
**UNITED STATES**

**ENVIRONMENTAL PROTECTION AGENCY**

**REGION 5**

Statement of Basis

for

Olin Corporation

East Alton, IL

EPA ID No. ILD006271696

## TABLE OF CONTENTS



## ATTACHMENTS

## ACRONYMS

| | |
|---|---|
| AOC | Area of Concern |
| BGS | Below Grade Surface |
| BMP | Best Management Practices |
| CAO | Corrective Action Objective |
| CFR | Code of Federal Regulations |
| CMI | Corrective Measures Implementation |
| COC | Constituent of Concern |
| CSM | Conceptual Site Model |
| EI | Environmental Indicator |
| EJ | Environmental Justice |
| EPA | Environmental Protection Agency |
| ERA | Ecological Risk Assessment |
| ESV | Ecological Screening Value |
| HASP | Health and Safety Plan |
| HHRA | Human Health Risk Assessment |
| HQ | Hazard Quotient |
| IC | Institutional Controls |
| ICIAP | Institutional Control Implementation and Assurance Plan |
| IEPA | Illinois Environmental Protection Agency |
| MPF | Main Plant Facility |
| MRF | Material Reclamation Facility |
| NCP | National Contingency Plan |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PFAS | Perfluorinated Alkyl Substances |
| PFOA | Perfluorooctanoate |
| ppm | Parts Per Million |
| RCRA | Resource Conservation and Recovery Act |
| RFI | RCRA Facility Investigation |
| RSPD | Remedy Selection Process Document |
| SB | Statement of Basis |
| SWMU | Solid Waste Management Unit |
| TACO | Tiered Approach to Corrective Action Objectives |
| TSDF | Treatment, Storage, or Disposal Facility |
| USC | United States Code |
| VOC | Volatile Organic Compound |

# SECTION I: INTRODUCTION AND PURPOSE OF THE STATEMENT OF BASIS

This Statement of Basis (SB) explains the United States Environmental Protection Agency's (EPA) proposed remedy to address soil and groundwater impacts at the Olin Corporation (Olin) East Alton, Illinois Facility (the Facility).

This SB summarizes information that can be found in greater detail in the Administrative Record available online, at the EPA Region 5 office in Chicago, Illinois, and at the East Alton Public Library. See **Section VII** for addresses for these locations. A list of documents referenced in this SB is included in **Attachment 3**.

This SB is being issued to fulfill the public participation responsibilities under the Resource Conservation and Recovery Act (RCRA), 42 .U.S.C. § 6901 et al., and the regulation at 40 CFR § 270.42(c)(2), to solicit public input on the selection of the final remedy for the Facility. EPA invites written comments from the public on the proposed remedy during a 60-day comment period. Additionally, EPA will host a public meeting to answer questions and receive additional comments. Public comments will be used to inform EPA's final decision regarding the remedy selection. EPA plans to publish a Final Decision and Response to Comments document, conveying EPA's decision about how contamination at the Facility will be remediated, within 60 days after the close of the comment period. See **Section VII** of the SB for instructions on how to provide comments to EPA on the SB and for the open comment period and public hearing dates.

Under the RCRA Corrective Action program, EPA oversees investigation and cleanup of RCRA treatment, storage, and disposal facilities (TSDFs) with releases of hazardous constituents that pose a risk to human health and the environment. The proposed remedy detailed in this SB is has been determined by EPA to be protective of human health and the environment, considering current and anticipated future uses of Facility property.

## Remedy Summary

After reviewing the results of soil and groundwater sampling, past environmental practices, historical investigations and remedial activities, EPA is proposing sediment removal, engineered capping, oil recovery system operation and maintenance, groundwater monitoring, and institutional controls to address remaining contamination at the Facility. For a full explanation of the proposed remedy, see **Section VI**.

> **East and West Slough Sediment Removal:** Olin will remove metals-impacted sediments in two stormwater and cooling water drainage sloughs on Facility property and dispose of sediments in an off-site facility.
>
> **Oil Recovery System Operation and Maintenance:** Olin will continue to operate and maintain an existing oil recovery system installed in 2003 to mitigate an oil release under a Facility building.

**Engineered Control - Ballistics Sand Staging Area and Materials Reclamation Facility Soil Cap:** Olin will remove the top foot of metals-impacted soils in several areas and replace the soil with an engineered cap.

**Post-Remedial Groundwater Monitoring:** Olin will conduct groundwater monitoring after conclusion of sediment removal and capping activities.

**Institutional Controls**: Olin will maintain, via an Environmental Covenant, a deed restriction limiting Facility land use to industrial and prohibiting potable use of Facility groundwater. Olin will also maintain a Soil Management plan to address soil contamination being left in place on Facility property.

**Financial Assurance**: Olin will demonstrate the financial ability to complete the proposed remedy and long-term monitoring by securing an appropriate financial instrument.

**Long-Term Stewardship**: EPA will require Olin to establish a long-term stewardship plan, including provisions for monitoring and reporting, for the period contamination remains on site above levels that would allow unrestricted use.

## SECTION II: FACILITY BACKGROUND

### Location and Setting

The Facility is located at 600 Powder Mill Road in East Alton, Madison County, Illinois, and consists of approximately 1,247 acres located in a historically industrialized area within the St. Louis Metropolitan Area. See **Figure 1** for a map of the location of the Facility in the East Alton area.

The Facility has been active since 1892. Other industries that have been active in the area during that time include steel mills, metal smelting, metal recycling, glass works, petroleum facilities, and other manufacturing. Residential areas are present surrounding the Facility, with more densely populated areas to the east, west, and south. The East Fork of the Wood River runs through the Facility, meeting the West Fork and reaching the Mississippi River approximately one half-mile southwest of the Facility. Portions of the Facility property are wooded.

EPA's Office of Environmental Justice (EJ) strives to address the needs of vulnerable populations by decreasing environmental burdens, increasing environmental benefits, and working collaboratively to build healthy, sustainable communities. EPA developed an EJ mapping and screening tool, called EJSCREEN. The tool is found at: https://ejscreen.epa.gov/mapper/. Based on EJSCREEN data generated on March 3, 2021, no "USA Percentile" primary EJ indexes were above the 80th percentile within a one-mile radius of the Facility. However, the Facility is located in an area identified by the Illinois Environmental Protection Agency (IEPA) as an EJ area due to the average number of residents in the area with incomes below the poverty line exceeding twice the state average (IEPA's screening tool can be found at https://www2.illinois.gov/epa/topics/environmental-justice/Pages/default.aspx, under the "EJ Mapping" subsection).

Demographic data for the East Alton area obtained from the U.S. Census Bureau (dated July 1, 2019) are summarized in the following table.

| **Population** | |
|---|---|
| Population estimate, July 1, 2019 | 5,954 |
| Population, Census, April 1, 2010 | 6,301 |
| **Age and Sex** | |
| Persons under 5 years, percent | 7.30% |
| Persons under 18 years, percent | 21.20% |
| Persons 65 years and over, percent | 17.70% |
| Female persons, percent | 48.60% |
| **Race and Hispanic Origin** | |
| White alone, percent | 91.60% |
| Black or African American alone, percent | 4.40% |
| American Indian and Alaska Native alone, percent | 0.00% |
| Asian alone, percent | 1.80% |
| Native Hawaiian and Other Pacific Islander alone, percent | 0.00% |
| Two or More Races, percent | 2.20% |
| Hispanic or Latino, percent | 0.50% |
| White alone, not Hispanic or Latino, percent | 91.40% |
| **Income & Poverty** | |
| Median household income (in 2019 dollars), 2015-2019 | $44,830 |
| Per capita income in past 12 months (in 2019 dollars), 2015-2019 | $25,411 |
| Persons in poverty, percent | 18.60% |

## Ownership History

Olin has owned and operated the majority of the Facility property since its construction in 1892. In 2007, the Brass Mill operation in the southwest portion of the Facility property was sold to Global Brass and Copper Holdings, LLC, which merged with the Wieland Group in 2019. However, Olin retains responsibility for addressing RCRA obligations at the entire Facility property (including the portion sold) discussed in this Statement of Basis.

## Manufacturing and Regulatory History

Manufacturing operations are mainly unchanged since 1892 and consist primarily of copper-based alloy (e.g. brass) strip and various fabricated products, explosives, small arms ammunition, and ammunition components, including lead shot, primer compounds, cellulose wads, and shotshell casings.

