U.S. ENVIRONMENTAL PROTECTION AGENCY
PROPOSED PLAN
Olin McIntosh Operable Unit 2
Washington County, Alabama

This Proposed Plan is not to be considered a technical document. It has been prepared to provide the general public an understanding of the activities that have been occurring at the Olin OU-2 Site. For technical information, please review the documents in the information repositories.

The U.S. Environmental Protection Agency (EPA), in consultation with the Alabama Department of Environmental Management (ADEM), is releasing this Proposed Plan for the environmental cleanup of Operable Unit 2 (OU-2) of the Olin Chemical Facility located in McIntosh, Alabama. This Proposed Plan summarizes the findings documented in the reports on which the preferred cleanup alternative is based. These reports include the Remedial Investigation (RI) Addendum, which includes a Baseline Risk Assessment, the Remedial Goal Option (RGO) Report, and a Feasibility Study (FS). EPA is issuing this Proposed Plan as part of its public participation responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117 and Section 300.430(f)(2), of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

What is a Proposed Plan?
A Proposed Plan is a document to facilitate public involvement in a site's remedy selection process. A Proposed Plan presents EPA's preliminary recommendation of how to best address contamination at a site, presents alternatives that have been evaluated, and explains the reasons EPA recommends the Preferred Alternative.

EPA, in consultation with the State, will select a final remedy for the OU-2 after reviewing and considering all information submitted during the 30-day public comment period. EPA, in consultation with ADEM, may modify the proposed preferred Alternative or select another response action presented in this Plan based on new information or public comments.

What are the next steps in the process?
An open house and public meeting will be held between 5:00 p.m. and 7:00 p.m. at the McIntosh Town Hall (see details in the box at the right side of this page). Public comments can be submitted by mail or e-mail throughout the comment period.

The CERCLA Process

The EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of CERCLA and Section 300.430(f)(2) of the NCP. Environmental investigations and cleanup at OU-2 follow the steps shown in Figure 1. The current stage of the project is Step 3, the Proposed Plan and remedy selection. Remaining activities include the Record of Decision (ROD), remedial design, remedial action, long-term monitoring, and site closure.

Open House and Public Meeting

May 22, 2013
McIntosh Town Hall
206 Commerce Street
McIntosh, Alabama 36553

30-Day Public Comment Period

May 22, 2013 – June 21, 2013

As part of public involvement during the 30 day public comment period, the community is invited to an Open House and Public Meeting. An informal open house will be held from 5:00 to 6:00 p.m. At 6:00 p.m., EPA will present its understanding of the Site, provide its rationale for the EPA Preferred Alternative presented in this Proposed Plan, and answer questions from the community.

The Olin McIntosh OU-2 Information Repository is located at McIntosh Town Hall; and EPA Records Center in Atlanta, Georgia. Electronic documents are posted at the EPA Region 4 webpage:

http://www.epa.gov/region4/foiapgs/readingroom/index.htm

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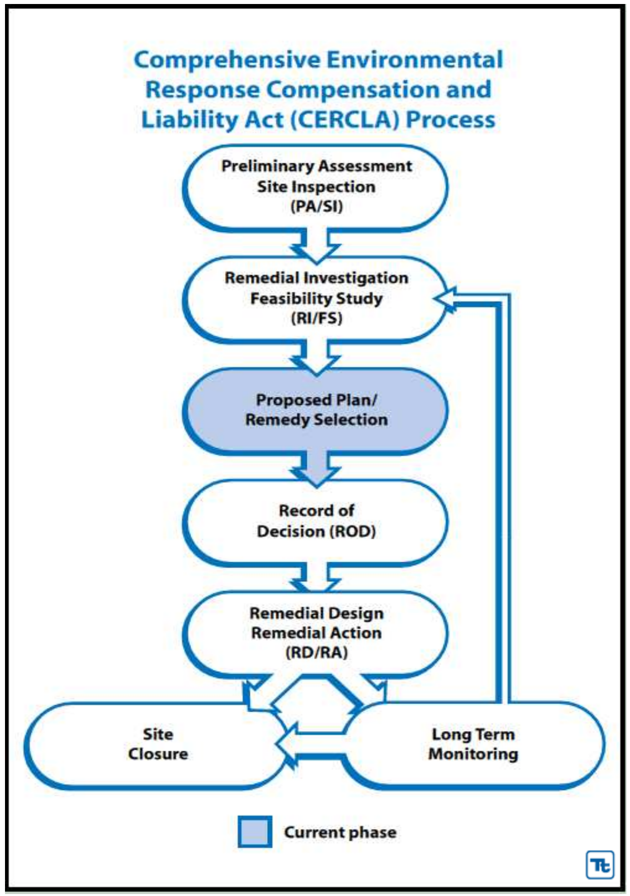

