Resource Conservation, and Recovery Act (RCRA) would not be

triggered, including characterization testing via the toxicity characteristic leaching procedure (TCLP). CBS also states that TCLP analysis is not required for SRM, since this material is slag, and is exempt from RCRA due to the Bevill amendment. CBS requests Illinois EPA's rationale regarding the AOC concept.

Illinois EPA Response: It is Illinois EPA's position that the Area of Contamination (AOC) policy does not apply at OU4. In general, Illinois EPA understands that the AOC and related corrective action management unit (CAMU) concept is meant to apply to a "facility", or owned property, under the control of an owner/operator. Individually owned residential properties in OU4 would not be considered part of an AOC that includes OU3 that is owned by the PRPs. USEPA generally equates the CERCLA AOC with a single RCRA land-based unit, usually a "landfill." As stated in 55 Fed. Reg. 8760, March 8, 1990,

> *"…Thus, EPA believes that it is appropriate generally to consider CERCLA areas of contamination as a single RCRA land-based unit, or "landfill". However, since the definition of "landfill" would not include discrete, widely separated areas of contamination, the RCRA "unit" would not always encompass an entire CERCLA site. Waste consolidation from different units or AOCs at a CERCLA site are subject to any applicable RCRA requirements regardless of the volume of the waste or the purpose of the consolidation…".*

A residential property in OU4 would not, and should not, be equated with a "landfill." The entire plant site in OU3, or portions therein could be considered a single unit. Even other OUs that are directly connected to OU3, such as OUs 1 and 5, could be considered a single unit with each other and with OU3, but not properties in OU4. Additionally, the AOC policy is not a blanket relief from all RCRA hazardous waste requirements, but only provides relief against triggering land disposal requirements (LDRs) and the associated minimum technology requirements. Such requirements are not invoked for non-hazardous waste (i.e., non-hazardous soil).

Based on professional judgement, Illinois EPA anticipates that contaminated soils will not be hazardous. However, TCLP testing should be conducted for contaminated soils to confirm their status as non-hazardous. Regardless of the AOC concept, such soils should be tested to comply with the waste identification requirements of 35 Il. Admin Code 720 and 721. The Bevill Amendment is irrelevant for contaminated soils, since contaminated soils are not listed as one of the specific waste included in 40 CFR 261.4(b)(7)(ii) and 35 Il. Adm. Code 721.104 (b)(7)(B).

Illinois EPA provides no comment on the Bevill exemption status of SRM at this time. Regardless of the applicability of the Bevill amendment, RCRA is relevant and appropriate. SRM would require characterization via TCLP analysis to confirm if it exhibits characteristics different than those already exhibited by the slag pile and to ensure appropriate methods for management until a remedy is determined for OU3. TCLP analysis of the SRM could be conducted when OU4 actions are completed or close to complete or conducted at a later time in support of the FS for OU3.

TCLP analysis of stockpiles can be delayed until the OU4 actions are completed or close to complete, or conducted at a later time in support of the FS for OU3.

Comment #11: It should be noted in the ROD that if it is determined during completion of the remedial action that a more cost effective or efficient method of soil management is identified, the ROD should allow flexibility on implementing these options while keeping the same soil management practices as proposed for the two stockpiles.

Illinois EPA Response: Additional flexibility in managing soil could be appropriate. For instance, if at any point during Remedial Action, the DePue Group determines that placement in the corrective action management unit (CAMU) in OU3 would be appropriate for certain soils or SRM, Illinois EPA could support this as an appropriate action. Stockpiles may also be located in closer proximity to each other or configured differently than depicted in the Scoping Document for more efficient management. The ROD does not provide specific locations for the stockpiles. Details of stockpile location and management will be provided in Remedial Design.

CBS Comment #12: Table 3, ARARs: Because properties evaluated primarily for ecological concerns will be addressed at a later time, the ARARs listed in Table 3 that are related to waterfowl, wetlands, Section 404 of the Clean Water Act, etc. should not be included as ARARs in this Proposed Plan.

Illinois EPA Response: Compliance with these ARARs is separate from evaluation of "ecological concerns." It is possible these ARARs will not be triggered during any of the activities conducted within the residential areas, but would be applicable if such conditions or situations were present. No change from the Proposed Plan to the ROD is made in response to this comment.

Supplemental Comment: CBS comments about a recent decision in the United States Ninth Circuit Federal Court of Appeals, *Pakootas v. Teck Cominco Metals* (see 2006 WL 4011196, July 27, 2016). In this case, the 9th Circuit held that air deposition from a smelter was not a "disposal" of hazardous substances as that term is defined in CERCLA and the RCRA. CBS's comment states:

> *"…Consequently, Teck did not arrange for the disposal of lead, arsenic, cadmium, and mercury pursuant to CERCLA 107(a)(3) by emitting those constituents from the smelter's smokestack. Indeed, a disposal or deposit of constituents "is akin to 'putting down,' or placement" of those materials rather than the "gradual spread of contaminants without human intervention." …Based on the Teck case, CBS' remediation responsibility at OU4 and other parts of the Site may no longer include any constituents that may have been potentially deposited into the land or water by the former zinc smelter's air emissions at the Site. Moreover, as previously discussed with Illinois EPA, there is very little (if any) evidence to show that site-related materials are located at the OU4 properties due to the former smelter company's actions rather than by others when those properties were developed. Consequently, CBS' potential liability for site-related material present at OU4 is shared as noted within the Company's July25, 2016 comments to the Proposed Plan (see comment 3).*

CBS, however, remains committed to conducting the soil remediation program. But, based on the Teck decision, CBS may propose and discuss with Illinois EPA and U.S. EPA options to streamline some aspects of the remediation activities at OU4…".

Response: CBS comments dated August 15, 2016, indicated that based on the decision in Pakootas v. Teck Cominco Metals, 2016 WL 4011196 (9th Cir, July 27, 2016), it may propose and discuss with Illinois EPA and USEPA "options to streamline some aspects of the remediation activities at OU4." No specific modifications to the remediation activities at OU4 are proposed in the comment, and no change is made from the Proposed Plan to the ROD. Illinois EPA thanks CBS for bringing the Pakootas decision to its attention.

Comments from the Public

Ten members of the public submitted written comments, and one member of the public provided verbal comment at the public meeting. Many of these comments expressed the same concerns, and therefore, have been grouped when appropriate. Other comments that were lengthy or concern other specific issues are presented separately.

Public Comment #1: Several commenters expressed concerns about the manner in which soils and SRM excavated from OU4 would be stockpiled on OU3. Several commenters expressed support for disposing of this soil in a location not in DePue. Concerns included: soil and SRM from OU4 would increase contamination on OU3, OU3 would be more costly to cleanup, soils deposited in OU3 will need to be handled twice, Village property will be more prone to flooding from contaminated water, OU4 soils and SRM may contribute to groundwater contamination, groundwater condition and movement in OU3 is unknown, groundwater control systems are not fully functioning, soils will be stockpiled for a long time and may contribute to recontamination of surrounding area, contaminant migration may occur through air dispersal, water transport, and/or poorly functioning controls.

Illinois EPA Response: Illinois EPA agrees that if soils and SRM from OU4 were placed at OU3 in an uncontrolled manner, these concerns would be valid. However, Illinois EPA cannot accept a remedy that would cause further contamination or present the potential for an ongoing or future release, whether through air dispersion of contaminated soil or from contaminated surface water leaving the site. As part of the remedial action, and as described in the Proposed Plan for Alternative 2, the stockpiles are planned to be managed appropriately such that these types of ongoing releases do not occur.

A variety of best management practices will be employed to control the stockpiles and keep them contained. These practices may include multiple techniques such as use of covers, liners, berms or other containment structures which would control run-on and run-off. Covers would prevent the potential for air dispersion, covers and liners would prevent the potential for contaminant migration via leaching or surface water transport into groundwater or to ground surface. Surface water run-on, and run-off would be controlled by the cover and any secondary containment, such as a berm. Details of stockpile management will be presented in Remedial Design.

Existing soil within OU3 exhibit elevated concentrations of metals. The highest levels of metals found within OU3 soil and waste samples are five times to more than an order of magnitude greater than the concentrations found in OU4 soils. Based on the Pilot Study results, the contribution to total contaminant levels within OU3 from OU4 soils is expected to be minimal due to the relatively low concentrations in most of the OU4 soil compared to what is already present in OU3. SRM found on residential properties would have higher concentrations than residential soils, and is expected to be similar to the slag material that already exists at OU3, but the volume of this material to be removed from OU4 compared to what is already present at the plant site is minor. The estimate of the total in-place volume of soil and SRM likely to be removed from OU4 is 55,000 cubic yards (CY). As described in the Scoping Document (Section 9.2.1.2) soil from OU4 that exhibits concentrations of COCs greater than the residential RGs but

less than the construction worker RGs will be stockpiled and managed on OU3. Based on the Pilot Study results these soils (39,000 CY) are estimated to be the bulk of the soil excavated from OU4, and represent approximately 4% of the volume of slag (998,600 CY) currently estimated in OU3. The remaining materials to be removed from OU4 that contain SRM and soil with COC concentrations greater than the construction worker RG (16,000 CY) represents less than 2% of the volume of slag estimated in OU3.

Concerns about how the contaminated soil may affect groundwater are addressed in more detail later in this Responsiveness Summary.

In regard to the residents' desire to transport the contaminated soil from OU4 away from DePue, Illinois EPA acknowledges the community's desire. However, Illinois EPA is confident the soils will be managed appropriately when stockpiled on OU3. There is a valid concern regarding the significant amount of additional truck traffic that would be needed to transport soil out of town. The Village has a large population of small children, who would be at risk. While it is true that OU4 soils placed on OU3 will require a second handling, this future truck movement will be contained within OU3. When a remedy is implemented for OU3, the small amount of truck movement required to finally place OU4 soils will be subsumed by the much larger construction traffic required to construct an OU3 remedy.

Public Comment #2: How can this be called "a clean-up of the town" when the contaminated material is placed next to a three story slag pile that is nearly a ¼ of a mile long? This contaminated material will add to the pollution of the groundwater that passes under OU3 onto parts of OU4 and into OU5. This material needs to be placed in a lined area (a landfill type) and covered so water can not pass through and spread the contaminated material.

Illinois EPA Response: The preferred remedy will address only remediation of private and Village properties within the boundary of the Village of DePue. This remedy will not address forested or agricultural areas of the Village of DePue or contaminated portions of the former smelter and fertilizer facility. These other areas of the Village will be addressed after the residential and public areas are remediated. The former smelter and fertilizer facility will be addressed under a separate Proposed Plan and ROD that will be developed for OU3. Illinois EPA intends to protect any material stockpiled on OU3 such that water does not contact it and that the stockpiles themselves do not leach into shallow soil or contribute to further groundwater contamination.