Most of Olin's documents refer to the 1,273-acre Facility property as the Main Plant Facility (MPF). The MPF is divided into nine zones, with current manufacturing processes summarized in the following table. Please refer to **Figure 2** for the locations of these zones in the MPF.

| Zone | Activities |
|---|---|
| **1** | Major Manufacturing Area, GBC Metals |
| **2** | Wad Manufacturing |
| **3** | Waste Incineration and Steam Production |
| **4** | Shotshell and Explosives Manufacturing, Materials Reclamation |
| **5** | Explosive Magazine Storage |
| **6** | Wastewater Treatment |
| **7** | Water Filtration and Shipping |
| **14** | Employee Clubhouse |
| **15** | Employee Trap and Skeet Range |

In 1980, Olin applied for a RCRA Permit to treat and store hazardous wastes at the Facility. EPA then issued the Facility a RCRA ID number of ILD006271696. Wastes listed in the permit application included:

- arsenic
- arsenic oxides
- barium
- cadmium
- carbon disulfide
- chromium
- cyanides (including copper cyanide, potassium cyanide, silver cyanide, zinc cyanide, and sodium cyanide)
- heat treating oil
- hydrofluoric acid
- lead
- lead acetate
- lead phosphate
- mercury
- metal plating bath solution
- organic solvents
- selenium
- silver
- sodium azide
- vanadic acid
- wastewater treatment sludges from explosives manufacturing, lead-based initiating compounds, and metal plating

Olin undertook various revisions to the initial permit application over the next several years based on EPA and IEPA comments and changes in Facility operations, and in 1992 both a Federal and State RCRA Permit were issued to the Facility. Conditions of these permits required Olin to submit a RCRA Facility Investigation (RFI) Work Plan and "institute such corrective action as necessary so as to protect human health and the environment." These permits expired in 2000 and was not renewed as Olin had closed the hazardous waste management units for which the permit was originally issued. However, obligations for Olin to complete the RFI and complete any necessary corrective action from the permit remain despite the permit itself expiring.

As part of the RFI required by the Federal RCRA permit, Olin identified 30 Solid Waste Management Units (SWMUs) on the Facility property where wastes were treated, stored, or disposed of as part of Facility operations. In addition to these SWMUs, six Areas of Concern (AOCs) have been identified throughout the RFI as releases or other contamination has been identified. See **Figures 2 and 3** for the

locations of these SWMUs and AOCs. See **Table 1** for a summary of waste treatment, storage, or disposal activities at each SWMU and AOC.

Olin also operated several other hazardous waste management units that were not permitted; many of these units were closed during the permitting process under IEPA supervision. Five of these units, designated as Interim Status units by EPA and IEPA, were delayed for closure until EPA concluded the RFI at the Facility. These units will be closed as part of the remedy described in this Statement of Basis.

## Environmental Indicators

EPA has developed two "environmental indicators" (EIs) to track conditions that affect human health and groundwater impacts at RCRA facilities. The Human Exposure EI is used to identify whether there are any unacceptable human exposures to contamination at the Facility, and the Groundwater EI is used to identify whether any contaminated groundwater from the Facility is stabilized and not migrating. These EIs are used to assess whether early intervention (such as an interim measure to prevent people from drinking contaminated groundwater) is needed. The EI evaluations use available environmental data such as measurements of contaminants in groundwater within a decision matrix.

The EIs have been evaluated for this Facility. In 2000, EPA determined that human health exposures at the Facility were under control and, in 2004, that groundwater conditions were under control. Further information can be found online at https://wcms.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-olin-corporation-east-alton-illinois.

## Physical Setting and Site Characteristics

The Facility comprises approximately 1,247 acres of primarily industrial land. A portion of the Facility property in the northwest is forested, and a portion of the Facility to the northeast is leased agricultural land. Olin also operates a trap and skeet shooting range in the northeast part of the Facility that is open to the public. Portions of the Facility property are paved, particularly in the southern half of the property; the majority of the land has grass or forest cover.

*Soil and Geology***.** Surface soils at most of the Facility consist of silts and sandy silts with intermittent sand units, to a depth of up to 80 feet of valley fill of the Cahokia Alluvium formation over bedrock. In select areas there are deposits of loess and glacial till, and terrace sand and gravel deposits of the Henry Formation can be found in the northwest part of the Facility. Bedrock beneath these surface soils consists of Mississippian age limestone in the western portion of the Facility and Pennsylvanian age shale in the eastern portion.

*Hydrogeology and Groundwater Flow*. Shallow groundwater at the Facility is found approximately 10 feet below grade surface (bgs) within sand and silty sand units of the Cahokia Alluvium and glacial till. Shallow groundwater flow beneath the Facility is largely controlled by the East and West Forks of the Wood River. Groundwater on the Facility property north of the East Fork drains southward toward the East Fork and westward toward the West Fork. South of the East Fork, groundwater flows northward toward the East Fork but changes direction to southward near the southern boundary of the Facility property. See Figure 7-12 in the Phase I RFI Report for Facility-wide groundwater contours.

*Surface Water.* Surface water on Facility property includes several drainage sloughs (referred to as SWMU 15A/B in the RFI Reports) that collect surface water runoff from various drainage ditches and outfalls. The East Fork of the Wood River runs through the Facility property and meets the West Fork of the Wood River near the southwest corner of the Facility property. The Wood River drains to the Mississippi River approximately two miles southwest of the Facility.

*Water Supplies and Groundwater Use.* Shallow groundwater at the Facility has been previously classified by the IEPA as Class II Groundwater, which is defined under Illinois law to "be capable of agricultural, industrial, recreational or other beneficial uses" but not potable use. Olin does not use Facility groundwater for drinking or any other on-site purposes. Local community water supplies and another Olin property located 1.5 miles southwest of the Facility provide potable water to the Facility.

*Ecological Setting.* Several areas of potential ecological significance exist of the Facility property. These include deciduous forests, surface water bodies, and grassy fields. Please refer to the Phase I and II RFI and the Remedy Selection Process Document for further details regarding the ecological setting.

## SECTION III: SUMMARY OF ENVIRONMENTAL INVESTIGATION

The purpose of an RFI is to determine whether hazardous waste or hazardous constituents were released into the environment at a facility, and if so, to evaluate the significance of the releases in terms of risk to human health and the environment. The investigation uses a conceptual site model (CSM), which illustrates Site physical characteristics, sources of contaminants, their fate and transport, affected environmental media, and potentially exposed people (in categories, such as office and construction workers) and ecological receptors (plants and animals).

During the investigation phases, environmental media such as soil, groundwater, surface water, sediments, and biota are sampled and analyzed for contamination. Where contaminated media are found, subsequent sampling is usually completed to refine the CSM and define the extent of contamination (how far it may have traveled and how deeply), and to collect enough information for analysis of exposure effects in risk assessments. After each sampling event or investigation phase, EPA evaluates the CSM to determine the adequacy of the data to support decision-making. If found to be inadequate, additional data collection is necessary.

For additional Facility investigation details, consult the documents for various investigations included in the Administrative Record (**Attachment 3**). Facility documents can be found at the facility webpage (https://wcms.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-olin-corporation-east-alton-illinois) and the local document repository (see **Section VII** for additional information).

### Site Investigation Summary of Results.

*Materials Reclamation Facility and Ballistics Sand Staging Areas.* In 1986, Olin submitted several closure plans to IEPA for clean closure of SWMUs located within the Material Reclamation Facility (MRF), which is an area of the Facility where scrap materials are processed for re-use or disposal, and the Brass Mill area, where shotshell casings and lead shot are manufactured. In the early 1990s, IEPA approved closure

of most of these areas. IEPA deferred five interim status units for closure until conclusion of the RFI: a solvent storage area, a storage dumpster, a fenced-in storage area, the shot tower storage area, and two areas of the Facility located in the MRF and near the shot tower where ballistics sand was staged. The ballistics sand is used to stop bullets during ammunition testing, and often becomes contaminated with metals. Olin continues to submit semi-annual monitoring reports to IEPA and EPA, reporting lead levels in groundwater around the ballistics sand staging areas. Since the initial closure plans and investigation, several buildings around the staging areas have been demolished and the areas have been partially covered with gravel.

*RCRA Facility Investigation.* In September 1995, Olin submitted its *Phase 1 RFI Report.* In the report Olin identified 27 SWMUs located throughout the Facility and collected soil, groundwater, sediment, and surface water samples at these SWMUs to identify any contamination present as well as the extent of such contamination. Olin also collected deeper soil borings and groundwater samples around the Facility property to understand groundwater flow and geology for the full Facility property. As part of this investigation, Olin conducted a baseline Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) to determine if further investigation was warranted in other areas. In the report Olin recommended that in Olin's opinion, three SWMUs (SWMUs 8, 11, 16) did not require further investigation as no detected compounds exceeded risk screening levels (See **Section IV** for further information) and proposed additional investigation at the remaining 24 SWMUs for Phase 2 of the RFI.