Figure 1. CERCLA Process

Site History

The Olin Chemicals McIntosh plant is located approximately one mile east-southeast of the town of McIntosh, in Washington County, Alabama (see Figure 2). The Olin plant is an active chemical production facility. The main plant and associated Olin properties cover approximately 1,500 acres, with active plant production areas occupying about 60 acres. Olin has produced chlor-alkali chemicals at McIntosh since 1952, first with a mercury-cell process, shut down since 1982, and now with diaphragm-cell and membrane cell processes. Crop protection chemicals (CPC), basically chlorinated organics, were produced from 1952 to 1982.

Because the problems at the Olin site are complex, the site has been organized in two operable units (OUs): OU-1 – the active production facility, Solid Waste Management Units (SWMUs), and the upland area of the Olin property; and OU-2 – the Olin Basin located adjacent to the Tombigbee River, a floodplain and a wastewater ditch leading to the Basin (Figure 3). The ROD detailing the cleanup plan for OU-1 was issued on December 15, 1994. It addresses the source of the contamination on the site as well as the ground water contamination across the entire site. The construction for the OU-1 cleanup plan began in 2000 and was completed in 2001. A 2006 assessment found that the cleanup plan was implemented properly. Activities that have been taken, include closure of solid waste management units and other areas of concern; implementation of the OU-1 groundwater recovery and treatment system; and installation of a multi-layer cap at a former onsite landfill. An assessment during 2006 found that the cleanup plan was implemented properly.

Olin OU-2 Site Background and Characteristics

Olin OU-2 is located to the east of the Olin Chemical main plant site in McIntosh, Alabama and consists of