Public Comment #3: If the XRF is used, one member of the public suggested that "an appropriately designed statistical comparison program be developed that proves to a high degree of statistical probability that samples being analyzed by field survey instrumentation replicates accredited/certified laboratory analysis. This comparative system should be utilized in all other Site sampling situations where there is a desire to utilize field survey instrumentation for sample analysis."

Illinois EPA Response: Illinois EPA agrees that rigorous quality control protocols should be in place to govern the use of field technologies such as the XRF. The Remedial Design will provide a detailed description of the specific ways in which XRF will be used and how that data

will be evaluated. USEPA guidance and methods provide data evaluation methods which will be consulted and used to design an appropriate data quality monitoring program for the XRF.

Public Comment #4: One member of the public stated that averaging sample results from a specific area has the tendency to represent a lower overall exposure and should be discouraged.

Illinois EPA Response: The average is the proper value to use when evaluating exposure, and ultimately, risk. The application of cleanup levels at a site is based on the behavior of the receptor and how the receptor is exposed to contamination across the site (USEPA, 2004). A key concept is the exposure unit (EU). The exposure unit generally is the geographic area within which a receptor comes in contact with a contaminated medium during the exposure duration. The EU for an adult resident is typically the residential yard, assuming the resident moves randomly across his/her property spending equal amounts of time in all areas over the long-term period of residence. However, the EU for a child living on the same residential yard may be much smaller than the entire yard, under the assumption that a child may receive most of his/her exposure in a more limited area such as a backyard, front yard, or a similar subunit of the entire yard. The objective for OU4 sampling is to provide the data necessary to determine if soil concentrations exceed the remedial goals. In the proposed approach for OU4 each residential yard typically will be subdivided into separate sampling areas, for example a front yard, back yard, side yards, depending on the total yard size. Each of these yard subunits will represent a separate EU for a child receptor.

The exposure point concentration (EPC) is the essential data element needed to evaluate exposure and risk in each EU. The EPC is defined in EPA's Risk Assessment Guidance for Superfund: Volume III-Part A (USEPA, 2001) as "the average chemical concentration to which receptors are exposed within an exposure unit." In OU4 residential properties, composite soil samples will be collected in each of the yard EUs to represent the chemical concentration a child could be exposed to. Because the average is the proper value to use when evaluating exposure, and ultimately risk, the physical "averaging" that occurs during composite sampling is consistent with the goal of estimating the mean for each EU. The sampling approach proposed for OU4 is consistent with the Superfund Lead-Contaminated Residential Sites Handbook (USEPA, 2003) which recommends five-point composite samples in residential yard subunits and special use areas like parks and schools.

Public Comment #5: A member of the public observed that the proposed OU4 HHRA is essentially a single metals contaminant presumptive remedy assessment. The commenter suggests that PRGs or, as stated by the commenter, "allowable levels of contaminant exposure," are adjusted to account for exposure to multiple contaminants.

Illinois EPA Response:

Addressing mixture effects for noncarcinogens: For those contaminants that are noncarcinogens, mixtures are addressed on a target organ basis. For the list of preliminary chemicals of potential concern for OU4, the only two contaminants that impact the same target organ are cadmium and barium. Both of these non-carcinogenic metals may have deleterious effects on the kidneys. The highest barium concentration detected to date on off-site properties has been 8,260 mg/kg

during the 2005 Removal Action Limit effort. During the Pilot Study sampling, the highest barium concentration detected was 7,610 mg/kg, with most of the samples less than 1,000 mg/kg. There have been no detections of barium that exceed the PRG of 15,000 mg/kg. If barium and cadmium are detected together in the same sample, one or the other, or both may still be detected below its PRG, yet if the concentrations were high enough the combination could result in a hazard index (HI) above 1.0 for the residential subarea (e.g. front yard, back yard, etc.) represented by that sample.

However, based on the low level of barium concentrations compared to its PRG found throughout the Village, the fact that cleanup of other COCs will further reduce cadmium and barium concentrations, and the fact that remedial decisions will be made for small subareas of a property (front yard, back yard, etc.) which provides for increased protectiveness, it is Illinois EPA's best professional judgement that the cadmium/barium mixture does not require the RGs to be modified.

Addressing mixture effects for carcinogens: For the list of preliminary chemicals of potential concern for OU4, only arsenic and cadmium are considered carcinogens. Cadmium is considered to be carcinogenic by the inhalation route of exposure only. A PRG based on a 1×10^{-6} cancer risk level for cadmium is 2,100 mg/kg (USEPA 2016). The noncancer endpoint of kidney toxicity is the more sensitive endpoint for cadmium, with a lower PRG of 70 mg/kg. Because the non-carcinogen-based PRGs are lower, they are more protective, and would also be protective of any potential carcinogenic risk. The residential RG of 70 mg/kg and the garden RG of 24 mg/kg included in the ROD are considered the most health-protective for cadmium.

Arsenic is also a carcinogen, and a protective level within the CERCLA risk range has been derived for arsenic, the details of which are included in the Scoping Document and the detailed response above. Cancer risk for arsenic at 21 mg/kg is 6×10^{-5} based on ingestion. Cancer risk for cadmium, based on inhalation, when cleaned up to 70 mg/kg will be significantly less than 1×10^{-6}, approximately 3×10^{-8}. If arsenic and cadmium cancer risks are additive, the risk from cadmium will be so small as to be negligible, and the resulting cancer risk would still be 6×10^{-5}.

Public Comment #6: Why are the criteria different at M&H Zinc in LaSalle when the 2 sites are only 15 miles apart?

Illinois EPA Response: See response above regarding the arsenic value and M&H. The differences are largely attributable to different exposure inputs used in the calculations of the RG.

Public Comment #7: I don't think that the proposed plan is very good, but I appreciate that, above all, you are interested in the health of people here in DePue and getting the pollution out of DePue. But, even though the proposed plan outside the OU4 site and Superfund site in New Jersey is to clean the ground, I believe it is important to mention that this site is the main center of pollution, so cleaning should take place around the barriers so that when it rains and water flows everywhere it does not continue to pollute. Well, I believe they had already taken measures to prevent this. But I am very interested in knowing the following: What food products grown in community gardens are contaminated with dangerous metals? I have planted pear trees,

tomatoes, apple trees, cucumbers and watermelon, and I do ask for an answer to these questions. How risky it is to consume this? Is the water contaminated as well?
Thank you for your attention to these comments.

Illinois EPA Response: Because metals are naturally occurring in soils, it is impossible to grow plants completely free of metals. The variation that exists among people, plants, soils, and behavioral factors further complicates predicting the uptake into plants and the absorption into humans. Metal concentrations in plants are affected by many factors, including weather, growth rate, and plant maturity. This means that levels of chemicals measured in a vegetable at one point in time may not represent the levels that would be in the same vegetable at another time during the growing season.

In general, while gardening, the greatest risk of exposure to contaminants is from contaminated soil getting into your mouth or by breathing in contaminated dust. For example, children playing in the garden may directly eat soil through hand-to-mouth play, or people may eat plants without first washing them to remove soil and dust. Because of this difficulty in predicting uptake into plants, we recommend that all gardeners follow healthy gardening practices that can help reduce exposure to chemicals from garden soils. In particular, remember to wash your garden vegetables thoroughly before eating them. This is especially important for root crops which grow directly in the soil and for leafy greens and herbs, which are likely to be contaminated by soil and dust. You should also consider peeling root vegetables like carrots and beets that are in contact with the soil or throwing away the outer leaves of crops like lettuce and cabbage.
Other good practices to follow include:

- Locate gardens away from old painted buildings and roads with heavy traffic.
- Use a thick layer of organic material such as compost or mulch. Place landscape fabric between ground soil and new, clean soil.
- Watch over small children to stop them from eating soil through hand-to-mouth play.
- Wash hands immediately after gardening and before eating to avoid accidentally eating soil.
- Wear gloves as a barrier between your hands and the soil.
- Throw away the outer leaves of greens, especially from the bottom of plants, before washing. Soil particles are most likely to be located on the outer leaves of leafy plants.
- Wash produce using running water.
- Avoid bringing contaminated soil into the home by: Cleaning tools, gloves and shoes before bringing them indoors; Putting highly soiled clothes in a bag before bringing them indoors and washing them promptly in a separate load; Washing off excess dirt from crops, especially root crops and leafy vegetables, before bringing them indoors.
- Maintaining a good soil nutrient balance, sufficient organic content, and a soil pH near a neutral pH of 7.0 will also decrease metal uptake into plants.
- As an alternative, raised garden beds filled with clean soil and compost can be used to grow garden plants.

Please note that all property owners that provide access during the sampling of the residential areas will have their garden soil sampled for the chemicals of concern.

Water from the village water system is not impacted by contamination from the site. See more detailed response about the Village's water supply in this Responsiveness Summary.

Public Comment #8: One commenter indicated that the risk assessment focuses on metals, and does not take into account other contaminants, including asbestos (asbestos containing waste materials, ACM) and radiologicals associated with fertilizer manufacture. The commenter suggests that bulk sampling of site-related fill material to determine if ACM is present should occur, and if ACM is present, the appropriate regulations should be complied with to control a potential release. The commenter expresses concern for workers that may be exposed by not using correct personal protective equipment or employing correct procedures for evaluating the need for personal protective equipment.

This same commenter asked if radioactive cobalt has been analyzed in samples from the Site, and if not, what the logic was for this decision.

Illinois EPA Response: An assessment of risk conducted for metals would not be combined with assessed risks from asbestos and/or radiologicals because of the different manner in which risks from asbestos and radiologicals are evaluated compared to metals.

A broader, fundamental question is "Are asbestos and radiologicals thought to be present in soils of OU4 such that they need to be evaluated?" Illinois EPA addresses these categories of contaminants in detail responses, below. To summarize, radiologicals will not be included in the sampling for OU4. Samples may be analyzed for asbestos as needed, if asbestos containing materials are found to be present. Illinois EPA does not have any evidence to believe that radiologicals would be present from plant operations given the nature of the operations. The CAG and/or Village have previously inquired about radioactive vanadium, potassium 40, and uranium on the plant site and radiologicals associated with OU2. Illinois EPA has addressed these questions to the CAG and Village, and copies of the responses may be found in the Information Repository at the Selby Township Library. (For instance, see Illinois EPA correspondence of September 22, 2011, May 30, 2012, July 11, 2013 and February 1, 2016.)

Asbestos: Asbestos and asbestos-containing materials (ACM) were present in building materials and equipment at the plant site. In Zinc Corporation of America's (ZCA) response to USEPA's CERCLA Section 104 (e) request for the New Jersey Zinc site, ZCA, a former owner and operator of the facility, indicates that ACM was removed from plant buildings before demolition and disposed of off-site in accordance with applicable requirements. ZCA states that a hired contractor conducted the removal and ACM was disposed at two different Illinois landfills. These activities occurred before 1992.