After the first phase of the RFI, Olin conducted an additional ERA to expand the ERA conducted in the Phase 1 RFI. EPA determined that SWMU 16 required further investigation work, bringing the total number of SWMUs to be further evaluated in Phase 2 to 25. Olin and EPA exchanged comments on the scope of work for the second phase of the RFI for several years. In June 2006, Olin submitted its Phase 2 RFI Report. This report summarized Olin's continued investigation at the 25 SWMUs identified in the Phase 1 RFI as needing further investigation, as well as an additional SWMU discovered by Olin after conclusion of the Phase 1 RFI (SWMU 26) and a SWMU not investigated in the Phase 1 RFI (SWMU 24) due to its similarity to SWMU 23. The additional work varied by SWMU, but broadly consisted of 58 surface soil samples, 20 sediment samples, 42 soil borings, 19 groundwater monitoring wells, 6 soil test pits (areas of excavated soil), 8 surface water samples, and 29 groundwater samples. The HHRA and ERA previously conducted by Olin were expanded using information gathered from this phase of the RFI (see **Section IV** for further information). In the Phase 2 RFI Report, Olin recommended that no further work was necessary at 14 SWMUs, and recommended institutional controls (use limitations, restrictions on the Facility deed, etc.) for the remaining SWMUs.

*Building 433 Oil Release.* In September 2002, Olin notified EPA that a release of oil had been discovered under Building 433, located in the Brass Mill area, during a geotechnical investigation in the roadway next to the building. The release was traced to a leak in a concrete pit in the Brass Mill used for cleaning. Olin sealed the leak and extended 12 soil borings and eight groundwater monitoring wells into the area to identify the extent of the release. In 2003, Olin installed an extraction system consisting of four oil recovery wells with pumps in the contaminated area to remove floating oil. The oil is consolidated in a container for disposal. Olin has been continuously operating the system since 2003. Over time, pumps in seven of the wells have been replaced with oil-absorbing socks due to decreased oil levels in the wells.

In 2019, EPA requested that Olin sample groundwater around the Building 433 oil release to determine if volatile organic compounds (VOCs) were present at high enough quantities to pose a risk for vapor intrusion into Building 433. No VOCs were detected above groundwater volatilization criteria, and it was determined by EPA that a vapor intrusion risk was not present.

*Building T-242 Release.* In 2004, Olin reported to IEPA a release of trinitroresorcinol, a priming compound, to a dewatering sump at Building T-242. The dewatering sump is located approximately 1,000 feet northeast of the MRF. The release was traced to a broken sewer line that was subsequently fixed. Following the release, Olin conducted groundwater monitoring at seven monitoring wells, and continues to monitor groundwater in the area. As part of that monitoring, lead impacts were also detected in groundwater in the area; currently, lead concentrations above drinking water criteria remain in groundwater at one well in the area (well P-2).

*Outfall 11 Soil Removal*. In 2004, Olin notified EPA of the discovery of lead-impacted sediments; the sediment was removed from a stormwater drainage outfall in the East Fork of the Wood River (Outfall 11) and stockpiled on the banks near the outfall. Between 2004 and 2008, Olin conducted several phases of soil sampling to understand the extent of lead impact in the stockpiling area. In 2008, Olin provided a report to EPA documenting the excavation and off-site disposal of lead-impacted soils and backfilling of the excavation with clean soil, and proposing several years of groundwater monitoring in the area. Groundwater monitoring concluded in 2013, with lead remaining present above drinking water criteria in one well in the area (well MW-06R).

*Off-Site Soil Sampling.* In 2018, EPA requested Olin collect soil samples in the off-site residential property and public rights-of-way surrounding the Facility, to determine if land surrounding the Facility had been impacted by the deposition of metals from various Facility processes through airborne emissions. This investigation did not identify contamination above residential screening criteria for any of the areas sampled. IEPA regulates the Facility's air emissions through Clean Air Act permits.

*Wood River Sediment Sampling*. In 2019, EPA requested that Olin investigate the sediments along the portions of the Wood River to determine whether any impacts were present that would pose a risk to ecological receptors, i.e., fish and wildlife. Olin collected composite sediment samples along several transects of the river and detected no impacts above ecological screening criteria.

*PFAS Sampling.* In 2019, EPA requested that Olin conduct additional groundwater monitoring for perfluoroalkyl substances (PFAS) in select wells near the location of a small chrome plating operation within the Brass Mill area. PFAS are a family of organic fluorine compounds used in a variety of industrial processes, the most well-known being coating non-stick cookware. Chrome plating operations have also been linked to PFAS contamination at other industrial facilities. Sampling conducted as part of this work detected perfluoroctanoate (PFOA) present in concentrations below EPA health advisory levels but above IEPA health advisory levels. No other PFAS were detected above health advisory levels. As mentioned in Section II, on-site groundwater is not used for drinking at the Facility.

## SECTION IV: SUMMARY OF RISK EVALUATION

### Human Health Risk Evaluation

The information and data collected in the RFI and other investigations are used to determine whether contamination present at the facility poses an unacceptable risk to human health. This is done through a Human Health Risk Assessment (HHRA). EPA has developed a cancer risk range that is acceptable to protect the public. Cancer risk is often expressed as the maximum number of new cases of cancer projected to occur in a population due to exposure to the cancer-causing substance over a 70-year lifetime. For example, a cancer risk of one in one million means that in a population of one million people, not more than one additional person would be expected to develop cancer due to exposure to the substance causing that risk. EPA utilizes the acceptable exposure level, or "risk goal," defined within the National Oil and Hazardous Substance Contingency Plan (NCP) at 40 C.F.R. Part 300, for site enforcement and cleanup decisions. The NCP defines the acceptable excess upper lifetime cancer risk as generally a range between $1x10^{-6}$ – $1x10^{-4}$ for determining remediation goals. IEPA's risk assessment framework under the Tiered Approach to Corrective Action Objectives (TACO) program uses the same risk ranges as EPA.

If the contaminants are not cancer causing but could cause other health problems, then a hazard index quotient is used. To be acceptable to the EPA, the hazard quotient (HQ) for all contaminants must be less than one. The hazard quotient is the sum of the ratios of the concentration of each contaminant to its human health screening value. See EPA's webpage on risk assessment (https://www.epa.gov/risk) for more information.

Olin conducted several phases of HHRA during the first and second phases of the RFI, and the time between both phases. At the conclusion of the second phase of the RFI, Olin proposed SWMU-specific remedies to address human health risks posed by contamination present at each SWMU and summarized them in a 2011 letter to EPA and in the Phase II RFI Report. Further discussions took place between Olin and EPA after 2011, and EPA requested Olin conduct additional sampling off Facility property to address data gaps (see summary and supporting documents in **Section III**). After concluding this additional sampling, Olin submitted a Remedy Selection Process Document (RSPD) to EPA in January 2021, summarizing the recommended remedies for SWMUs and other areas of the site not identified as SWMUs and considering information from more recent sampling.

Throughout the various phases of the HHRA, Olin considered the following exposure scenarios:

- Soil exposure to commercial/industrial workers via ingestion, inhalation, or skin contact;
- Soil exposure to construction workers via ingestion, inhalation, or skin contact;
- Surface water and sediment exposures to trespassers; and
- Future use of groundwater for drinking.

Other exposure scenarios are currently prevented at the Facility by fencing and the presence of on-site security. Additionally, the proposed remedy in this SB includes institutional controls, that is, non-

engineered legal mechanisms, that will prevent future use of the Facility property for residential development and future use of groundwater on the Facility property as drinking water.

**Table 1** contains a summary of HHRA concerns at each SWMU, including any exceedances of the target cancer risk of 1 x $10^{-6}$ and exceedances of a HQ of 1.0, and the constituents that caused these exceedances. Exceedances at SWMUs in soil were largely caused by metals, polycyclic aromatic hydrocarbons (PAHs), and explosive residuals. Corrective Action Objectives (CAOs) for the Final Remedy at the Facility include addressing any exposures that exceed these limits. See **Sections V and VI** for more information.

### Ecological Risk Evaluation

The information and data collected in the RFI and other investigations are also used to determine whether contamination present poses an unacceptable risk to the environment. Olin conducted several phases of ERA during the first and second phases of the RFI and the time between both phases. At the conclusion of the second phase of the RFI, it was determined that the only contaminants present on-site posing a risk to ecological receptors were chromium, lead, and mercury present in sediments in SWMU 15B, and assumed to be present in SWMU 15A, known as the East and West Sloughs, respectively. Sediments in both sloughs were re-sampled in 2019 as part of the Wood River sediment sampling that EPA requested. The levels present at the conclusion of the Phase 2 RFI ERA (2005) and in the 2019 sampling are provided below, compared to EPA Region 4 Ecological Screening Values (ESVs), which EPA Region 5 uses, in units of parts per million (ppm):

| | | **West Slough (SWMU 15A)** | **East Slough (SWMU 15B)** | | |
|---|---|---|---|---|---|
| | | | **2005** | | |
| | **ESV** | **2019** | **Min** | **Max** | **2019** |
| **Chromium** | 43.4 | 35 | 18.4 | 89.5 | 35 |
| **Lead** | 35.8 | 480 | 127 | 5,610 | 5,000 |
| **Mercury** | 0.17 | 3.5 | 0.77 | 5 | 0.97 |

Sediment removal, proposed as part of the Final Remedy, will achieve mitigation of the ecological risks that contamination in sediments in SWMU 15A and 15B poses (See **Section VI** for more details).