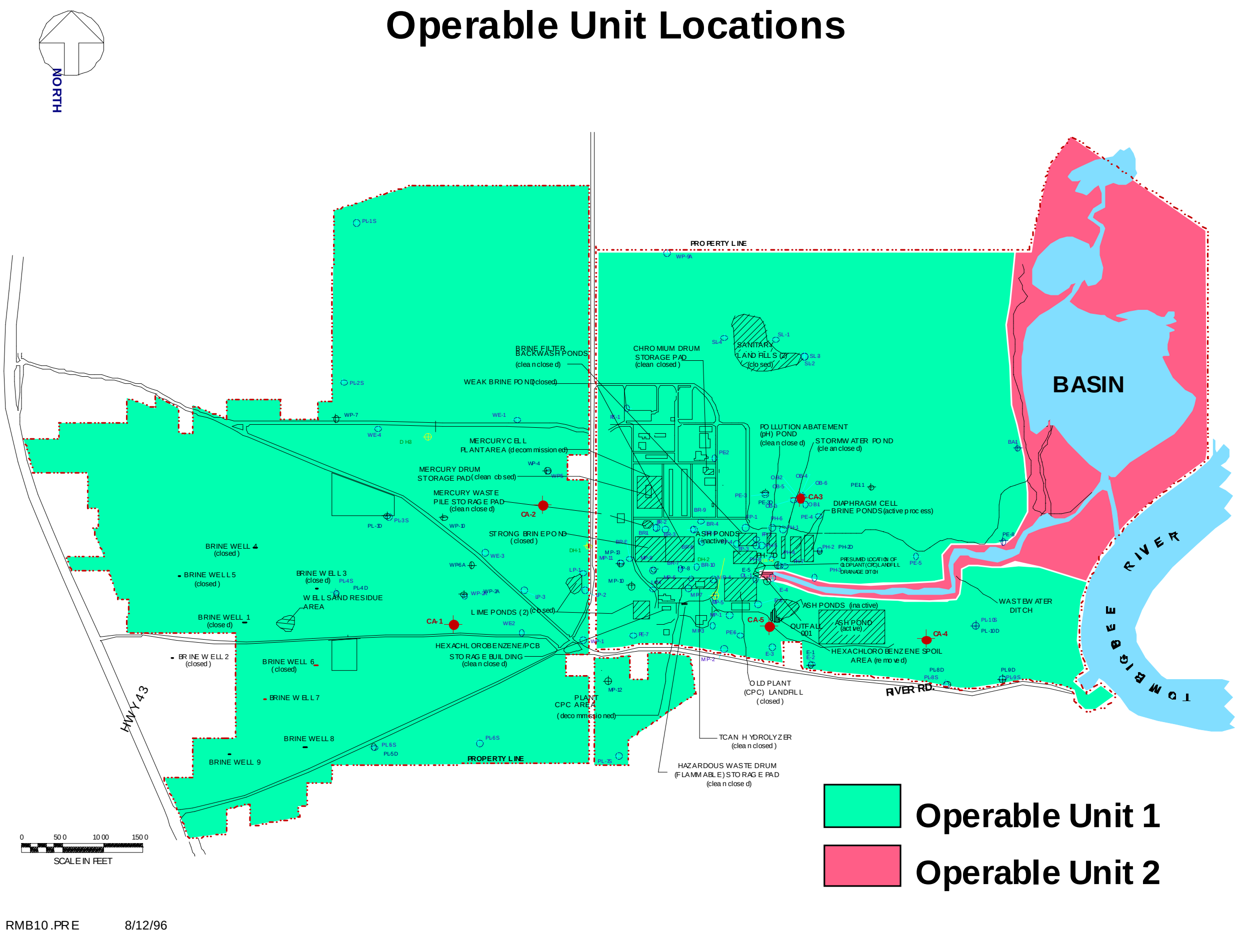

Figure 2. Operable Unit Locations

approximately 209 acres of open ponded water and seasonally flooded wetland. Under base water flow (non-flooded stage) conditions, the open water portion of OU-2 consists of the 76 acre Olin Basin (the Basin), and the 4 acre Round Pond. Olin Basin and Round Pond drain to the Tombigbee River through an inlet channel at the south end of the Basin. OU-2 also includes a wastewater ditch (about 6,000 linear feet) that extends from the main plant to the Basin. This ditch formerly discharged into the southwest corner of the Basin, but currently discharges into the inlet channel to the Tombigbee River (Figure 3).

Olin operated a mercury cell chlor-alkali plant at the main plant site west of OU-2 from 1952 through December 1982. OU-2 Basin received wastewater discharge from the plant from 1952 to 1974. The primary chemicals of concern (COCs) that were discharged into the Basin from the Olin plant are mercury and hexachlorobenzene (HCB). Dichlorodiphenyltrichloroethane (DDT) and its degradation products, dichlorodiphenyldichloro ethylene

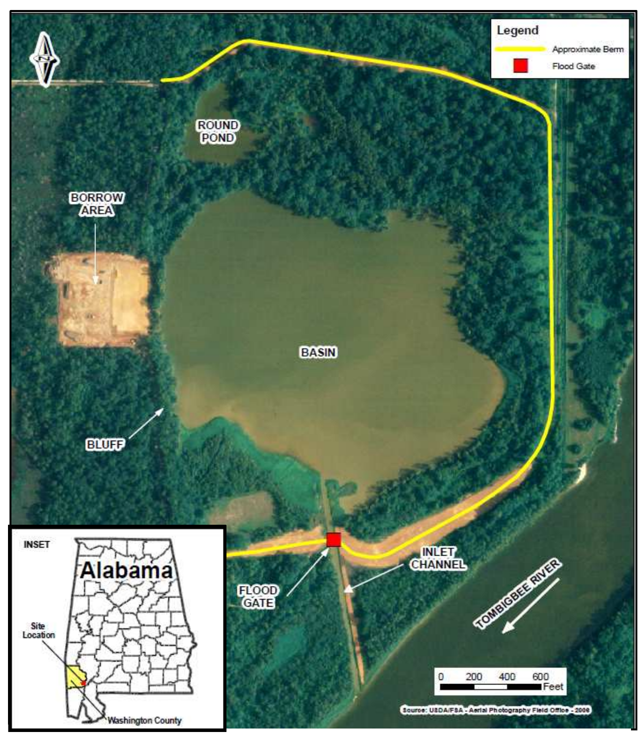

Figure 3. Olin OU-2, McIntosh, Alabama

(DDE), and dichlorodiphenyldichloroethane (DDD) (DDT and its breakdown products are referred to as DDTR) are also COCs in OU-2, though the source of DDTR was runoff from the BASF Chemical facility (formerly Ciba-Geigy Corporation) located to the north of Olin OU-2.