The New Jersey Zinc facility was not abandoned when demolition occurred. The company had only recently ceased operations and still had a staff presence on site when demolition activities were conducted. Information from ZCA indicates that handling of any ACM generated during demolition was addressed by the contractor according to practices in place at the time. These practices are the same as those used today. Materials to be removed would have been wetted, removed and contained while wet, and disposed of at an approved landfill.

There are no plans to conduct routine sampling and analysis for asbestos during remedial activities in the residential areas. Asbestos would not be associated with the slag or emissions generated during smelting operations. Asbestos is naturally occurring, ubiquitous, and was and is present in many materials used in building construction, older cars, etc. While it is possible that asbestos fibers may be present in the soil in residential yards, asbestos fibers could be present from any number of sources and from sources not related to the plant. There is no specific way to determine asbestos fibers' origin or to attribute asbestos fibers to the plant area.

If there is any building debris mixed with site-related material (i.e, SRM, the fill material from the plant area) that is recognized as ACM (e.g., a transite tile or piece of pipe wrap), it is possible asbestos could be present. If debris that is ACM is noted in the field, sampling for asbestos may occur. Illinois EPA would approach such a decision to sample based on the type of material present, the extent of debris relative to the extent of SRM and its removal. If such debris is discovered, and confirmed to be ACM, all such materials would be handled in accordance with applicable regulations to protect workers and residents.

Radiologicals: The Site was used for various manufacturing activities including diammonium phosphate (DAP) fertilizer manufacturing. Although radiologicals are recognized as intrinsic to the waste product from DAP fertilizer manufacturing, there is no evidence or reason to believe this material made its way to soils in OU4. OU2 of the NPL site is comprised of the phosphogypsum stack system which was used in conjunction with a DAP fertilizer manufacturing facility that was located in the Former Plant Site Area (OU3). The byproduct of the fertilizer manufacturing operations was phosphogypsum, which consists primarily of calcium sulfate with lesser amounts of fluoride, phosphorus, ammonia, and trace concentrations of radium. The phosphogypsum was pumped with large volumes of water to disposal in the phosphogypsum stack area in OU2. These materials were allowed to settle out from the waste stream and the excess water was recycled to the DAP manufacturing facility.

The National Emission Standard for Hazardous Air Pollutants (NESHAPs) regulates phosphogypsum (40 Code of Federal Regulations [CFR] Part 61, Subpart R). NESHAP mandates storage of phosphogypsum in stacks. Removal or transportation of the phosphogypsum from the stack system is strictly controlled and generally prohibited. NESHAP also provides limits on the amount of radon-222 that can be emitted from a phosphogypsum stack into the air per unit area (m^2) per unit of time (s).

In May 1990, in accordance with the requirements of 40 CFR 61, radon flux testing was conducted on the inactivated phosphogypsum stack. These source regions were measured and a mean radon flux for the total stack was calculated to be 7.4 picocuries per square meter per second (pCi/m^2s); which is below the NESHAPs 20 pCi/m^2s radon-222 flux limit.

In response to an inquiry from the community, the PRPs initiated additional radon flux testing for the current Phosphogypsum Stack configuration. On July 25, through 27, 2011, the additional radon flux testing was conducted on the stack. This testing was conducted to assess radon flux conditions on the stack after pond closures, and for current grading and vegetation conditions of the phosphogypsum stack surface. The testing was conducted in accordance with the USEPA and Illinois EPA approved work plan, and the field work was observed by a

representative of the USEPA's Region 5, Air and Radiation Division. A description of the work performed and results of the testing were presented in the Final Report: Phosphogypsum Stack Radon-222 Flux Testing, Terra Environmental, October 2011. The report was submitted to the USEPA, Region 5, Air and Radiation Division and Illinois EPA. All radon-222 flux readings were below the 20 pCi/m^2s standard listed in NESHAPs.

The radionuclides radium-226 (RD-226) and radium-228 (Rd-228) were included in the list of constituents analyzed in ground water samples for all Phase I, Phase II and Phase III quarterly monitoring events through the Fourth Quarterly Monitoring Event, conducted in July 2010 at OU2. No radium concentrations exceeded the State of Illinois ground water criterion of 20 pCi/L.

In response to comments received from Illinois EPA on behalf of the Village of DePue Community Advisory Group (CAG) regarding the potential for radionuclides other than Ra-226 and Ra-228 (e.g., lead-210 and polongium-210) to be present in ground water, the PRPs proposed and Illinois EPA concurred with analyzing selected ground water samples collected during the Second Biannual Monitoring Event conducted in May 2012 for Gross Alpha activity. The Gross Alpha test is commonly used to evaluate the presence/absence of several alpha-emitting radionuclides in drinking water and ground water samples, and is generally considered by USEPA to be a definitive test for that purpose. The ground water samples were selected based on locations where the highest activities of Ra-226 have been detected in the Intermediate Sand and Lower Aquifer and/or one or more indicator constituents (i.e., ammonia, phosphorus, fluoride and sulfate) had been detected at elevated concentrations. All results were reported as not detected. The State of Illinois drinking water standard for Gross Alpha activity is 15 picocuries per liter (pCi/L, 35 Ill. Adm. Code Part 611). All reported detection limits for the samples are below the ground water quality criterion.

In regard to the specific comment about cobalt, the radioactive isotopes of cobalt have not been considered during the analysis of samples from OU4, during the evaluation of the data or assessment of risk, and are not being considered in development of remedial action objectives or cleanup goals for OU4 or the other OUs for the site.

Cobalt-59 (Co-59) is the only isotope to exist naturally on Earth and it is stable. There are 22 other cobalt radioisotopes that have been characterized, the most stable being Co-60 with a half-life of 5.2714 years. All others have half-lives of less than a year and most are less than 18 hours.

The isotope of cobalt with the longest half life, Co-60, is a synthetic isotope. It is produced artificially in nuclear reactors and cyclotrons, and by nuclear power plant operation. Since there was no nuclear reactor, cyclotron, or nuclear power plant in operation at the Site, the detection or presence of any radioisotopes of cobalt, other than Co-59, is a nearly impossible event. The other known radioisotopes of cobalt have half-lives that are too short to be of concern. As such, there was and is no need to pursue the characterization of various radioisotopes of cobalt at the Site.

Public Comment #9: Because of radioactive isotopes associated with OU2 and OU3, suggest implementing a long term air and groundwater monitoring program for the appropriate isotopes that shows no releases are occurring.

Illinois EPA Response: Based on the testing described in the response to the previous comment, radionuclides above screening criteria or regulatory standards that are associated with the manufacture of DAP fertilizer are not migrating to OU4. Therefore a specific monitoring program for isotopes is not required.

Public Comment #10: The safest cleanup standards for arsenic and lead levels should be used.

Illinois EPA Response: See responses to Village comments, above regarding cleanup levels.

Public Comment #11: One commenter provided an extensive comment about different situations that may arise on a residential property for which a marker barrier was installed. The specific questions the commenter asked are included in the response below, with Illinois EPA's response.

Illinois EPA Response:

Q. How are a property owner's mature trees, shrubs and flowers handled?

A. Specific cleanup details will be provided in the final Remedial Design. However the Illinois EPA approved Scoping Document provides a general approach to excavating around landscape features. On a property-by-property basis the excavation plan will be communicated to the property owners during a pre-construction meeting. A pre-remediation checklist will be prepared for each property to identify the location and depth of the areas requiring soil removal and to document pre-remediation property conditions. The plan for re-vegetation will also be communicated to the property owner during the preconstruction meeting. A request will be made to the property owner to sign the pre-remediation checklist.

   A tolerance zone of a minimum of 3 feet from tree trunks or the drip line of the tree will be established. To avoid damage to larger vegetation, remedial activities will not be completed within the tolerance zone, depending on the excavation depth. Special care will be taken during excavation to avoid damaging the root systems of trees. If abundant roots are encountered during excavation, the excavation activities will cease and Illinois EPA will be notified. If a shrub is located in the portion of the yard requiring soil removal, the soils surrounding the shrub will be removed to the drip line of the shrub to minimize the potential of stressing the plant. Illinois EPA will be consulted prior to undertaking soil excavation at each property.

   Proceeding with the excavation activities in the tolerance zones will be determined on a case-by-case basis based on field observations made by Illinois EPA and the PRPs. Property owners will be informed of the areas where soil could not be removed. Some landscaping such as small shrubs and plants may be destroyed during remediation

activities. Landscaping that is removed or destroyed as part of excavation activities will be replaced with comparable landscaping, if requested by the owner (Environ 2015).

A barrier is placed 18" below the surface to indicate further contamination and he gets a clean bill of health from the EPA. He now decides to retire to Florida and wants to sell.

Q. How is the new owner going to know about the barrier?

A. It is anticipated that the seller will give the new owner a copy of the Illinois EPA letter issued at the completion of remedial action. However, recognizing that this may not always happen, a database will be maintained by the PRPs, in consultation and cooperation with Illinois EPA and possibly the Village, to track such properties. Further details will be presented in Remedial Design.

Q. Is he obligated to tell or is there an attachment to the deed?

A. The State of Illinois Residential Real Property Disclosure Act (765 ILCS 77/1 et seq. (2012)) contains a list of items that must be disclosed by the seller of residential property in Illinois. It requires the disclosure of lead in soils, but it does not specifically address the disclosure of other metals in soils on a residential lot. However, it is always advisable for a seller to consult with their real estate agent and/or attorney before making any decision on what does or does not need to be disclosed during the sale of residential property. Illinois EPA does not anticipate using an IC mechanism that is attached to the deed, but it must be sufficient to provide notice to all future owners of real property.

Family X, consisting of Mom, Dad, 5 children and Grandma buy the house. They move in and promptly succeed in plugging the sewer with disposable diapers, call Roto Rooter. He has to dig and the sewer is 5 1/2 feet down.

Q. How will he know about the barrier?

A. Professionals digging on property will have utilized the one-call system or used a dig permit process before digging and will know that the barrier will be encountered before digging and can prepare accordingly.

Q. Who does he call for a permit to dig?

A. It is not yet known if dig permits will be utilized, but such an idea will be considered. If dig permits are used, either a call to the one-call center or Village is envisioned.

Q. Does someone qualified in Hazmat need to dig?

A. No. If no barrier is in place where digging is planned, no precautions are needed. As part of the remedial action the PRPs will develop and implement a Construction Support Program. Specific details will be provided in the Remedial Design. In general, if a contractor or homeowner will be digging below a barrier they will be instructed to contact the PRPs, either directly or through the village, and the PRPs will provide assistance through a construction support program to facilitate proper handling of the soil removed from below the barrier. This soil will be removed from the property by the PRPs and placed into a repository to be constructed in OU3.

This family takes showers, flushes toilets, does dishes, and lots of laundry.

Q. How long will it take to get the sewer repaired?
A. Illinois EPA cannot answer this question.

Homeowner Z did not have a garden, but Family X decides to have one.