## SECTION V: CORRECTIVE ACTION OBJECTIVES (CAO)

The proposed Final Remedy and associated remedial goals are designed to protect human health and the environment by mitigating risk to current and potential future receptors. EPA's long-term goals for the remedy being proposed for final remedy selection are the following:

- Protecting human health and the environment;
- Attaining the applicable media (e.g., soil, water, air) cleanup standards;
- Controlling the sources of the releases to the extent practicable; and
- Managing all remediation waste in compliance with applicable standards.

Presented below are the CAOs for the affected on-site media.

### Soils and Sediments

The CAOs for soils and sediments are as follows:

- Prevent exposure to soils and sediments contaminated with metals, PAHs, and explosive residues above a target cancer risk of 1 x $10^{-6}$ and/or a HQ of 1.0;
- Establish inspection and maintenance requirements that ensure the long-term integrity of any barriers preventing exposures to soil or sediments (soil cover, fencing, etc); and
- Prevent transport of contamination from sediments to Facility surface water or off-site via Facility groundwater.

### Groundwater

EPA expects final remedies to return groundwater to its maximum beneficial use within a timeframe that is reasonable, given the circumstances of the project. Shallow groundwater at the Facility is classified by the IEPA as a Class II Aquifer, which is defined under Illinois law to "be capable of agricultural, industrial, recreational or other beneficial uses" but not for potable use.

The CAOs for Facility groundwater are as follows:

- Prevent transport of contamination present in Facility groundwater off-site or to on-site surface water;
- Prevent leaching of soil and sediment contamination into Facility groundwater; and
- Prevent future use of Facility groundwater for drinking water.

Implementing the Final Remedy proposed in **Section VI** is expected to achieve the CAOs.

## SECTION VI: PROPOSED FINAL REMEDY

The proposed final remedy and associated CAOs are designed to protect human health and the environment by mitigating risk to current and potential future receptors. For certain situations, there are remedies that are proven to be effective; these are referred to as presumptive remedies. It is not necessary to evaluate multiple remedies for a site if a presumptive remedy is proposed. Olin proposed presumptive remedies for the Facility in the Remedy Selection Process Document (RSPD) and, through further discussions between EPA and Olin after submittal of the RSPD, EPA proposes the presumptive remedy described below. This proposed remedy adequately addresses CAOs and ensures ongoing protection of human health and the environment. EPA will consider comments and select the remedy, documenting the decision in a Final Decision and Response to Comments. Olin will then present details of its plans to implement the selected remedy in a Corrective Measures Implementation (CMI) Work Plan. EPA will review the CMI Work Plan and, unless revisions are necessary, approve or approve with modifications. Remedial activities will then begin.

See **Table 1** for a list of each SWMU and AOC at the Facility, remaining contamination, and the elements of the proposed remedy being used to address contamination.

### East and West Slough Sediment Removal

Olin will remove metals-impacted sediments in the East and West Sloughs (SWMUs 15A/B) to prevent direct contact exposure and surface water migration risks these sediments pose. These sediments will be dredged, dewatered, and disposed of in an appropriate landfill depending on waste characterization sampling results. Olin will prepare a Health and Safety Plan (HASP) as part of the CMI Work Plan to ensure dredging is conducted in a safe manner.

### Oil Recovery System Operation and Maintenance

Olin will continue to monitor the Building 433 Oil Recovery System, gauging wells for any oil present, replacing absorbent socks as needed, and disposing of accumulated oil at an appropriate facility. Ongoing operations and maintenance of this system will continue until oil is no longer present for several monitoring periods. Olin will maintain financial assurance to ensure funds for continued operations and maintenance are available (see Financial Assurance below).

### Engineered Control - Ballistics Sand Staging Area and Materials Reclamation Facility Soil Cap

Olin will remove the top one-foot of metals-impacted soil in the Ballistics Sand Staging Areas (1-10 and 4-6) and the MRF (SWMUs 3 & 4) and replace the removed soil with an engineered asphalt or low-permeability soil cap to prevent stormwater infiltration over deeper metals-impacted soil that could otherwise impact groundwater. Surficial soil sampling will be conducted prior to implementing the cap to define its dimensions. As part of the CMI Work Plan, Olin will prepare a HASP to ensure soil sampling, removal, and capping will be conducted in a safe manner. Long-term maintenance of the cap will be included as part of the proposed work in the CMI Work Plan, and Olin will maintain financial assurance to ensure funds for continued maintenance are available (see Financial Assurance below).

### Post-Remedial Groundwater Monitoring

Olin will conduct groundwater monitoring after conclusion of sediment removal and capping activities described above, to ensure removal activities did not alter groundwater quality in the impacted areas and that the removal and capping are achieving CAOs. Groundwater samples will be collected for constituents of concern (COCs) present in the impacted areas, and monitoring will continue until concentrations of contaminants have been demonstrated to be stable and not migrating outside of the impacted areas. Groundwater sampling methods, specific locations, sampling frequencies, and stabilization criteria will be proposed by Olin in the CMI Work Plan and reviewed and approved by EPA prior to commencing monitoring. Olin will maintain financial assurance to ensure funds for monitoring are available (see Financial Assurance below).

### Institutional Controls

Institutional Control (IC) remedies restrict land or resource use at a facility through legal instruments. ICs are distinct from engineered or construction remedies. ICs limit land or resource use through means such as rules, regulations, building permit requirements, well-drilling prohibitions and other types of

ordinances, and restrictive covenants to eliminate or minimize exposures to contamination and protect a remedy's integrity. For an IC to become part of a remedy, there must be binding documentation, such as land use restrictions in an environmental restrictive covenant, local zoning restrictions, or rules restricting private wells.

Olin will maintain two ICs as part of this remedy:

- A restriction on the Facility deed, in the form of a restrictive covenant compliant with Illinois's version of the Uniform Environmental Covenants Act (765 ILCS 122 et seq.), limiting future Facility land use to industrial use, and limiting use of Facility groundwater to non-potable purposes; and
- An EPA-approved Soil Management Plan, documenting the locations and levels of contamination above risk criteria present at the Facility, restricting access and construction/excavation activities at those areas without additional health and safety precautions and/or sampling, maintaining appropriate signage warning Facility workers of contamination present, and establishing Best Management Practices (BMPs) to prevent any additional contamination to Facility soils and/or sediments.

Olin will submit for EPA review and approval an Institutional Controls Implementation and Assurance Plan (ICIAP) to document long-term maintenance and reporting requirements to ensure ICs remain protective into the future.

### Financial Assurance

Olin must demonstrate their financial ability to complete corrective action, including constructing the proposed remedy and monitoring Site conditions following remedy construction, as needed, by securing an appropriate financial instrument, consistent with the requirements of 40 C.F.R §§ 264.142 and 264.144. Olin will develop a detailed cost-estimate as part of the CMI Work Plan. Olin may use any of the following financial mechanisms to make the demonstration: financial trust, surety bonds, letters of credit, insurance, and/or qualification as a self-insurer (corporate guaranty) by means of a financial test. After successfully completing the construction phase of the remedy, Olin may request that EPA reduce the amount of the financial assurance to the amount necessary to cover the remaining costs of the remedy, including any yearly operation and maintenance costs. Olin may make similar requests of EPA as the operation and maintenance phase of the remedy proceeds and ultimately ceases.

### Long-Term Stewardship

Olin must ensure all ICs, engineered controls, and long-term remedy components are maintained and will operate as intended. The CMI Work Plan will include plans for long-term operations and maintenance of engineering controls to ensure they continue to achieve CAOs. In addition, Olin will submit an ICIAP detailing and documenting activities associated with ensuring long-term stewardship of institutional controls in place at the Facility. Long-term stewardship obligations will include annual notifications to EPA summarizing any work conducted in maintenance of institutional and engineered controls.

EPA will inspect and review long-term remedy components on a five-year basis to ensure the remedy is functioning as intended, the exposure assumptions, toxicity data, cleanup levels, and CAOs are still valid, and that any information that comes to light which could call into question the protectiveness of the remedy is considered. If any review by EPA or IEPA indicates that changes to the selected remedy are appropriate, or if Olin proposes changes to Facility operations that would impact the proposed remedy's effectiveness, EPA will determine whether the proposed changes are non-significant, significant, or fundamental changes to the remedy are necessary. EPA may approve non-significant changes without public comment. EPA would inform the public about any significant or fundamental changes to the remedy.

## SECTION VII. PUBLIC PARTICIPATION AND INFORMATION REPOSITORY

EPA requests feedback from the community on this proposed final remedy for the issues found at the Facility. On May 26, 2021, EPA placed an announcement in the Alton Telegraph and on the WBGZ-AM radio station, to notify the public of this SB's availability, its supporting Administrative Record, and the opportunity to request a public meeting on EPA's proposed corrective action for the Facility. The public comment period will last sixty (60) calendar days from the date of the public notification in the local newspaper, from May 26, 2021 to July 25, 2021. We encourage community members to submit any comments regarding the proposed remedy in writing by July 25, 2021. EPA will also host a virtual public meeting on June 16, 2021 from 6 to 8 PM CST to receive feedback directly (please see the facility webpage for more information - https://wcms.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-olin-corporation-east-alton-illinois). Send comments to EPA in writing at the EPA address listed below. To submit comments, contact EPA Project Manager Zachary Sasnow (see contact information below).