Investigative History

In an Agreement on Consent (AOC) between EPA and Olin Chemical signed on May 8, 1990, Olin agreed to complete a RI/FS for both OU-2 and OU-1 (main Plant Site). Numerous studies and investigations have been conducted at OU-2 since the AOC was signed. Results from studies conducted from the early 1990s to 2001 are considered historical. A berm was constructed around the Basin and Round Pond in late 2006. Results from studies conducted immediately before the construction of the berm and gate system are considered representative of current conditions.

Summary of Remedial Investigation

The Olin McIntosh Plant discharged wastewater to the Basin from 1952 to 1974. Mercury and HCB were transported with the wastewater deposited in the Basin and floodplain. BASF manufactured DDT during this period and indirectly discharged DDTR into OU-2 through run off and flood events.

Sediment

Year-to-year concentrations have shown some variability of mercury is detected in the top 4 inches of sediment in most areas of the Basin and Round Pond. Mercury concentrations in the surficial sediment are relatively higher in the central portion of the Basin in a west-east direction. An isolated area of higher mercury concentrations was observed in the northeast corner of the Basin. The distribution of mercury in the surficial sediment changed slightly over the years, potentially due to resuspension and deposition of incoming sediments. Since the berm was constructed around the Basin in 2006, surface sediment samples collected in OU-2 have reported mercury concentrations ranging from 0.965 milligrams/kilogram (mg/kg) to 213 mg/kg. The ranges of mercury concentrations in historical sampling events (prior to 2001) were non-detect (detection limit = 0.19 mg/kg) to 290 mg/kg in 1991, 18.6 to 113 mg/kg in 1994, and 0.84 to 780 mg/kg in 1995. Areas containing the maximum sediment concentrations in historical data are isolated and were not confirmed during the most recent sampling events. Sediment cores collected in 2009 indicate that the vertical distribution of mercury varies across the Basin, with some locations having higher concentration at or near the surface, and some locations with higher concentrations up to 6 feet below the sediment surface. Sediment HCB concentrations ranged from non-detect at a reporting limit of 0.0069 mg/kg to 8.90 mg/kg in 2009. Samples collected north of the gate structure in 2009 indicated an order of magnitude decrease in HCB from 1991 and 1994 samples. DDTR concentrations in 2009 ranged from 0.06 to 2.68 mg/kg in the Basin sediments.

Surface Water

Mercury in the bottom sediment of the Basin move into the overlying water through physical, chemical, and biological processes. Mercury concentrations in the OU-2 surface water in 2009 ranged from 0.0073 microgram per liter (μg/L) to 0.155 μg/L in unfiltered samples and from 0.0036 μg/L to 0.0147 μg/L in filtered samples. About two-thirds of the filtered surface water samples collected between 2008 and 2010 contained mercury concentrations in excess of the Ambient Water Quality Criteria (AWQC) of 0.012 μg/L. Unfiltered mercury concentrations in the gate overflow ranged from 0.0179 to 0.134 μg/L. Flow rates and mercury concentrations in the gate overflow and Tombigbee River were used to predict the concentration of mercury in the river. The predicted mercury concentrations in the river are expected to be below the AWQC.

Groundwater

Seventeen wells were installed around the Basin at varying depths at eight locations to monitor groundwater. Mercury concentrations in groundwater wells were less than both the drinking water standard of 2 μg/L and the AWQC of 0.012 μg/L. Mercury in the OU-2 sediments does not act as a continuing source to groundwater or the Tombigbee River via the groundwater pathway.

Summary of Risk Assessment

As part of the RI/FS, EPA conducted a baseline risk

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates the "baseline risk". This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate the baseline risk at a Superfund site, EPA undertakes a four-step process:

- **Step 1: Analyze Contamination**
- **Step 2: Estimate Exposure**
- **Step 3: Assess Potential Health Dangers**
- **Step 4: Characterize Site Risk**

In Step 1, EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparison between site-specific concentrations and concentrations reported in past studies helps EPA to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a "reasonable maximum exposure (REM)" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. EPA considers two types of risk: cancer risk and non-cancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as an upper bound probability; for example, a "*1 in 10,000 chance*". In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, EPA calculates a "hazard index". The key concept here is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, EPA determines whether the site risks are great enough to cause health problems for people at or near the Superfund site. The results of the three previous steps are combined, evaluated and summarized. EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

assessment to determine the current and future effects of contaminants on human health and the environment. Based on discussions with the Olin and local officials, the reasonably anticipated use for OU-2 is expected to remain as a floodplain with limited use with restricted access. The Olin McIntosh Plant is an active facility and is expected to remain active in the future.