Q. Since no area has been cleaned to 24", will DePue Group come back to reclean an area?
A. Homeowners who want to place a new garden that will extend deeper than 18 inches on their property in an area where a marker barrier is present will be encouraged to employ the Construction Support Program. Under this program, the PRPs will facilitate the proper handling of any soil brought to the surface from below a barrier. Specific details on how the program will be implemented will be provided in the Remedial Design. An alternative is to create raised beds such that the marker barrier is not breached.

Q. Will they also reclean a play area?
New play areas that are established in portions of a yard that have been remediated will not require recleaning because the soil used to backfill these areas will be clean (i.e. soil that meets the RG). Other portions of a property that do not require remediation, already contain soils that meet the RGs. New play areas established in these areas will not require recleaning.

Homeowner Z had put in an asphalt driveway which is now crumbling. Family X decides to have it removed and pour concrete. Since no contaminated soil was removed from under the asphalt, also no barrier, that will be dug up to put in a gravel base to pour cement.

Q. Who is qualified to dig and what will happen to the contaminated soil?
A. Putting in a new driveway would generally require a permit from the Village. A system could be developed whereby application for a permit could trigger the Construction Support Program which would require the PRPs to evaluate the need for removal of soil and placement into a repository in OU3.

Family X gets a job transfer and has to move.

Q. How does the new homeowner find out about all the digging and moving of the barrier?
A. The new homeowner will either receive a copy of the Illinois EPA letter from the previous homeowner, or can become informed about the status of their property from the database to be maintained by the PRPs, Village, and/or Illinois EPA. Any future modifications to the barrier or additional excavations of soils from the property under the Construction Support Program will be documented by the PRPs in the database. Illinois EPA is also considering other means of informing Village residents or prospective purchasers of the existence of the property registry/database so that new residents may be kept up to date.

Q. Will there be a map showing where the barrier exists at different levels?
A. Yes, the letters Illinois EPA will issue will include a map that shows where and at what depth the barrier was placed. This information will also be included in any database.

Public Comment #12: Several comments were made regarding how placing contaminated soils in OU3 may affect groundwater and the connection between groundwater in OU4 and soil contamination. Concerns include:

- Flow from OU3 has not been mapped out; my property has continuous seeps, are they polluted?
- The water table is high on my property; what happens if you hit water; what will you do to control the water?
- 18 inches will only address surface and leave contaminated soil in place that can continue to pollute water and Lake DePue.
- Division Street ditch is adjacent to my property, and won't be taken care of until OU5 is addressed. Drainage from my property runs through this area. No one has considered the water table and underground water flow in OU4.

Illinois EPA Response: Groundwater flow has been extensively investigated as part of the Remedial Investigations conducted for OU2, OU3, and OU5. This includes mapping and monitoring of seeps and springs along the Lake DePue shoreline during investigations of OU3 and OU5, and the installation of monitoring wells within OU4 during investigation of OU3, including along the south side of the OU3 plant site (along Marquette Street) and along the south side of the OU4 residential area (between the residential areas and the lake). Groundwater flow maps for both the Lower Aquifer and the Upper Water Bearing Zone, showing flow from OU3 through the residential areas of OU4 are provided in the Phase II Remedial Investigation Report for OU3: On-Site Soil and Groundwater (Environ, 2014), a copy of which is located in the Information Repository[22] for the Site.

The predominant water bearing zone below the residential portions of OU4 is located in the Lower Aquifer. The Lower Aquifer is comprised of outwash deposits of sand and gravel of the Sankoty Sand Formation below OU2 and contiguous portions of alluvial deposits of the Henry Formation which extend below OU3 and OU4. Above the Lower Aquifer are alluvial silts and clays that extend to the ground surface. The Lower Aquifer does not extend to the Illinois River and terminates somewhere below Lake DePue.

Groundwater flow in the Lower Aquifer below the residential area south of OU3 is generally southerly from the bluff area of OU3 toward the lake. In the residential area along Marquette Street the depth to groundwater is approximately 15 feet below ground surface. At Division and Third Street the depth to groundwater is approximately 5 feet below ground surface. The Lower Aquifer groundwater discharges to the seeps, springs, and wetlands along the north shore and east end of the lake and diffuses upward along the fringe of the lake and possibly within the lake. Groundwater that flows below the western portion of OU3 through the residential area of OU4 (approximately west of Nassau Street) toward the lake is generally not contaminated. However, seeps and springs sampled along the north shore of the lake have shown elevated concentrations of site related metals.

[22] The Information Repository is located at the Selby Township Library in DePue and includes documents pertaining to all operable units. The Administrative Record for OU4 is located in the same place and includes documents pertaining specifically to OU4.

The fill material consisting of concrete, bricks, potential SRM and other debris observed on the shoreline, including impacted soils at the Division Street Drain is currently thought to be the likely source of metals in these seeps. An in-depth source evaluation of these seeps will be conducted in connection with the efforts for OU3 after the residential cleanup is complete. This will also include an evaluation of any potential impact to the lake or groundwater that may result from soil or SRM remaining at depth in OU4.

Properties closest to the lake have a higher water table due to their generally lower ground surface elevation. Properties located near the lake that contain seeps, or significant amounts of SRM used to backfill low areas, or that experience lake related flooding issues may require additional evaluation during implementation of the OU4 remedy. Illinois EPA will work with the PRPs and the property owner to address these unique situations on a case by case basis. Illinois EPA's approach in each of these cases will be to have the PRPs remove as much SRM as engineering and safe construction practices allow without exacerbating potential flooding issues, re-contaminating newly remediated areas, or causing new structural problems with existing buildings.

Public Comment #13: One commenter suggested that color coded maps should be used to show the distribution of various site contaminants. The purpose of the maps would be to, "assist affected property owners with a greater understanding of their specific situation, and develop a more informed position on decisions/actions that might require their attention in the future."

Illinois EPA Response: Illinois EPA agrees that property-specific maps should be provided to property owners to increase their understanding of the specific situation on their property. Such color-coded maps were generated during the Pilot Study by the DePue Group and were provided to property owners. Illinois EPA encourages the DePue Group to continue the use this format during Remedial Action. The specifics of how such information will be conveyed to property owners will be described in detail in the Remedial Design.

Public Comment #14: Who will be responsible for any damage caused by increased equipment and truck traffic on Village streets?

Illinois EPA Response: Presumably, the Village streets are rated for certain types of trucks and there are specific net weight requirements. The PRPs should not conduct work within the Village that violates any specific transportation regulations at the State, county, or local level. As long as these requirements are complied with, damage to Village streets is not anticipated. In the unlikely event road or infrastructure damage occurs through remedial activities conducted by remedial contractors, these parties will be responsible.

Public Comment #15: What happens to structures like retaining walls, if they are compromised and weakened, who is responsible?

Illinois EPA Response: The pre-excavation condition of each property will be documented using photographs and/or video, and a pre-remediation checklist will be reviewed and agreed upon by the property owner and the PRPs in a pre-construction meeting. To avoid damage to structures like retaining walls, remedial activities will generally not be conducted within a 1.5

foot tolerance zone around such a structure. Criteria for delineating the tolerance zones are discussed in the Scoping Document and will be detailed in the final Remedial Design. During excavation the remedial contractor will routinely evaluate the integrity of nearby structures to avoid damage or document damage if it occurs. Illinois EPA will provide oversight of the PRP's contractor. Proceeding with excavation activities in the tolerance zone will be determined on a case-by case basis based on field observations and need. Property owners will be informed of areas where soil could not be removed and this will be documented. The Access Agreement proposed for signature between the homeowner and PRPs stipulates that any damage caused by the work will be restored or repaired by PRPs.

Public Comment #16: One commenter expressed concern about increase in air pollution due to contaminated soil being disturbed.

Illinois EPA Response: Monitoring and control of nuisance dust will be conducted as outlined in the Fugitive Dust Control Plan in Appendix E of the Scoping Document. A zero visible dust standard will be implemented as required in 35 Ill. Adm. Code Section 212.301. Real-time particulate monitoring will be performed at every excavation site and low-flow personal air monitoring will be conducted to further evaluate contractor and potential public exposures during excavation activities. If site-specific action levels are exceeded, immediate action to control the dust source will be taken. Procedures to control the generation and migration of dust will include but not be limited to the application of water or other suppressants directly to the active excavation, washing or dry brushing truck tires prior to leaving loading area, prompt cleanup of spilled soils, and tarping trucks used for transport. These and other procedures will also be applied for dust control on haul roads and during stockpiling. Such details will be provided in Remedial Design.

Public Comment #17: If you remove 18 inches of soil, will you replace it with 18 inches? Soil settles.

Illinois EPA Response: Settling will be prevented by appropriate construction practices during backfilling procedures. The backfill materials will be compacted using the construction equipment or other suitable compaction methods to achieve a final elevation consistent with the pre-excavation elevation.

Public Comment #18: Additionally, OU1 (South Ditch) waste sediments described as "toxic sediments" have already been placed onto OU3 for stockpiling purposes. Per the recently distributed OU1- 5 Year summary, these sediments were stabilized with "power plant combustion ash". Is that material coal ash? If yes, it would seem at least a questionable practice to stabilize toxic/contaminated wastes (i.e. OU1 or OU4 wastes) with a material that might be considered at least as toxic/or even more toxic than the waste material being treated/stabilized. Utilize a non-hazardous stabilizing agent, but do not repeat the practice of utilizing toxic stabilization materials.

Illinois EPA Response: Sediments from OU1 required stabilization due to their high moisture content. Soils excavated from OU4 will not require stabilization prior to stockpiling, so no such stabilizing agent will be used.

The stabilization product used for OU1 was a calcium oxide-pozzolan mixture from a lime/cement chemical family. The Material Safety Data sheet for this material identified it has non-hazardous (Apollo, 2004). Illinois EPA acknowledges that the Five Year Review Reports (Illinois EPA 2010, 2015b) state, "The collected soft metals-contaminated sediments were then fixed and stabilized using combustion fly ash with a 60+% active calcium oxide concentration," and also refers to power plant combustion ash. The remedial action report describes this material as "bed ash." Several different terms are used to describe these types of materials which generally fall under the definition of coal combustion residue (CCR).

In general, USEPA supports the beneficial reuse of CCR as binders, immobilizers, and as a substitute for Portland cement (https://www.epa.gov/coalash/frequent-questions-about-beneficial-use-coal-ash). Sediments from OU1 were dewatered, stabilized, and placed in the interim containment cell constructed on OU3. The containment cell was constructed with bottom and sidewalls, overlain by a GCL liner, 30 mil PVC liner, and composite drainage net for leachate collection (Apollo, 2005) under 12 inches of soil (Apollo, 2006). Stabilized sediment was placed in the corrective action management unit (CAMU) and the CAMU was capped with material from the associated mixing and drying bed, and vegetated. The use of CCR in this manner was not a "questionable practice". The beneficial use of CCR as a stabilizer is allowed by federal and state regulation, the material is non-hazardous, and it is effectively isolated within the containment cell.