Following the 60-day public comment period, EPA will prepare a Final Decision and Response to Comments document that will identify the selected remedy for the Site. The Response to Comments document will address all significant written comments and any significant oral comments generated at a public meeting. EPA will make the Final Decision and Response to Comments document available to the public. If such comments or other relevant information would cause EPA to propose significant changes to the currently proposed remedy, EPA will seek additional public comments on any proposed revised remedy.

The Administrative Record contains all Facility documents considered when making this proposal. The Administrative Record may be reviewed at these locations (please call for hours):

| | |
|---|---|
| East Alton Public Library<br>250 Washington Ave.<br>East Alton, Illinois<br>(618) 259 - 0787<br>https://www.eastaltonlibrary.org/ | EPA Region 5 Office<br>EPA Records Center<br>77 W. Jackson Blvd., 7th Floor<br>Chicago, IL<br>(312) 886-4253 |

At the conclusion of the comment period, EPA will summarize public comments and prepare the Response to Comments and Final Decision document, which will become part of the Administrative Record. To send written comments or obtain further information, contact:

Zachary Sasnow (LR-16J)
77 W. Jackson Blvd
Chicago, IL 60604
(312) 886-0258
sasnow.zachary@epa.gov

## Next Steps

Following issuance of the Final Decision and Response to Comments document, Olin will prepare a CMI Work Plan. The Plan will identify any additional data collection needed to implement the corrective measures, along with the specifications for completing the selected corrective measures and ensuring long-term maintenance. The Plan will provide a detailed construction schedule. Based on the proposed corrective measures, EPA anticipates that the majority of the remedial measures can be completed within two years of the Final Decision.

# Figure 1

# Facility Location

# From Phase 2 RFI Report (2006)

Madison County, Illinois

Forest Homes

Cottage Hills

EAST ALTON

WOOD RIVER

East Alton

Rosewood Heights

Alton Mental Health Ctr

Sewage Disposal

Quarry

Industrial Waste Pd

Skinney Island

St Louis Regional Airpo

Note: USGS Topographic Map East Alton, Illinois, United States 7/1/1985

## Legend

Olin Property Boundary

N
W E
S

0 1,000 2,000
Feet

1 inch equals 2,000 feet

*The Olin property boundary was not surveyed to check for it's accuracy. The boundary was extracted from CAD drawings supplied by Olin.*

Drawn By: TDW Approved by: DLB

Checked By: LMS Date: April 3, 2006

MACTEC

# Figure 1-1

**Facility Location Map**
**Phase II RFI**
**Olin Main Plant Facility**
**East Alton, Illinois**

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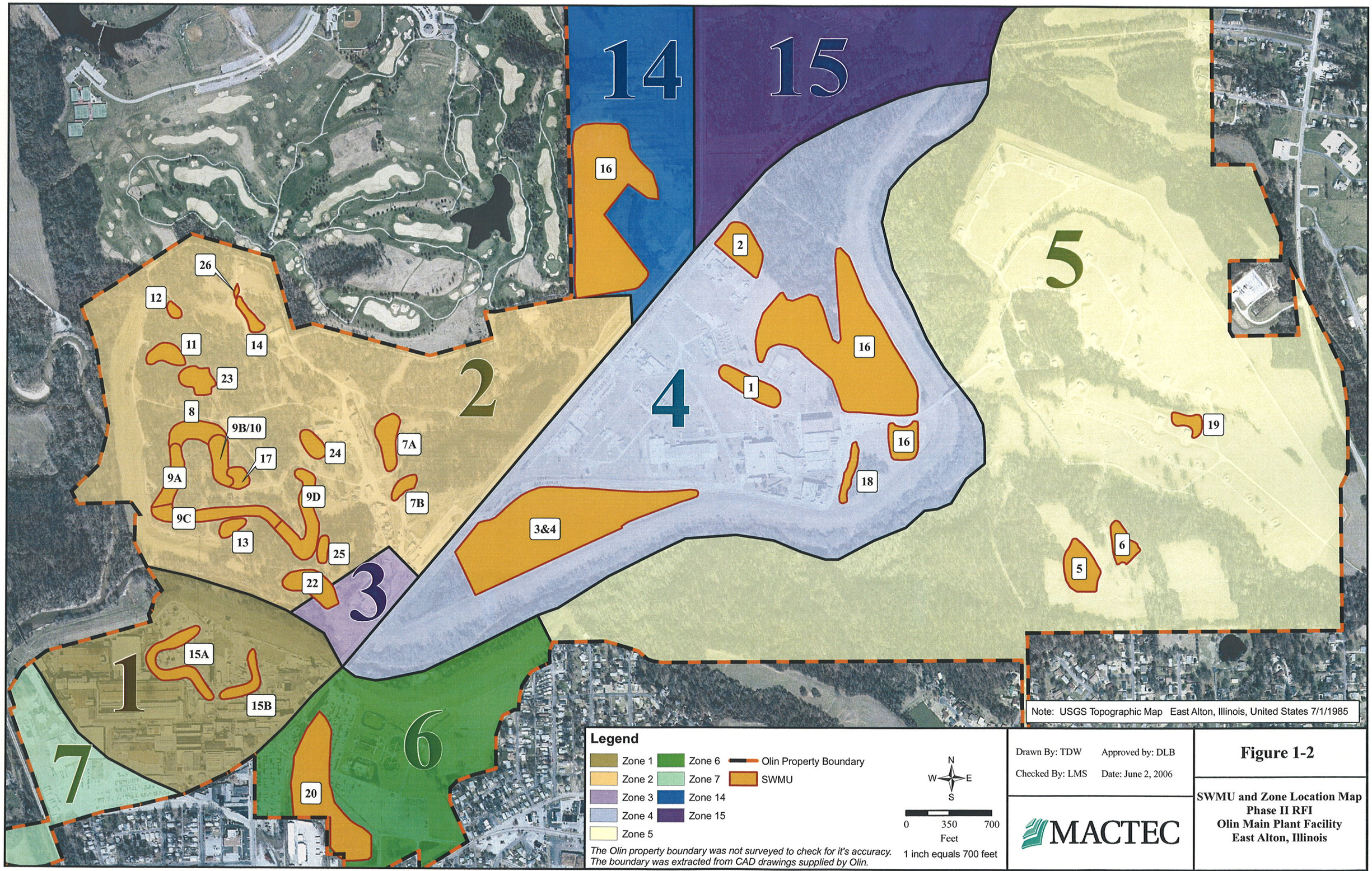
# Figure 2