Human Health Risks

The updated human health risk assessment assumed that no residential construction would ever occur within the boundaries of OU-2. OU-2 floods on a yearly basis during years with normal precipitation. The human health risk assessment assumed that nearby residents might trespass onto OU-2 under current conditions and utilize the Basin and flood plain for recreational purposes such as swimming and fishing, and that fisherman will eat fish from the Basin. Future use scenarios were the same as current use scenarios; with the exception that intensity of future use was assumed to be greater. All current and future use scenarios evaluated risk to both adult and pre-adolescent/adolescent receptors. Carcinogenic risk for all scenarios fell within the acceptable risk range for all COCs. The non-carcinogenic Hazard Index (HI) exceeds 1 for adult and adolescent receptors in future use time frames. The maximum HI of 6 was for the future adult receptor. For all scenarios, the HI was driven by ingestion of fish caught from OU-2, with minimal contribution from dermal contact with surface water and soil, and inhalation of soil particulates.

Ecological Risks

The ecological risk assessment evaluated exposure of plants and animals at OU-2 to contaminants in sediment, surface water, food chain, and concluded that risk exists to insectivorous and piscivorous (fish-eating) aquatic birds, piscivorous mammals, and insectivorous terrestrial birds from methylmercury and DDTR in fish tissue and sediment. Under conditions commonly found in lakes and wetlands, inorganic mercury is converted to the organic form known as methylmercury, which is readily taken up into the food chain.

Certain biotic tissue inputs to the risk assessment calculations were based on historical data due to the absence of recent data for those tissues. Concentrations of DDTR in mosquitofish (gambusia) were based on data collected in 2001, while concentrations of mercury, DDTR, and HCB in raccoon tissue, little blue heron tissue, bullfrog tissue and crayfish tissue were based on data collected in 1994. It is not known how the concentrations of COCs in those organisms have changed over the past 10 to 15 years. It is likely that DDTR concentrations have declined based on the fact that sediment concentrations of DDTR have declined during that time, but the same may not be true for HCB and mercury. Mercury concentrations in fish tissue increased from 2006 to 2008, likely due to the drought that reduced water exchange between the Basin and the Tombigbee River during that time period. It is not known if concentrations of mercury in aquatic invertebrate and amphibian tissue showed a similar increase during that time. The ecological risk assessment determined that the most significant potential exposure pathway was ingestion of fish by avian receptors for mercury, methylmercury, and DDTR.

It is EPA's current judgment that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this Site which may present an imminent and substantial endangerment to public health or welfare.

Remedial Action Objectives

Remedial Action Objectives (RAOs) describe what a proposed site cleanup is expected to accomplish. The RAOs for the Olin OU-2 are:

- ***Reduce, or mitigate, risk to piscivorous birds from ingestion of fish exposed to mercury-contaminated sediments.***
  EPA has selected a sediment cleanup level for mercury of 3 mg/kg to be protective of piscivorous birds at Olin OU-2.

- ***Reduce or mitigate, risk to piscivorous mammals from incidental ingestion of HCB-contaminated sediments.***
  EPA has selected a sediment cleanup level of 7.6 mg/kg to be protective of piscivorous mammals.

- ***Reduce, or mitigate, risk to piscivorous birds from ingestion of fish exposed to DDTR-contaminated sediments.***
  The recommended DDTR PRG for OU-2 sediments is 0.33 - 1.7 mg/kg to be protective of piscivorous birds.

- ***Prevent risk to humans from ingestion of fish.***
  EPA has selected a cleanup level of 0.3 mg/kg for mercury in fish filets based on the fish tissue-based water quality criterion. EPA has also selected a cleanup level of 0.64 mg/kg for DDTR in whole fish to be protective of fish.

- ***Reduce, or mitigate, risk to ecological receptors exposed to COCs in contaminated floodplain soils.***
  The recommended DDTR PRG for OU-2 soils is 0.039 - 0.25 mg/kg to be protective of insectivorous birds.