Public Comment # 19: My family and I are very interested in cleaning up the pollution in the yard of my house and the entire town, but as Mr. Bosnich said, all people do is talk, and I don't see anyone taking action to begin.

Public Comment #20: Well my comment is that you have promised many things, and have had meetings and meetings, but there are no advances at all. You are not concerned about the people that live in DePue. I won't believe it until I see the facts, that there is no more pollution. And honestly, I am worried just like everyone that lives in DePue. We have children. I've talked to people that have heard the same thing for years, that they're going to resolve it, and nothing. For God's sake, you should be humanitarians and offer a solution for the good of all of us. I hope that you really do something now without more years passing by. Don't let so many tests and meetings be in vain.

Public Comment #21: CBS has again delayed the clean-up of DePue for another year or two. The term "shovel ready" used two or three years ago has embarrassed the residents of this town. The promises from CBS mean nothing. The delay has given CBS the advantage of a less restrictive policy for the clean-up of lead, arsenic, and cadmium.

Illinois EPA Response: Illinois EPA acknowledges the slow pace of progress and acknowledges that its anticipated efficiencies haven't been realized due to the extended negotiations that have been required with one of the PRPs to reach agreement on how OU4 should be investigated and cleaned up. This included a lengthy, formal dispute resolution process that was required to resolve the arsenic RG and default minimum depth of excavation. Many aspects of these projects are not governed by specific regulation, nor does the State have

the authority to order the PRPs to conduct certain activities in certain ways. Therefore, many issues are required to be negotiated with the PRPs. Extended negotiations have taken time away from moving forward on cleanup of OU4 and from work on other OUs.

There are several steps in the Superfund process that remain to be accomplished before field work can occur. These steps are required of the Superfund law and the legal process, and are not discretionary. After the ROD is finalized, signed, and released to the public, the Remedial Design will be finalized. At the same time the Remedial Design is being developed, negotiations among the PRPs, USEPA, and Illinois EPA will occur, resulting in a consent order for implementation of the cleanup action. After the new order is finalized, field work can commence. Illinois EPA remains committed to accomplishing these additional steps as quickly as possible so the investigation and cleanup of the Village properties can begin.

Remaining Concerns

These comments concern issues that Illinois EPA cannot thoroughly address because it does not have regulatory authority or the jurisdiction to address the issues. Also included here are issues that are not limited to OU4, but may also concern other OUs or the Site as a whole.

Public Comment #22: I strongly believe that our small town was used for the benefit of Corp[orate] Greed. We were used, abused, and when all was depleted thrown away and left to deal with the consequences. Contaminated land, water, etc. I stay because I love my little town, we have a great spot, have raised our kids and don't want to go and start over. This is home. But, I do believe there is something here (ie. contaminants) reaking (*sic*) havoc on the health of our citizens – way too much cancer and MS to be justified. Maybe it's too late to do anything – but at least "own it" and compensate the Village for your actions!!

Illinois EPA Response: The commenter does not provide any specific comments pertaining to the proposed action for OU4, but expresses concern about the number of cancer and multiple sclerosis (MS) cases in DePue and states that the Village should be compensated.

In regard to the number of cancer and multiple sclerosis cases, Illinois EPA recognizes, based on available information from other agencies, that the rate of cancer in Bureau County does not appear to be elevated above state-wide rates. Information available about MS in DePue from the late 1990s indicates the presence of a MS "cluster" in DePue.

The ability to make a connection among a cancer, environmental exposure, and lifelong exposure history is extremely difficult. The Illinois Department of Public Health (IDPH) has published a report called "Incidence of Cancer in DePue (Bureau County), Illinois, 1987-1991", which indicated that during those years, 40 cases of all types of cancer were observed in the DePue zip code. This number did not differ significantly from the number of cases expected to be seen. More recent information from the Illinois State Cancer Registry maintained by IDPH indicates the age adjusted rate of cancer incidence in zip code 61322 (DePue, Illinois) between 2009 and 2013 is not statistically different from a group of 83 rural Illinois counties. In addition,

the five-year age adjusted incidence rate for zip code 61322 is not statistically different from the state as a whole (IDPH, 2015).

A study conducted in 1997 of the number of MS cases in DePue determined that the incidence of MS was higher between 1971 and 1990 than what would be expected. The study stated, "We cannot conclude with any reasonable certainty, however, that the MS cluster reported in this study is connected causally with the trace metal exposures generated by the smelter operations from 1903 through 1986 in DePue. Other competing explanations are available." (Schiffer, 2001).

Illinois EPA does not have authority or jurisdiction to address issues regarding compensation to the Village of DePue and its residents; therefore, does not address this portion of the comment in this Responsiveness Summary.

Public Comment #23: This delay and uncertain clean-up of lead, arsenic, and cadmium levels has caused property values to sink. Selling property in DePue is difficult. Banks refuse to give loans for property in a Superfund site. Will our cleanup certificate satisfy bankers that DePue is no longer [a] hazard and is safe for residents? The superfund site status must be eliminated through this cleanup process.

Illinois EPA Response: Illinois EPA cannot speak for area banks regarding what they will or will not need in order to provide loans. The letters that Illinois EPA will provide will thoroughly document the status of individual properties.

Superfund sites must go through a process which deletes the site from the National Priorities List. Partial deletions are possible after a site has been cleaned up. Even if Five Year Reviews are still required, a site or portion of a site may be deleted. Illinois EPA will pursue partial deletions when appropriate and will work with USEPA to accomplish deletions or partial deletions.

Public Comment #24: A commenter indicated that a coworker has mentioned that the water in DePue "is bad."

Illinois EPA Response: Drinking water may present a health concern if there are contaminants in it above health-based drinking water standards. It may also be the case that drinking water can be compliant with those regulatory standards, but still have some qualities that negatively affect its taste, smell, or color but do not present health threats. According to Illinois EPA's records as provided by the Village of DePue, and based on Illinois EPA's own sampling, the Village's water supply is in compliance with all relevant regulatory standards.

The Village of DePue obtains its drinking water from a deep groundwater aquifer consisting of limestone and sandstone overlain by shale bedrock. The aquifer utilized is considered confined by Illinois EPA and therefore is not geologically sensitive. The water is pumped from the aquifer by two wells. These wells are regulated as "community water supply" wells for the Village of DePue, and are designated Well #2 (also known as Village No. 4) and Well #3 (also known as Village No. 3). These two wells have depths of about 1,487 and 1,490 feet deep, respectively.

The wells are located behind the Village Hall and old Public Works building. Water is pumped from the wells, monitored and treated by the Village as needed in a filter and ion exchange plant, (for example, chlorine is added as a disinfectant), pressurized, and distributed throughout the Village. See Illinois EPA's Source Water Assessment Program (SWAP) Fact Sheet for DePue for more information. (See http://dataservices.epa.illinois.gov/swap/factsheet.aspx)

The Village of DePue must periodically test the water supply, consistent with Illinois regulations. The Village tests the water supply for lead, copper, chlorine, haloacetic acids, total trihalomethanes, barium, fluoride, iron, nitrate, sodium, combined radium 226/228, gross alpha, and uranium. (Not all of these regulated contaminants are required to be monitored every year.) Radionuclide sampling is required because this aquifer contains naturally occurring radionuclides, unrelated to the presence of the New Jersey Zinc/Mobil Chemical site.

To report the findings of its testing, the Village of DePue is required to provide a Consumer Confidence Report (CCR) to the public, which includes detailed information about the Village's water supply. The Village is responsible for the information in the CCR. The 2016 CCR, received at Illinois EPA on May 5, 2016, reported no violations. The CCR was published in the Bureau County Republican on March 31, 2016 in conformance with Illinois requirements. The 2016 CCR should be available no later than July 1, 2016. To see the Village's latest CCR, see http://www.epa.state.il.us/water/drinking-water-watch/index.html.

Due to the depth of the bedrock wells and the properties of the geological materials between the surface and the bedrock aquifers, the Village's water supply is effectively isolated from near surface groundwater. Illinois EPA does not consider site contaminants a threat to the bedrock aquifer which serves as a source of drinking water for the Village. In contrast to the depth of the drinking water supply wells, the wells used to monitor contaminants associated with the site are monitoring the more permeable sand and gravel water-bearing zone, at about 30 feet below ground surface.

Due to the location of the Village's water supply aquifer, the New Jersey Zinc/Mobil Chemical site is not considered a threat to the water supply; therefore, Illinois EPA has not required the Village's water system to be tested in connection with the investigations of the New Jersey Zinc/Mobil Chemical site.

In August 2014, Illinois EPA distributed to DePue residents Fact Sheet 16 that addressed community concerns about the Village of DePue's water supply and the New Jersey Zinc site. The full fact sheet may be found on Illinois EPA's web site, at:
http://www.epa.illinois.gov/topics/community-relations/sites/new-jersey-zinc/fact-sheet-16/index

Public Comment #25: Ongoing/Long term sampling program controls – Due to the longevity of certain site contaminants it seems that a well-developed long-term periodic site contaminant sampling program needs to be instituted to ensure that remaining contaminants in OU4, and for that matter any other impacted Site OU, are being held in containment as designed, and are not being released or escaping into any surrounding environment creating stressor exposure potentials to any subject receptor.

Illinois EPA Response: The effectiveness of any containment technologies and/or structures used as a component of the remedial action for OU4 (or any other OU after its remediation) will be assessed through five year reviews as required by CERCLA. In addition, those containment structures that are located on the plant site facility (i.e., the corrective action management unit and the planned stockpiles) will be under surveillance and maintained by the PRPs as will be required under a consent order to be entered into by the PRPs, Illinois EPA, and USEPA for the remedial action. Such containment technologies are considered adequate to properly contain contaminated soils and prevent additional releases such that Illinois EPA does not consider a stockpile sampling program as recommended by the commenter as necessary.

Public Comment #26: One commenter expressed the concern that even though certain contaminants, such as metals and radiologicals, may be naturally occurring, the concentrations of these contaminants on site and in certain places within OU4 may be higher than what is generally found in nature due to fact that contaminated wastes, soil, sediment, and waters are accumulated as waste piles and in concentrated volumes. The commenter indicates that exposure under these circumstances cannot be considered similar to exposure from naturally occurring conditions. The commenter also expresses a concern that potential exposures are complicated by receptors being exposed to more than one contaminant at the same time.

Illinois EPA Response: Illinois EPA agrees with the comment and acknowledges that naturally occurring compounds and elements can present risk to receptors if someone is exposed to concentrations above levels protective of human health.

Remediation objectives used for cleanup in OU4 will ensure that concentrations of metals remaining after action is taken will be at levels protective of human health. Radionuclide contaminants are not present at levels of concern in various source materials (see other responses regarding radionuclide contaminants) and will not be of concern for OU4.