# SWMU Locations

# From Phase 2 RFI Report (2006)




Drawn By: TDW Approved by: DLB

Checked By: LMS Date: June 2, 2006

MACTEC

**Figure 1-2**

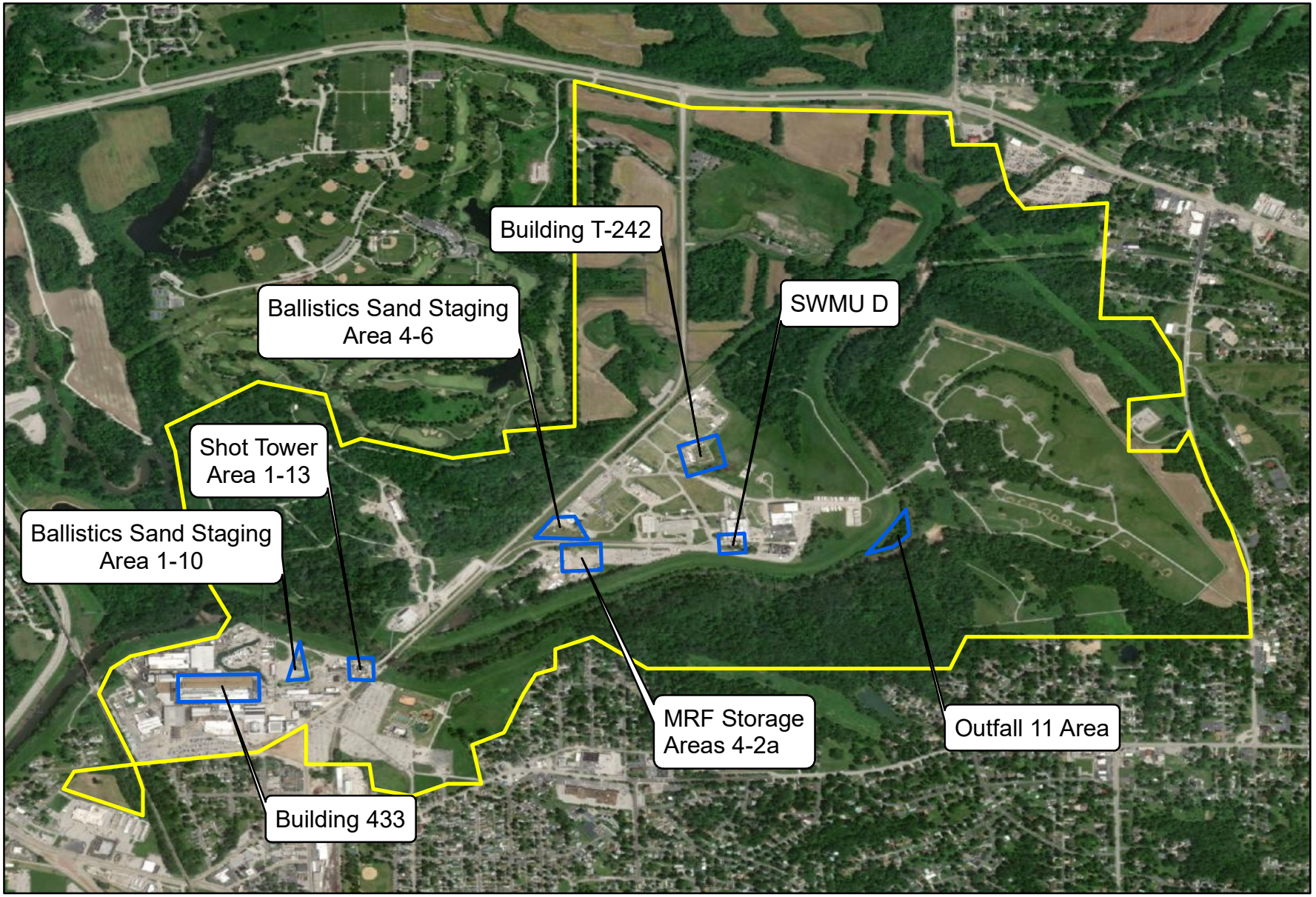
**SWMU and Zone Location Map**
**Phase II RFI**
**Olin Main Plant Facility**
**East Alton, Illinois**

P:\1_Gis\32500551351a_MXD\figures\fig1-2.mxd

# Figure 3

# Additional SWMU/AOC Locations

# Figure 3 - Additional AOC/SWMU Locations




EPA United States Environmental Protection Agency

N

0 0.1 0.2 0.4 0.6 0.8 Miles

Source: ESRI

US EPA R5 LCD RRB: ZDS 3/11/2021

# Table 1

# SWMU/AOC Summary

| SWMU/AOC Name | Description and Waste Handling | Activities Conducted During Investigations | Contamination Remaining Above Risk Criteria | Remedy to Address Remaining Contamination |
|---|---|---|---|---|
| SWMU 1 | Northeast of MRF in Zone 4. Scrap clay targets, asphalt, coal tar, and packing materials were disposed of in this area prior to 1968, and construction and demolition debris was disposed of in the area as fill until the early 1990s. | Two test pits were dug in this area as part of the Phase 1 RFI, and soil in these pits was sampled at the surface and at 10.5 ft. During the Phase 2 RFI, five surface soil samples, one sediment sample, and one 4-foot depth soil sample were collected. | PAHs in soil | Institutional Controls |
| SWMU 2 | North of SWMU 1 in Zone 4. Fly ash, scrap metal, and wood were disposed of as fill in this area. Now the area is mostly grass cover with a gravel pad that previously stored transformers. | Three test pits were dug during the Phase 1 RFI, with one soil samples collected at the surface and two soil samples collected at 2-3 and 3-4 feet deep. During the Phase 2 RFI, six surface soil samples were collected and two soil borings were sampled at 7 foot depth. | Copper in soil | Institutional Controls |
| SWMUs 3&4 / Material Reclamation Facility | Located in Zone 4. Open pit burning of scrap ammunition, explosives, solvents, petroleum, trash was done in this area until 1966. An incineration failicity was constructed and wastes were incinerated from 1966 to the present. Fly ash, coal, asphalt and explosive residues were also historically disposed of in the area. | Four test pits were dug in this area during the Phase 1 RFI, and soil samples were collected from 0.5-1.5 feet, 1-2 feet, 4.5-5.5 feet depth, and groundwater samples were collected at seven monitoring wells. During the Phase 2 RFI, one surface soil sample was collected and seven samples of fill material were collected at 1-foot and 6-foot depths, and groundwater was sampled at 6 wells. Three sediment samples and one surface water sample in the drainage ditches were also collected. | Vinyl chloride in groundwater; cadmium, copper, and lead in soil | Capping, Groundwater Monitoring, and Institutional Controls |
| SWMU 5 | Located in the southern part of Zone 5 (explosive storage bunker area). Scrap equipment and debris were disposed of in this area prior to 1972. Currently the area is grass covered with some exposed soil/cinders. | Two test pits were dug in this area during the Phase 1 RFI, and soil samples were collected from 0-1 and 3-4 feet. Sediment was collected from a drainage ditch in the area and groundwater was sampled from one well. During the Phase 2 RFI, six surface soil samples were collected and groundwater was sampled in four wells. | Cadmium, mercury, and zinc in soil | Institutional Controls |
| SWMU 6 | Near SWMU 5 in southern part of Zone 5. Barrels of scrap powder, explosives, chemicals, solvents, and debris were disposed of in this area until 1972. Currently the area has grass and tree cover. | During the Phase 1 RFI, two test pits were dug and samples were collected at 1.5-2.5 and 2.5-3.5 feet depth. Sediment and surface water were also sampled from a drainage ditch in the area. During the Phase 2 RFI, buried containers found in the area were removed, five surface soil samples were collected, and one soil boring was sampled at a 4-foot depth. Groundwater was also sampled in 3 wells in the area. | Copper and lead in soil | Institutional Controls |
| SWMU 7A | This area is a former waste pile near Target Manufacturing Building in center of Zone 2, used from 1968-1978. Clay target material (coal tar pitch and limestone) were disposed of in this area. Currently the area is overgrown with grass and shrubs. | During the Phase 1 RFI, one test pit was dug and sampled from 0-1 feet deep, and two surface soil samples were collected. Sediment and surface water samples were also collected from a nearby drainage ditch. During the Phase 2 RFI two surface soil samples and one sediment sample were collected. | PAHs in soil | Institutional Controls |
| SWMU 7B | This area is a drainage ditch near SWMU 7A where explosives laboratory wastewater was discharged until 1968 (lab operations were shut down in 1968). The ditch flows into a culvert which discharges to the East Fork of Wood River. Currently the area is grass and shrub covered. | During the Phase 1 RFI, two test pits were dug and sampled at 2-3 and 3-4 feet depths, and a soil boring was sampled at 2.5, 5.5, 8.5 foot depths. A sediment sample was also collected from a nearby drainage ditch, and groundwater was sampled at one well. In the Phase 2 RFI, four surface soil samples and one sediment sample were collected, and a soil boring was sampled at 7 feet deep. A surface water sample was also collected in a nearby drainage ditch. | Explosives residues in soil | Institutional Controls |

| SWMU/AOC Name | Description and Waste Handling | Activities Conducted During Investigations | Contamination Remaining Above Risk Criteria | Remedy to Address Remaining Contamination |
|---|---|---|---|---|
| SWMU 8 | These SWMUs are part of a large slough in Zone 2 consisting of SWMUs 8, 9A, 9B, 9C, 9D, and SWMU 10. Historically propellant explosives were discharged into the slough from the 1940s until 1970. Olin removed some sediments in the slough in 1972 and disposed of them in SWMU 23. The banks of the slough are currently vegetated. | Seven sediment samples and two surface water samples were collected in the slough during the Phase 1 RFI. During the Phase 2 RFI, groundwater samples were collected from five nearby wells. | None | Not Needed |
| SWMU 9A | | | Explosives residues in sediment | Institutional Controls |
| SWMU 9B | | | Explosives residues in sediment | Institutional Controls |
| SWMU 9C | | | None | Not Needed |
| SWMU 9D | | | Explosives residues in sediment | Institutional Controls |
| SWMU 10 | | | None | Not Needed |
| SWMU 11 | This area is a drainage ditch in northern part of Zone 2. Explosives were discharged to this ditch from the 1940s to the 1970s. Explosive contaminated sludges were removed from the ditch as part of cleaning operation in the Zone 2 slough (SWMUs 8, 9A, 9B, 9C, 9D, 10). The area is currently wooded and overgrown with shrubs. | During the Phase 1 RFI, two surface soil samples and one sediment sample were collected. No work was conducted in this area after the Phase 1 RFI. | None | Not Needed |