- ***Restore surface water to meet water quality standards.***
  The water quality criterion for mercury in impaired waters in Alabama is 0.012 μg/L. The criterion will be applied in the Basin and at the point of discharge to ensure that mercury is not leaving the Site at levels of concern.

Summary of Remedial Alternatives

Based on results from the Remedial Investigation, it was determined that remedial actions would be required in Olin OU-2 for approximately 73 acres of sediment and soil that exceed cleanup levels for mercury, DDTR, and/or HCB. The NCP at 40 CFR Section 300.430(e)(7) describes methods for screening cleanup technologies in order to develop applicable remedial alternatives. These procedures ensure that the best or most promising alternatives are retained for detailed analysis and comparison. As part of the FS, a variety of cleanup technologies were first screened for their implementability and effectiveness in abating the identified aquatic risks at this site. Technologies that passed the screening were then combined to develop a final set of remedial alternatives to be further evaluated. The alternatives that were developed for each area are described below.

Alternatives 2A, 2B, 2C, and 3 all include additional sediment sampling during the remedial design phase to refine the area for the remedial footprint before implementing the cleanup action. Additional sampling will be performed in the channel connecting Round Pond to the Basin and the perimeter of the floodplain soils that are often inundated; and the former wastewater and discharge ditch.

Alternative 1: No Action – (No Cost)

The NCP requires the consideration of "No Action" to serve as a baseline alternative. The No Action alternative assumes that no treatment, engineering controls, or institutional controls would be employed. The berm and gate structure would not be maintained and that current restrictions on trespassing and fishing would not be enforced.

Alternative 2A: In-situ Capping, Institutional Controls (IC), and Engineering Controls (ECs) – ($15M)

In this alternative, a cap would be applied over the areas of sediment exceeding the mercury, DDTR, and HCB remediation goals. The In-situ cap (see Figure 4) would serve as a barrier between the environment and contaminants in the sediment, thus reducing risks to acceptable levels. The cap consists of three layers 1) a mixing zone, 2) active cap layer, and 3) habitat layer.

The mixing or transition zone would be placed immediately above the sediment surface and allows for mixing between the sediment and the cap material during placement. The cap material is placed above the mixing zone. The effectiveness of various cap materials (passive material with and without amendments and reactive materials) will be evaluated during the remedial design. The cap materials will be tested to evaluate effectiveness in immobilizing the COCs to produce a safe, sustainable, and long cap life (100 years or more). The cap thickness will be determined during remedial design. Reactive sorbents, such as activated carbon or other contaminant-sequestering agents, may be used to reduce the potential for contaminants to migrate through the cap. The effectiveness and potential impacts of these amendment technologies will be evaluated in pilot

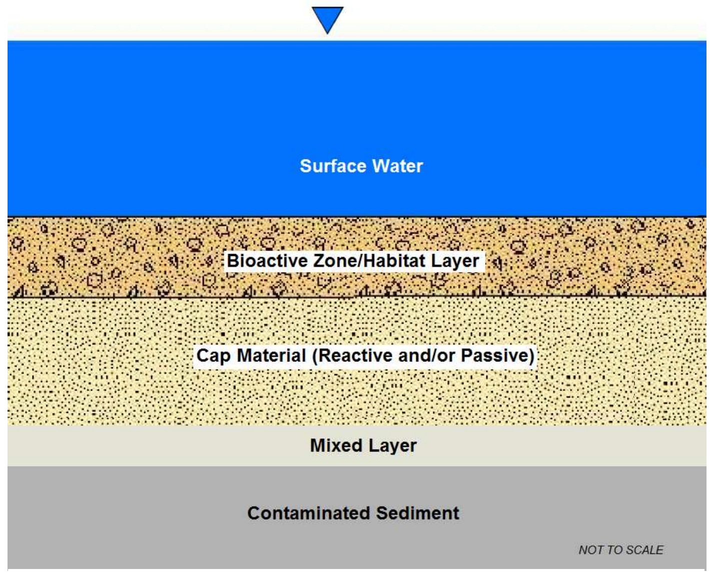

Figure 4. Schematic Diagram of In-situ Cap

tests performed during remedial design. The approximate remedial footprint is shown in Figure 5. In habitat areas, the uppermost layers of caps will be designed using suitable habitat materials. The habitat layer would include stone armoring to prevent erosion and resuspension of cap material. Water levels would be managed through the berm and gate system through the completion of construction to maintain a consistent water level for equipment mobility and limit the influence of potential flooding, ICs, including deed and use restrictions currently in place as a result of OU-1; long-term monitoring; and ECs, including the berm and gate system, signs, fencing, and security monitoring, would be employed to limit risks to human receptors. Long-term monitoring will include cap maintenance; topographic surveys; sediment (grabs and cores); porewater and surface water monitoring; fish tissue monitoring; and other biota monitoring. Because this alternative will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after the remedy completion to ensure that the remedy is, or will be, protective of human health and the environment.