Public Comment #27: Several commenters expressed concern about the time it was taking to get to this point in the process and that the cleanup itself would take too long. One commenter stated that they want to see the plan move ahead as quickly as it can; but that cleanup shouldn't take this long. When children are involved, there should be a sense of urgency. The commenter expressed the desire to see the initial 41 properties that have already been tested to get cleaned up. The Village noted that children and other residents will continue to be exposed to contaminants every day, and the Proposed Plan will allow these exposures to continue for another three years, at a minimum. The cleanup can and must move faster.

Illinois EPA Response: Delays in the cleanup have been discussed in a previous response. Illinois EPA remains committed to working with the PRPs to initiate the investigation and cleanup of village properties as quickly as possible.

Illinois EPA agrees that prioritization of properties for cleanup makes sense. How this can be accomplished will be discussed with the PRPs and specifics will be detailed in the final Remedial Design.

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ATTACHMENT 1

Detailed Response to CBS position of May 11, 2016 regarding Manganese

CBS describes the Pilot Study results for manganese, and makes the following points:

- Manganese was detected above its PRG at a frequency of about 1% of the Pilot Study samples, from the east and south subareas.
- In only three of the 15 samples in which manganese was detected above its PRG were lead or arsenic detected greater than their respective PRGs. In the remaining samples with manganese above its PRG, arsenic and lead were at their respective background levels, and zinc and cadmium were above background, but below their respective PRGs.
- Most of the elevated manganese concentrations occur below one foot below ground surface.

Illinois EPA acknowledges these points as an accurate description of the data, and provides the following considerations:

Cadmium was also detected above its PRG at about the same frequency as manganese. Particularly with metals with higher PRGs, a low frequency of detection above a PRG does not necessarily mean the metal is not site-related.

The fact that most of the PRG exceedances for manganese are found in the East Subarea, with very few in the South Subarea and none in the west or northwest suggests that manganese concentrations above the PRG are not representative of background conditions, otherwise exceedances would not be isolated to a few distinct areas. As acknowledged by CBS, manganese appears to be associated with zinc and cadmium concentrations that exceed their respective background concentrations. Because zinc and cadmium concentrations above background are site-related, this association provides further evidence that elevated manganese concentrations above the PRG could be site-related (because of its association with zinc and cadmium) and not representative of background.

Manganese is not the only metal that occurs predominantly in the subsurface. Most of the arsenic concentrations that exceed the PRG were also found in the 6-12 or 12-18 inch intervals. The occurrence of elevated manganese at depths below ground surface is consistent with the vertical distribution observed for other site-related contaminants.

<u>Manganese at Zinc Smelter Sites</u>

CBS indicates that the zinc ore used at the DePue plant was low in manganese concentrations and would primarily be present in the gangue materials separated from the ore during the beneficiation process. The concentrate resulting from the beneficiation process, was then shipped to DePue. CBS acknowledges that some zinc ore can contain elevated levels of manganese, such as Franklinite from New Jersey mines, or some smelters may have produced Spiegeleisen, a product high in manganese; however, production of this material was not conducted at DePue. Further, CBS contends that other zinc smelters cleanups in Illinois do not include manganese as a contaminant of concern or manganese is not considered a primary risk driver in soil.

Illinois EPA does not dispute that the DePue plant received concentrates from ores in Colorado. Illinois EPA has not independently verified that these ores are generally low in manganese, but is willing to concede this may be the case. But the DePue plant also received ores and ore

concentrates from other mines throughout the country with presumably variable levels of manganese.

Paramount Communications, Inc.'s response to USEPA's §104(e) information request states, "The ore used for NJZ's zinc operations came from various sources including company mines in New Mexico, Colorado, and Wisconsin. See Appendix C (Deposition of David Claus in Illinois v. New Jersey Zinc Co.)" (Morgan, Lewis & Bockius, October 11, 1993). Paramount's response also states, "The vertical retort residues in the cinder bank contained iron and other metals, mainly manganese, zinc and lead, not recovered in the furnacing operation. The composition of these residues changed due to different sources of material for NJZ's zinc operations." (Morgan, Lewis & Bockius, October 11, 1993).[23]

The DePue plant received, handled, and processed green ores, roasted ores and sintered ores from a variety of mines and sources throughout North America, which likely had variable levels of manganese. CBS's suggestions that manganese can be ignored as a potential soil contaminant of concern because previously beneficiated ore from Colorado was used, that ores generally low in manganese were used, or that Franklinite from New Jersey was never used, are weak lines of evidence, and are speculative without exhaustive records.

There are at least two other zinc smelter Superfund sites in Illinois that currently include manganese as a COC in residential soil: Matthiessen & Hegeler (M&H, Proposed Plan, 2015) and Sandoval Zinc (Final Remedial Investigation Report, November 2015). Regardless, such decisions are most appropriately made on a site-by-site basis, and whether or not other zinc smelter sites in Illinois include or do not include certain metals as COCs depends on the specific circumstances for that individual site.

One such specific circumstance involves the types of operations conducted at the various smelters in Illinois. While the M&H facility produced several manganese products, the DePue plant included one significant operation that did not occur at the other zinc smelters in Illinois, that of lithopone production. At the DePue plant, the highest concentrations of manganese are found in the eastern portion of the site (i.e., OU3), primarily associated with the Lithopone Ridges where lithopone manufacturing wastes were dumped and remain exposed at the ground surface, and to a lesser extent, around the Slag Pile area.

Illinois EPA disagrees with CBS's statement that Illinois EPA has identified manganese as a primary risk driver. On any given property, manganese could be a more significant risk driver, the only risk driver if it occurs as the only metal above its PRG, or a lesser contributor, if co-located with arsenic or cadmium. Because individual property-specific risk assessments were not conducted in an effort to expedite the remedial action, consideration for apportionment of risk or risk contribution from each metal was not a part of the presumptive remedy or remediation objective development process. Consequently Illinois EPA and the DePue Group agreed to make remediation decisions on a quadrant-by-quadrant basis, based on the sample results in each quadrant. As observed in the Pilot Study, on any given property, any of the HCOPCs could be a more significant risk driver or the only risk driver. Therefore by definition, if only manganese exceeds its PRG in any given sample, then manganese could be identified as the primary risk driver for remediation in that quadrant. Similarly, where lead, arsenic, or cadmium

[23] Illinois EPA's files include information indicating that ores and concentrates were sourced from a wide variety of mines over several decades, including manganese-bearing sphalerite from Wisconsin mines (Engineering Mining, December 1953 and Geology of the Upper Mississippi Valley Zinc-Lead District, USGS Professional Paper 309, also Wisconsin Geological & Natural History Survey, http://wgnhs.uwex.edu/minerals/sphalerite/).

concentrations exceed their PRGs, then one or more of these metals would be identified as the primary risk drivers for remediation in that quadrant. Illinois EPA acknowledges that lead and arsenic are the more prevalent contaminants of concern, on a Village-wide basis, in that they occur more often on a greater number of properties, but on any given individual property, the primary risk driver may differ.

Manganese at the DePue Site

CBS indicates that manganese would not be present in plant emissions, due to operating processes, including the temperatures attained in the retorts, and the presence of gas scrubbers. CBS opines that if manganese is site-related at all, it is due to slag residue rather than aerial deposition and if manganese is due to slag material (i.e, site-related material, or SRM), then manganese should not be found in isolation. Based on analytical results from the slag in OU3, 57 percent of the slag samples demonstrate manganese concentrations less that the PRG, and only 10 percent of the slag samples exceed the highest value in OU4[24]. CBS then presents a ratio or "fingerprint" of manganese concentrations to other metals in the slag, including zinc to manganese of 10:1 and lead to manganese of more than 3:1. CBS reasons that if the manganese in yards is due to SRM, then lead concentrations should be elevated above background, and zinc should be elevated above manganese. Based on the manganese samples that exceed the PRG, these conditions hold for only one sample. Some samples as noted with SRM had the same manganese concentrations as those that did not have SRM.

Illinois EPA agrees that direct placement of slag may be one of the sources for manganese in the East Subarea; however, placement of fill or SRM is not the only way manganese could be found in the residential area. The Slag Pile has only been covered since the early 1980's, and only on top. Wind-blown particulates from the pile could easily have been deposited in the East Subarea, downwind of the Slag Pile, in the prevailing wind direction, according to the DePue Group's evaluation of regional data and site-specific wind data collected at the site.

Illinois EPA notes that none of the Pilot Study samples that have manganese greater than its PRG contained significant SRM, based on the fact that any sample interval that contained SRM would have been excluded from the composite sample sent for analysis. Therefore, it's not remarkable that soil samples results do not fit the fingerprint profile the DePue Group has developed for average manganese, lead, and zinc concentrations in slag. Illinois EPA notes that the manganese, lead, and zinc concentrations in slag samples encompass a wide range of concentrations and proportions, probably due to the various ore types and processes used at the plant over time. This limits the usefulness of a slag "fingerprint" to represent all slag from the site. The fact that manganese concentrations in samples that exceed the manganese PRG are not consistent with the average "fingerprint" ratios for slag also highlights the possibility that the occurrence of manganese above site-specific background and above the PRG may be due to the contribution of manganese from another non-slag source.

Illinois EPA recognizes that lithopone production and/or lithopone waste residuals could also have contributed manganese to yards. OU3 Phase I Remedial Investigation data shows that manganese concentrations are 10 to 100 times greater than the PRG in the Lithopone Ridge Area, near the vanadium pentoxide disposal area, and near the Slag Pile along Marquette Street. Dust deposition of waste from lithopone manufacture may also be a source of manganese.

[24] Based on the Access database provided by the DePue Group (DePue_PlantData_08-25-06) there are 113 (plus three duplicates) Phase I non-native slag samples, with the maximum concentration up to 34,600 mg/kg, not 13,700 mg/kg as noted in CBS's comment.

As part of the lithopone manufacturing process, manganese typically was removed as an impurity because it degraded and darkened the white paint pigment over time. Although manganese-based products may not have been produced at the DePue site, potassium permanganate apparently was used as an oxidant to precipitate manganese in the production of lithopone at the DePue site (Mining Engineering, December 1953). Manganese concentrations in the Lithopone Ridge area range up to 174,000 mg/kg (W-20I, 7.5-10 ft.).

Manganese in Background Soils

CBS contends that manganese detections above the PRG are consistent with background levels at the DePue site and throughout Illinois. To support this, they present the range of concentrations detected in all site-specific background samples; present the range of Illinois-specific values from Illinois EPA's background data set; and calculate "subarea-specific" background values for the OU4 subareas.