| SWMU/AOC Name | Description and Waste Handling | Activities Conducted During Investigations | Contamination Remaining Above Risk Criteria | Remedy to Address Remaining Contamination |
|---|---|---|---|---|
| SWMU 12 | This area is in the northern part of Zone 2; debris and equipment from the 1972 Zone 2 slough (SWMUs 8, 9A, 9B, 9C, 9D, 10) decontamination were disposed of in this area. Currently the area is heavily vegetated. | During the Phase 1 RFI, three test pits were dug in this area, and soil samples were collected at 0-1, 1-2, and 2-3 foot depths. In the Phase 2 RFI, four surface soil samples were collected and one soil boring was sampled at a 3-foot depth. | None | Not Needed |
| SWMU 13 | This area is located near SWMU 9C along the Zone 2 slough (SWMUs 8, 9A, 9B, 9C, 9D, 10). Building debris from the 1972 Zone 2 decontamination were disposed of in this ara. Currently the area is heavily vegetated. | During the Phase 1 RFI, one surface soil sample was collected and two test pits were dug and sampled from a 0-1 foot depth. During the Phase 2 RFI, this area was considered part of the Zone 2 slough and no further sampling was conducted. | None | Not Needed |
| SWMU 14 | This area is located east of SWMU 12 in the northern part of Zone 2. Debris and equipment from the 1972 Zone 2 slough (SWMUs 8, 9A, 9B, 9C, 9D, 10) decontamination were disposed of in this area. Currently the area is heavily vegetated. | During the Phase 1 RFI, one surface soil sample was collected and two test pits were dug and sampled at 0-1 and 0.5-1.5 foot depths. One sediment sample was also collected in a nearby drainage ditch. During the Phase 2 RFI, buried containers were removed from this area, three surface soil samples were collected, one soil boring was sampled at a 5 foot depth, and sediment was sampled from the drainage ditch. | None | Not Needed |
| SWMU 15A / West Slough | This slough is located in Zone 1. Scrap metal from thermal ammunition treatment was discharged into the slough until 1950. Currently the slough only collects stormwater and non-contact cooling water; this is normally discharged to the Mississippi River via a force main, but can also be directed to the Zone 6 wastewater treatment facility if needed. | Three sediment samples were collected in this slough as part of the Phase 1 RFI along with one surface water sample. During the Phase 2 RFI groundwater was sampled at three nearby monitoring wells. A composite sediment sample was collected from this slough in 2019. | Chromium, mercury, and lead in sediments | Sediment Removal, Groundwater Monitoring, and Institutional Controls |
| SWMU 15B / East Slough | This slough is located in Zone 1. Facility process water and smokeless powder were discharged to this slough until 1966. Stormwater runoff from the nearby lead shot manufacturing area was collected in slough until mid-1970s; currently this slough only collects stormwater and non-contact cooling water. This slough drains to the West Slough (SWMU 15A) and is located next to Ballistics Sand Staging Area 1-10. | One surface water sample was collected in this slough as part of the Phase 1 RFI. During the Phase 2 RFI six sediment samples and one surface water sample were collected. A composite sediment sample was collected in 2019. | Chromium, mercury, and lead in sediments | Sediment Removal, Groundwater Monitoring, and Institutional Controls |
| SWMU 16 | This area consists of three large parcels of land in Zone 4 and Zone 14. From 1974 to 1975 scrap powder was used as fertilizer for cropland in this area. Currently part of the land is leased for farming. | During the Phase 1 RFI, one test pit was dug and sampled from 3-4 feet, five surface soil samples were collected and three soil borings were sampled. During the Phase 2 RFI one sediment sample was collected from a drainage ditch in the area. | None | Not Needed |
| SWMU 17 | This area is located near one of the ends of the Zone 2 slough (SWMUs 8, 9A, 9B, 9C, 9D, 10). Debris from demolition and sediment removal in the Zone 2 slough were stored in this area, along with debris from construction of the incinerator and boiler facilities in Zone 3. Currently the area is vegetated. | During the Phase 1 RFI, one surface soil sample was collected, and two test pits dug and sampled from 2.5-3.5 and 3-4 feet. During the Phase 2 RFI three surface soil samples were collected and one soil boring was sampled. | Lead in soil | Institutional Controls |

| SWMU/AOC Name | Description and Waste Handling | Activities Conducted During Investigations | Contamination Remaining Above Risk Criteria | Remedy to Address Remaining Contamination |
|---|---|---|---|---|
| SWMU 18 | This area includes a drainage ditch and vegetated area in the southern part of Zone 4. Demolition debris was disposed of in this area from 1979 to 1982. | During the Phase 1 RFI, one surface soil sample was collected and one test pit was dug and sampled from 6.5-8.5 ft. During the Phase 2 RFI three surface soil samples, three sediment samples, and three surface water samples were collected from the drainage ditch. | Mercury in soil | Institutional Controls |
| SWMU 19 | This area is in the center of Zone 5. Mercury-bearing material was discovered in the area during construction in 1981. Currently the area is grass covered. | During the Phase 1 RFI, one surface soil sample and one sediment sample were collected, and two test pits were dug and sampled from 6-7 and 7-8 feet. During the Phase 2 RFI three surface soil samples were collected. | None | Not Needed |
| SWMU 20 | This area is a 16-acre paved parking lot located in Zone 6. Prior to paving, fly ash, ballistics sand, and debris were disposed of in the area until 1977. | During the Phase 1 RFI, five test pits were dug and sampled from 0.5-1.5, 1.5-2.5, 2.0-3.0, 3.0-4.0 and 8.0-9.0 foot depths. During the Phase 2 RFI four surface soil samples were collected and one soil boring was sampled at a 6-foot depth. | Lead in soil | Institutional Controls |
| SWMU 22 | This area is located in the southwest part of Zone 2, north of East Fork of Wood River. Building debris, equipment and drums were disposed of in this area prior to 1970. Currently the area is sparsely vegetated. | During the Phase 1 RFI, three test pits dug and sampled from 1.0-2.0 ft, 2.0-3.0 ft, and 1.5-2.5 feet deep. During the Phase 2 RFI, one surface soil sample was collected and one groundwater sample was collected at a nearby well. | Antimony, arsenic, copper, lead, mercury, zinc in soil | Institutional Controls |
| SWMU 23 | This is an area located in the west part of Zone 2. Historically propellant explosives and scrap nitrocellulose were stored in a powder pit in this area and broken clay targets (pitch and limestone) and debris were used as fill. Powders were removed from the area as part of the Zone 2 slough cleaning operations in 1972. Currently the area is sparsely vegetated. | During the Phase 1 RFI, two test pits were dug and sampled at 2.0 and 3.0 foot depths. During the Phase 2 RFI, five surface soil samples were collected and two soil borings were sampled at a 3-foot depth. | PAHs in soil | Institutional Controls |
| SWMU 24 | This is an area located in the east part of Zone 2. Historically propellant explosives and scrap nitrocellulose were stored in a powder pit in this area and broken clay targets (pitch and limestone) and debris were used as fill. Powders were removed from the area as part of the Zone 2 slough cleaning operations in 1972. Currently the area is sparsely vegetated. | This are was not investigated during the Phase 1 RFI, but was recommended for further investigation in Phase 2 due to results at SWMU 23. During the Phase 2 RFI, three surface soil samples, two sediment samples, and two surface water samples were collected, and three soil borings were sampled at 8 and 9-foot depths. | None | Not Needed |
| SWMU 25 | This is an area in the outhwest part of Zone 2 that was historically used for the disposal of equipment and building debris prior to 1972. | During the Phase 2 RFI, two test pits were dug and sampled from 0-1 and 0.5-1.5 foot depths, and one surface soil sample was collected. This area was considered part of the Zone 2 slough area during the Phase 2 RFI and no additional samples were collected. | None | Not Needed |