The DePue site-specific background study, as designed by the DePue Group and approved by Illinois EPA, segregates the background data set into the predominant soil types observed in the different land uses represented within the NPL site and the Village: residential/commercial/recreational (developed lands) forested/woodland, and uncultivated/cultivated fields. Different background values have been calculated for different land uses, with the intent that the appropriate land-use background value would be used for the respective land-use associated with assessing site contamination. The various calculated background values account for the potential differences in anthropogenic influences, and to a certain extent, the different chemistries of soil types found across the site and Village.

For the OU4 residential areas, the appropriate background data set is that associated with developed lands. The 95 percent upper prediction limit (UPL) value for manganese associated with this dataset is 1,051 mg/kg. Manganese in soil at OU4, particularly in the East Subarea is not consistent with the site-specific background concentration determined by the DePue Group for developed land soils. Approximately 134 out of the 431 samples collected in the East Subarea had a manganese concentration greater than the site-specific background concentration of 1,051 mg/kg. This is approximately 31 percent of the samples in this subarea. In contrast, only 25 out of the 867 samples in the South, West, and Northwest Subareas combined exhibited manganese concentrations above background. This is approximately 3 percent.

While the calculated site-specific background concentrations of manganese in forested soils and developed soils were relatively similar (i.e., 95 percent upper prediction limit (UPL) of 909 mg/kg in forested soils, and 1,051 mg/kg for developed lands), the background manganese concentration for fields is nearly double (i.e., a 95 percent UPL background value of 1,863 mg/kg, or 1,563 mg/kg excluding outliers). The cause of increased concentrations in field soils is unknown. Without further justification, the concentrations of manganese in OU4 residential soils should not be compared to the upper range of manganese found in all site-specific background data sets, but to the background value calculated from the developed lands dataset of 1,051 mg/kg.

In regard to Illinois EPA's state-wide background data, Illinois EPA's background values are based on the median value from the statewide dataset (with the exception of arsenic, which is based on a 95th percentile), not the maximum value detected. The median value from the non-metropolitan statistical dataset for manganese is 630 mg/kg which is significantly lower than the site-specific background value of 1,051 mg/kg. Use of the maximum values from the state

dataset as CBS suggests, is not appropriate particularly when the Illinois EPA's technical report (A Summary of Selected Background Conditions for Inorganics in Soil, Illinois EPA Office of Chemical Safety, August 1994) from which the data comes clearly states that, "No efforts were made to investigate these results relative to the potential for past sources of atmospheric deposition (e.g., smelter, leaded gasoline, etc.) or previous site activities at the background sample location." Illinois EPA acknowledges the uncertainties in its state-wide background data set and encourages potentially responsible parties to develop site-specific background values. Beginning in 2005, Illinois EPA and the DePue Group worked cooperatively to develop and complete the site-specific and thorough approach to establishing site-specific background for site work. Acceptance of the DePue Group's proposed new approach to a background evaluation for manganese would be inconsistent with how all other metal contaminants are being assessed in this project and for this OU, and represents a misuse of Illinois EPA's data.

CBS used the presence of zinc above its site-specific background value as an indicator of OU4 soil samples that may exhibit influence from the former zinc smelter. Using samples with zinc concentrations less than its site specific background (i.e., unaffected by zinc smelter operations), CBS calculated subarea specific background for manganese, which yielded 1,770 mg/kg for the East and 1,147 mg/kg for the South Subareas.

Illinois EPA cannot accept this method of data evaluation. The point of background data is that it should be collected from areas unaffected by site operations, regardless of the particular chemicals involved. Illinois EPA cannot support calculation of background based on samples within an area clearly affected by site operations, as evidenced by the presence of other COCs at concentrations above background and PRGs. (See Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites, EPA 540-R-01-003, OSWER 9285.7-41, September 2002).

Regardless of which defensible or questionable representation of background is used, there are still Pilot Study samples that exceed these values. Fifteen Pilot Study samples exceed the manganese health-based PRG of 1,800 mg/kg. These 15 samples also exceed the appropriate Illinois background value (630 mg/kg), the appropriate DePue Group site-specific background value for developed lands (1,051 mg/kg), the questionable Pilot Study subarea-specific background values (1,147 mg/kg and 1,770 mg/kg), and the DePue Group site-specific values for other land uses (909 mg/kg for forest and 1,563 mg/kg (excluding outliers) for fields). The manganese samples that exceed the PRG also exhibit cadmium and zinc concentrations that on average are six times and four times, respectively, above their background concentrations.

Illinois EPA acknowledges that there are certain soil types within the East Subarea of the Village that were not represented in the DePue Group's site-specific background study. These soils primarily include the Warsaw, Waukegan, and Catlin Silt Loams. A definitive way to determine if there are elevated levels of manganese indicative of a naturally occurring condition unique to the eastern portion of the Village is to seek out these same soil types in areas unimpacted by the site, and analyze representative samples within developed areas for their manganese concentrations for comparison to the approved background value for manganese in developed soils and the risk-based screening criterion.

<u>Manganese Bioavailability</u>

CBS presents a discussion of manganese bioavailability and its conservativeness.

This discussion is irrelevant. Illinois EPA acknowledges the uncertainty in the information in IRIS regarding manganese bioavailability. There is also no USEPA-validated method for estimating site-specific bioavailability for manganese. The uncertainty in manganese bioavailability doesn't change anything about how a health-based PRG for manganese is calculated, whether the PRG is developed site-specifically or by using default exposure inputs. The PRG of 1,800 mg/kg has been calculated by USEPA to represent a hazard index of 1.0 for residential receptors and is appropriate to use for protection of residential children and adults.

The DePue Group ends their remarks on manganese with a request that Illinois EPA provide compelling information to support manganese's inclusion as a COC. The burden of proof does not rest with Illinois EPA. Based on the conceptual site model for OU4 including the presence of Site sources and potential sources, release mechanisms, migration and transport mechanisms, the presence of relevant receptors, and the occurrence of manganese above health-based screening levels and site-specific background, manganese should be included as a COC.

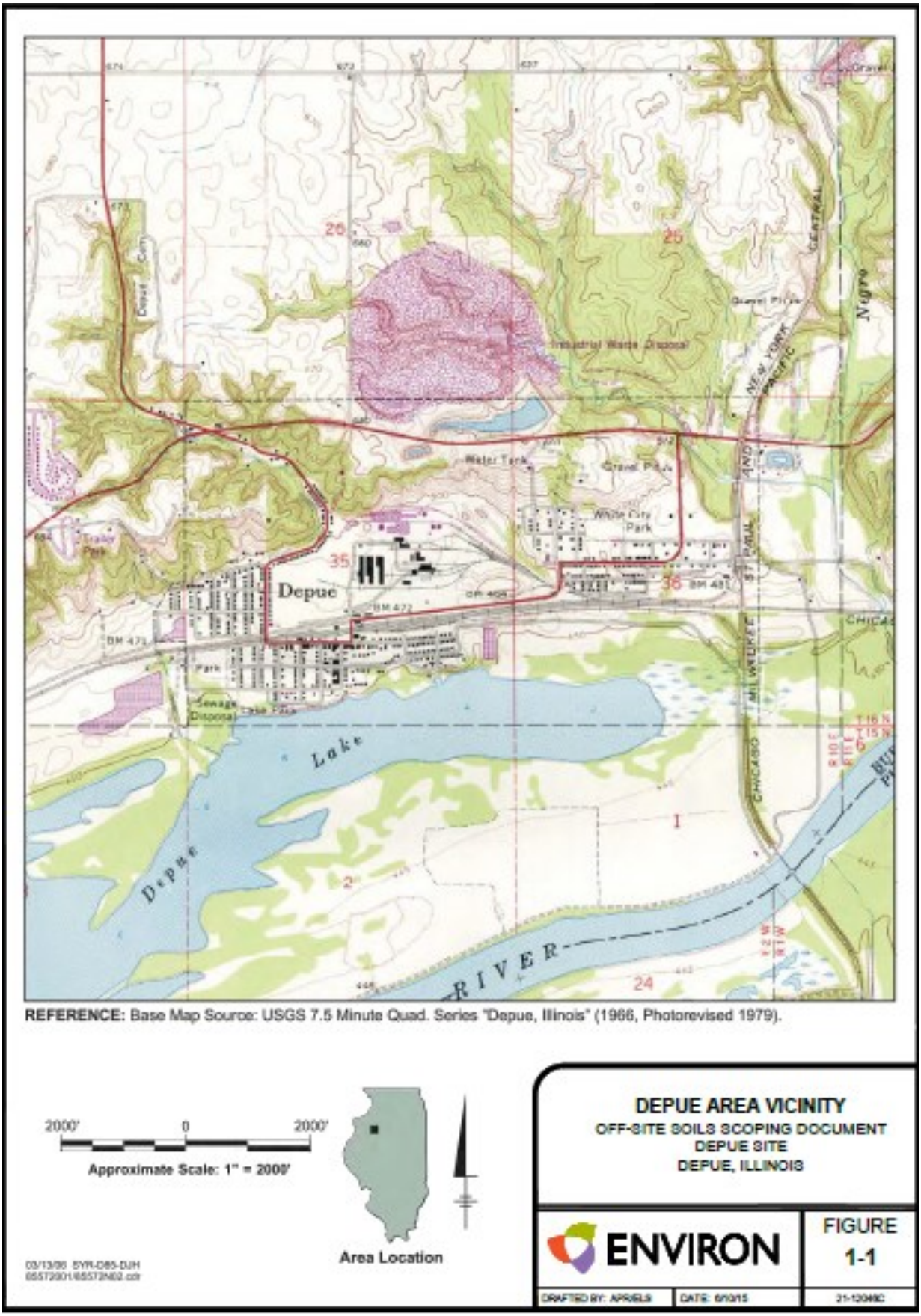


Figure 1. New Jersey Zinc/Mobil Chemical Site Location Map (Ramboll Environ 2015).