| SWMU/AOC Name | Description and Waste Handling | Activities Conducted During Investigations | Contamination Remaining Above Risk Criteria | Remedy to Address Remaining Contamination |
|---|---|---|---|---|
| SWMU 26 | This area is immediately north of SWMU 14 in the northern part of Zone 2. Construction and demolition debris were discovered disposed in this area in 1997. | During the Phase 2 RFI, two test pits were dug and sampled at 1 and 2-foot depths, and two soil borings were sampled at 9 and 10-foot depths. | None | Not Needed |
| SWMU D | This area was an underground oil/water separator and recovery system, which was removed in 1990-1991 and replaced with an above-ground system. | Olin installed four groundwater monitoring wells in this area and sampled them in 2003 as part of closure requirements under underground storage tank (UST) regulations with the State of Illinois. This area was approved as "clean-closed" by the IEPA in 2004. | None | Not Needed |
| Ballistics Sand Staging Areas (1-10 and 4-6) | These are large areas of facility in the Brass Mill (Zone 1) and MRF (Zone 4) where spent ballistics sand was historically stockpiled and used as fill material until 1980. | This area was sampled in the 1980s as part of closure activities overseen by IEPA. During the Phase 1 RFI, five test pits were dug and sampled at 3.5-4.5, 1-2, 3-4, and 4-5 foot depths. Olin continues to conduct groundwater monitoring in these areas to monitor lead impacts from ballistics sand disposal. | Lead in soil | Capping, Groundwater Monitoring, and Institutional Controls |
| Site 4-2a (Former MRF Hazardous Waste Storage Areas) | This area consists of several former hazardous waste storage areas located within SWMU 3 & 4 in the MRF area (Zone 4). The areas included spent solvent storage and reclassified scrap shot shell storage. | This area was investigated as part of the SWMU 3&4 area during the Phase 1 and 2 RFI. | See SWMU 3&4 | See SWMU 3&4 |
| Site 1-13 (Shot Tower) | This area is located in the Brass Mill area (Zone 1) northeast of the East and West Sloughs (SWMU 15A & 15B). Lead-impacted cob meal was stored in this area historically. | This area was not investigated as part of the RFI, but was deferred for closure by the IEPA pending conclusion of the RFI under EPA oversight. | None | Not Needed |
| Building 433 Area | Building west of the West Slough (SWMU 15A) where brass milling is conducted. A leaking concrete pit was discovered in 2002 that had released oil into the groundwater in the area. | Olin installed an oil recovery system in this area in 2003 and continues to operate it. Oil is collected in a container for off-site disposal, and wells are periodically checked for oil. Oil levels have decreased since the leak was discovered in 2002. | Oil present in subsurface | Oil Recovery System Operation and Maintenance, Institutional Controls |
| Outfall 11 Area | Area located in the eastern part of Zone 4, where sediments removed from a drainage outfall (Outfall 11) were stockpiled and found to be impacted with lead. | Olin conducted sediment and soil removal activities in 2007 to remove lead-impacted material in the area. Sampling was conducted in surface soil after the removal to confirm lead was no longer present above risk criteria. Groundwater monitoring was conducted in the area from 2011-2013 to monitor lead impacts to groundwater in the area. | Lead in groundwater | Institutional Controls |

**Administrative Record Index**
**Olin Corporation**
**600 Powder Mill Road**
**East Alton, Illinois**
**EPA ID: ILD006271696**

| Number | Date | To | From | Format | Title |
|---|---|---|---|---|---|
| **1** | August 14, 1980 | EPA | Olin | Report | Notification of Hazardous Waste Activity |
| **2** | November 14, 1980 - April 25, 1984 | EPA | Olin | Report | Seven revised copies of Olin's RCRA Part A Permit Application |
| **3** | June 3, 1982 | Olin | EPA | Letter | Interim Status Acknowledgement |
| **4** | August 3, 1983 | Olin | EPA | Letter | Request for RCRA Part B Permit Application |
| **5** | October 29, 1987 | Olin | EPA | Report | Visual Site Inspection |
| **6** | September 27, 1988 | EPA | Olin | Report | Former Ballistics Sand Staging Area Contamination Assessment |
| **7** | October 13, 1988 | Olin | EPA | Report | RCRA Facility Assessment |
| **8** | November 7, 1988 | EPA | Olin | Letter | Request for Partial Withdrawal of Part A RCRA Permit Application |
| **9** | January 13, 1989 | EPA | Olin | Report | RCRA Part B Permit Application |
| **10** | January 27, 1989 | EPA | Olin | Letter | Ballistics Sand Staging Area - Request for Closure Plan Modification |
| **11** | April 2, 1990 | Olin | Illinois EPA | Permit | State RCRA Permit |
| **12** | May 5, 1990 | Olin | EPA | Permit | Federal RCRA Permit |
| **13** | June 8, 1990 | EPA | Olin | Report | Revised Part A Permit Application |
| **14** | September 27, 1990 | Illinois EPA | Olin | Report | Revised Part A Permit Application |
| **15** | April 22, 1991 | Olin | Illinois EPA | Permit | Revised State RCRA Permit |
| **16** | February 13, 1992 | Olin | Illinois EPA | Letter | Letter documenting waste management units still being regulated as interim status units |
| **17** | August 27, 1993 | Illinois EPA | Olin | Report | Extended Post-Closure Plan for Ballistics Sand Staging Areas |
| **18** | March 22, 1994 | Illinois EPA | Olin | Letter | RCRA Part B Permit Modification Application |
| **19** | October 12, 1994 | Olin | Illinois EPA | Letter | Conditional Approval of 8/27/1993 Extended Post-Closure Plan |
| **20** | September 29, 1995 | EPA | Olin | Report | Phase 1 RFI Report |
| **21** | January 19, 1996 | Olin | Illinois EPA | Letter | Approval of 3/22/1994 Permit Modification Application |
| **22** | May 21, 1997 | Illinois EPA | Olin | Letter | Ballistics Sand Closure Plan Modification Request |
| **23** | February 18, 1998 | Olin | EPA | Letter | Conditional Approval of Phase 1 RFI Report |
| **24** | June 30, 2000 | EPA | Olin | Letter | Notification of Petroleum-Impacted Soils in Brass Mill |
| **25** | October 25, 2000 | EPA | Olin | Report | Brass Mill Contaminated Soil Excavation Report |
| **26** | November 1, 2000 | Olin | Illinois EPA | Letter | Area 4-2a Container Storage Unit Closure Approval |
| **27** | December 22, 2000 | Olin | EPA | Report | CA725 Determination (Current Human Exposures Under Control) |
| **28** | June 2001 | EPA | Olin | Report | Materials Reclamation Facility Groundwater Assessment Report |

| Number | Date | To | From | Format | Title |
|---|---|---|---|---|---|
| **29** | August 6, 2002 | Olin | Illinois EPA | Letter | Zone 3 Incinerator #1 Closure Approval |
| **30** | September 23, 2002 - December 19, 2002 | EPA | Olin | Reports | Three reports detailing investigations regarding Building 433 Oil Release |
| **31** | June 13, 2003 | EPA | Olin | Report | Building 433 Oil Recovery System Design Specifications |
| **32** | July 7, 2003 | Olin | Illinois EPA | Letter | Zone 3 Incinerator #2 Closure Approval |
| **33** | December 18, 2003 | Illinois EPA | Olin | Report | SWMU D (Building T-400 Tank) Corrective Action Completion Report |
| **34** | January 8, 2004 | Olin | Illinois EPA | Letter | SWMU D Corrective Action Completion Report Approval |
| **35** | April 14, 2004 | EPA | Olin | Letter | Building 433 Oil Recovery System Installation Letter |
| **36** | June 4, 2004 | EPA | Olin | Report | CA750 (Groundwater Migration Under Control) Determination Supplemental Monitoring |
| **37** | August 25, 2004 | Olin | EPA | Report | CA750 Determination (Groundwater Migration Under Control) |
| **38** | October 15, 2004 | EPA | Olin | Letter | Notification of Contamination at Outfall 11 |
| **39** | June 3, 2005 - February 17, 2017 | EPA | Olin | Report | Thirteen reports documenting monitoring and oil gauging for Building 433 Oil Recovery System |
| **40** | December 7, 2005 | Olin | Illinois EPA | Letter | Letter updating status of interim status units and requesting a revised permit application |
| **41** | May 2, 2006 | EPA | Olin | Report | Outfall 11 Investigation Report |
| **42** | June 23, 2006 | EPA | Olin | Report | Phase 2 RFI Report |
| **43** | March 11, 2008 | EPA | Olin | Report | Outfall 11 Excavation Report |
| **44** | December 22, 2008 | EPA | Olin | Letter | Olin response to EPA request for additional information for SWMUs 3, 4, 18, and 19 |
| **45** | January 11, 2010 - January 13, 2021 | Illinois EPA | Olin | Report | 32 reports documenting quarterly (and later semi-annually) groundwater monitoring at Ballistics Sand Staging Area |
| **46** | October 19, 2010 | EPA | Olin | Report | SWMU 18 Supplemental Groundwater Investigation |
| **47** | November 1, 2010 | EPA | Olin | Report | MRF & Sloughs Supplemental Groundwater Investigation |
| **48** | January 25, 2011 | EPA | Olin | Report | Supplemental Groundwater Sampling for CA750 EI Confirmation |
| **49** | March 15, 2011 | EPA | Olin | Letter | Human Health Risk Assessment Summary Letter |
| **50** | December 22, 2011 | EPA | Olin | Report | Supplemental Groundwater Sampling for CA750 EI Confirmation |
| **51** | February 16, 2012 | EPA | Olin | Report | 2011 Outfall 11 Groundwater Monitoring Report |
| **52** | January 10, 2013 | EPA | Olin | Report | 2012 Outfall 11 Groundwater Monitoring Report |
| **53** | December 5, 2017 | EPA | Olin | Report | Building 433 Oil Recovery System Evaluation |
| **54** | May 26, 2018 | EPA | Olin | Report | Building 433 Oil Recovery System Operation Report |
| **55** | May 1, 2019 | EPA | Olin | Letter | Olin Response to EPA RCRA 3007 Information Request |
| **56** | May 6, 2019 | EPA | Olin | Report | Off-Site Metals Sampling Report |
| **57** | May 29, 2020 | EPA | Olin | Report | Sediment and Groundwater Sampling (including PFAS) Report |
| **58** | January 28, 2021 | EPA | Olin | Report | Remedy Selection Process Document |