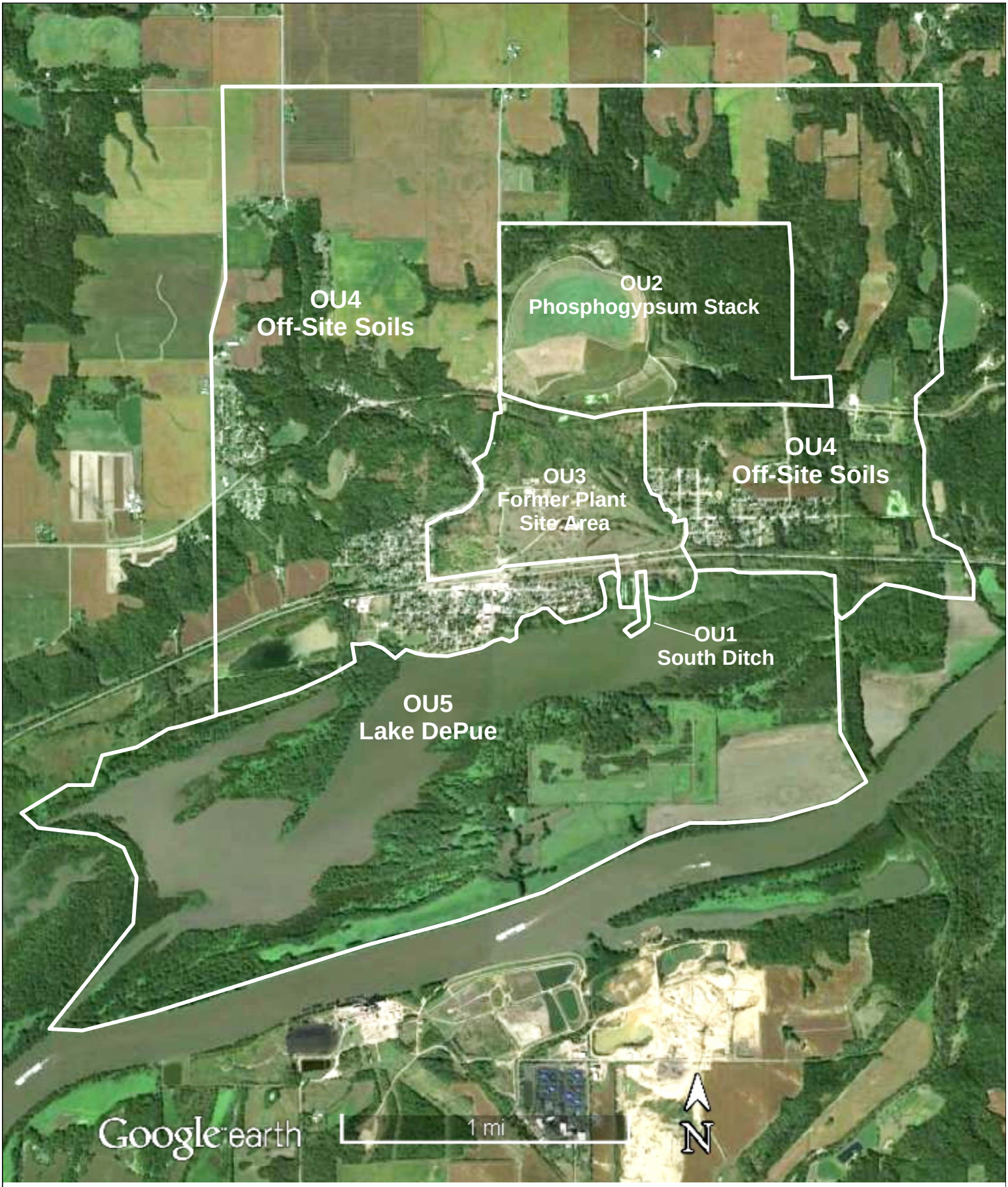
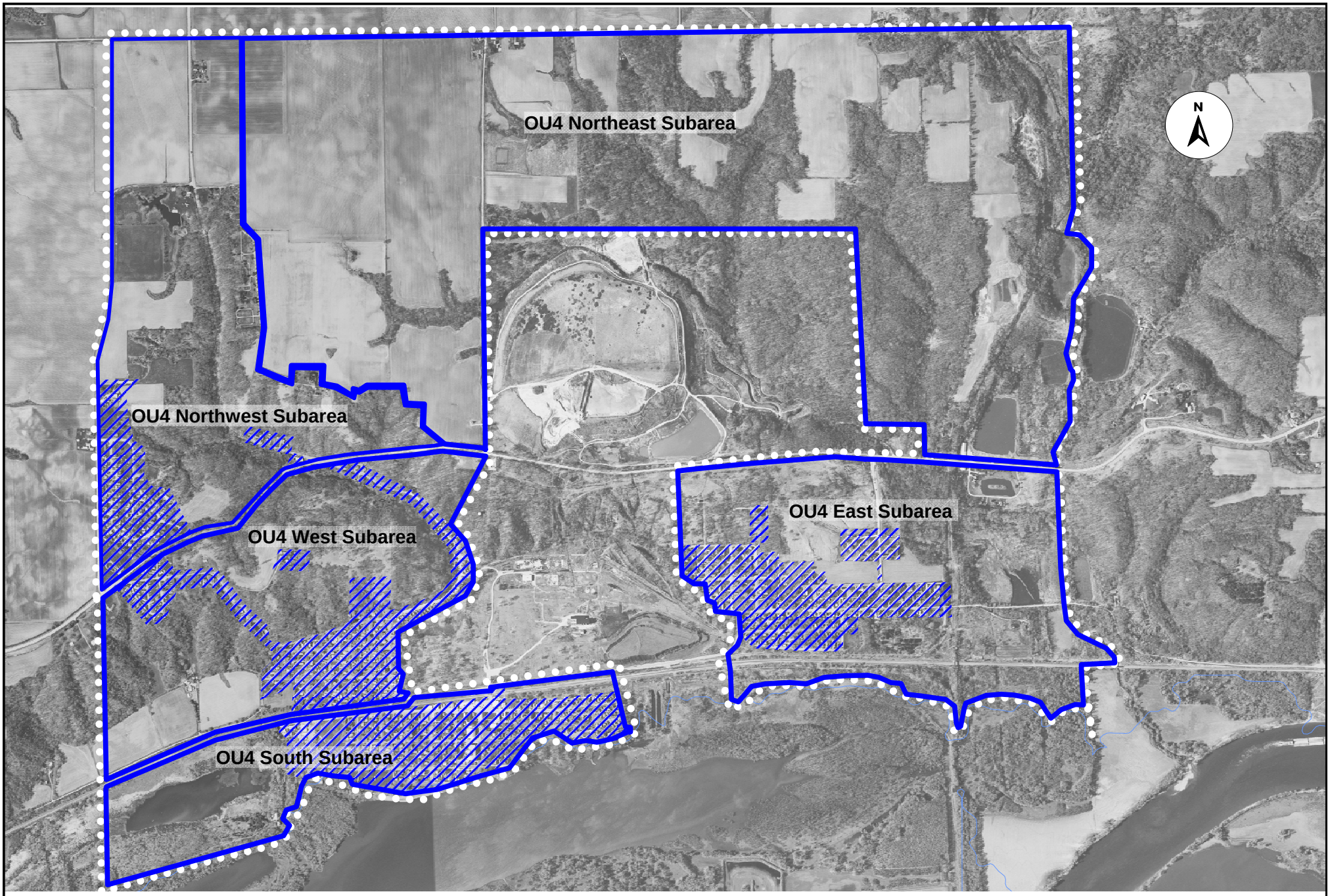


Figure 2.
Operable Units (OU's) within NPL Site

NJ Zinc/Mobil Chemical Site
DePue, Illinois



Legend

OU4 boundary, NJ Zinc/Mobil Chemical Site

OU4 residential, park, school, and alley properties addressed in this Proposed Plan. Agricultural and ecological areas (ponds, woodlands) will be addressed at a later date.

Figure 3.
OU4 Residential and Other Areas Addressed in this Proposed Plan

NJ Zinc/Mobil Chemical Site
DePue, Illinois

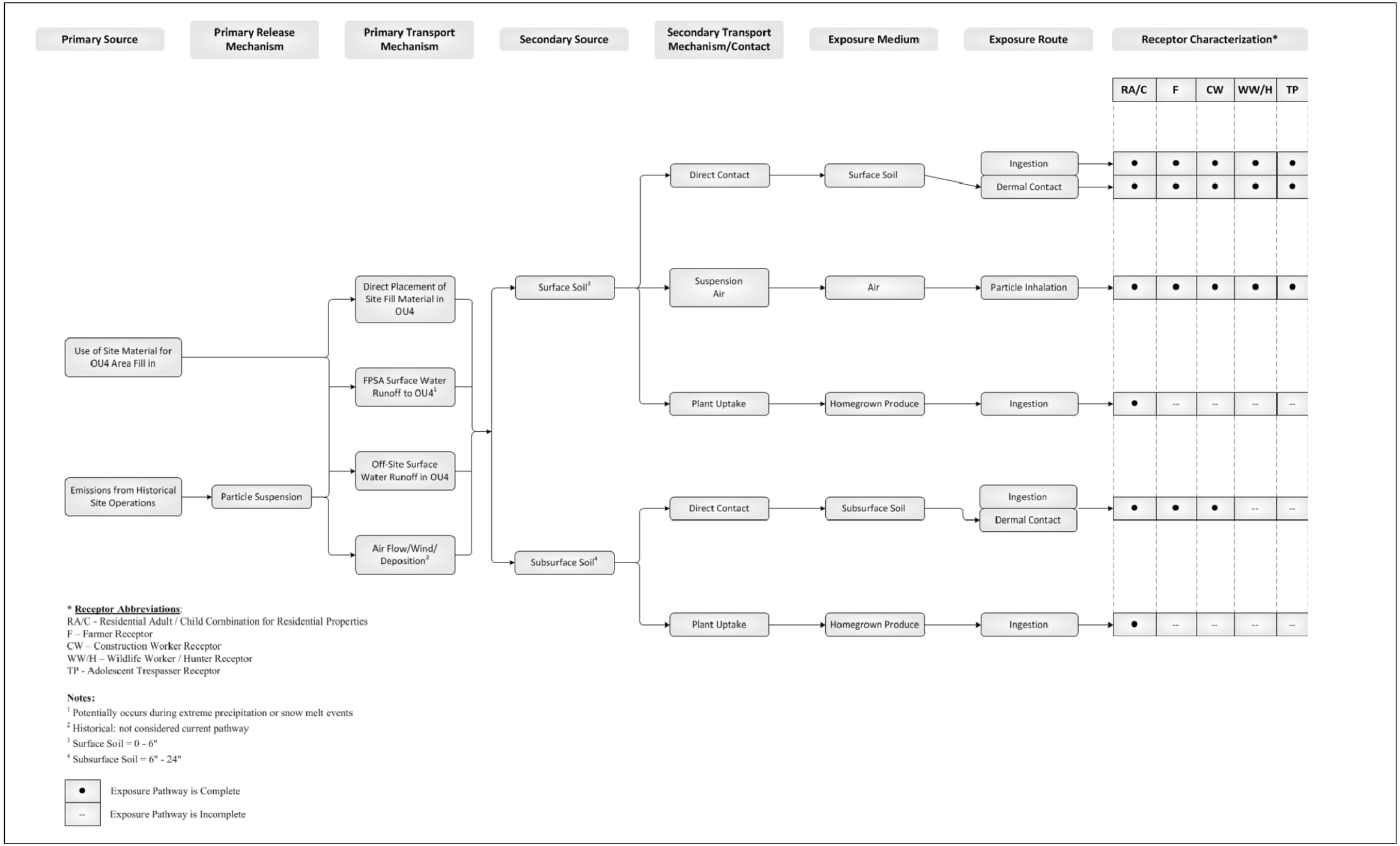


Figure 4 Human Health Exposure Pathway Conceptual Site Model for OU4 (Ramboll Environ 2015)