Alternative 2B: In-situ Capping, Dry Capping, ICs, and ECs – ($15.6M)

This alternative combines In-situ capping, dry capping, ICs and ECs. A cap would be applied over the areas of sediment exceeding the remediation goal consistent with Alternative 2A.

The portion of the Basin that is at elevation -5 feet North American Vertical Datum of 1988 (NAVD88) or lower would be capped In-situ, as in Alternative 2A. The portions of the Basin that are shallower than -5 feet NAVD88 and Round Pond would be capped in the dry. Capping in the dry is defined as dewatering the area and using earth-moving equipment to place cap material over the sediment. The areas would be incrementally segregated with cofferdams into 300- by 400-foot sections and dewatered. The water would be pumped to above-ground, modular storage tanks (Modutanks® or equivalent) located on the bluff. Solids would settle inside the storage tank, and the water would be returned to the Basin. A geotextile would be placed in the dewatered parcel, and then a cap would be applied. This cap would provide a barrier between the environment and the mercury in the sediment and surface water, thus reducing risks to acceptable levels. The cap would be as described in Alternative 2A (including the mixing zone, active cap material layer, and habitat layer), but would be a total thickness of approximately 24 inches to provide a stable surface for equipment. Work would begin in shallower areas of the Basin (south and southeast) and move towards the deeper portion of the Basin in an incremental fashion, moving the cofferdams as each parcel is capped. Water levels would be managed through the berm and gate system through the completion of construction to maintain the dewatered sections and to maintain consistent water levels for equipment. ICs, including deed and use restrictions; long-term monitoring; and ECs, including signs, fencing, and security monitoring, would be employed to limit risks to human receptors. Long-term monitoring will include cap maintenance; topographic surveys; sediment cores; surface water monitoring; fish tissue monitoring; and other biota monitoring. Because this alternative will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after the remedy completion to ensure that the remedy is, or will be, protective of human health and the environment.

Alternative 2C: Dry Capping, ICs, and ECs – ($17M)

In this alternative, all areas of Basin and Round Pond that exceed the remediation goal would be capped in the dry as described in Alternative 2B. ICs, including deed and use restrictions; long-term monitoring; and ECs, including berm and gate system, signs, fencing, and security monitoring, would be employed to limit risks to human receptors. Long-term monitoring will include cap maintenance; topographic surveys; sediment cores; surface water monitoring; fish tissue monitoring; and other biota monitoring. Because this alternative will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after the remedy completion to ensure that the remedy is, or will be, protective of human health and the environment.

Alternative 3: Debris Removal, Dredging, Dewatering, Onsite or Offsite Disposal, ICs and ECs – ($55.2M - $69.8M)

This alternative starts with removal of large debris (e.g., submerged stumps, fallen trees, etc.) with mechanical equipment, after which hydraulic dredging would be used to remove contaminated sediments from OU-2. The area of the Basin to be dredged includes approximately 73 acres. Most of the Basin, approximately 43 acres, would need to be dredged to 4 feet in depth; approximately 21 acres to a depth of 6 - 13 feet; and Round Pond would need to be dredged approximately 1 foot. The volume of in-place sediment to be removed in this alternative is approximately 590,000 cubic yards. The dredged sediments would be dewatered prior to disposal in an onsite or offsite landfill. It is assumed that the dredged sediments would be considered non-hazardous. This assumption would be verified with appropriate analyses prior to sediment removal. The residual water from dewatering would be either discharged to the river under a permit or returned to the Basin. Water levels would be managed through the berm and gate system through the completion of construction to maintain a consistent water level for equipment mobility and limit the influence of potential flooding. ICs, including deed and use restrictions; long-term monitoring; and ECs, including signs, fencing, and security monitoring, would be employed to limit risks to human receptors. Long-term monitoring will include landfill cap maintenance; surface water monitoring; fish tissue monitoring; and other biota monitoring. Because this alternative will result in hazardous substances, pollutants, or

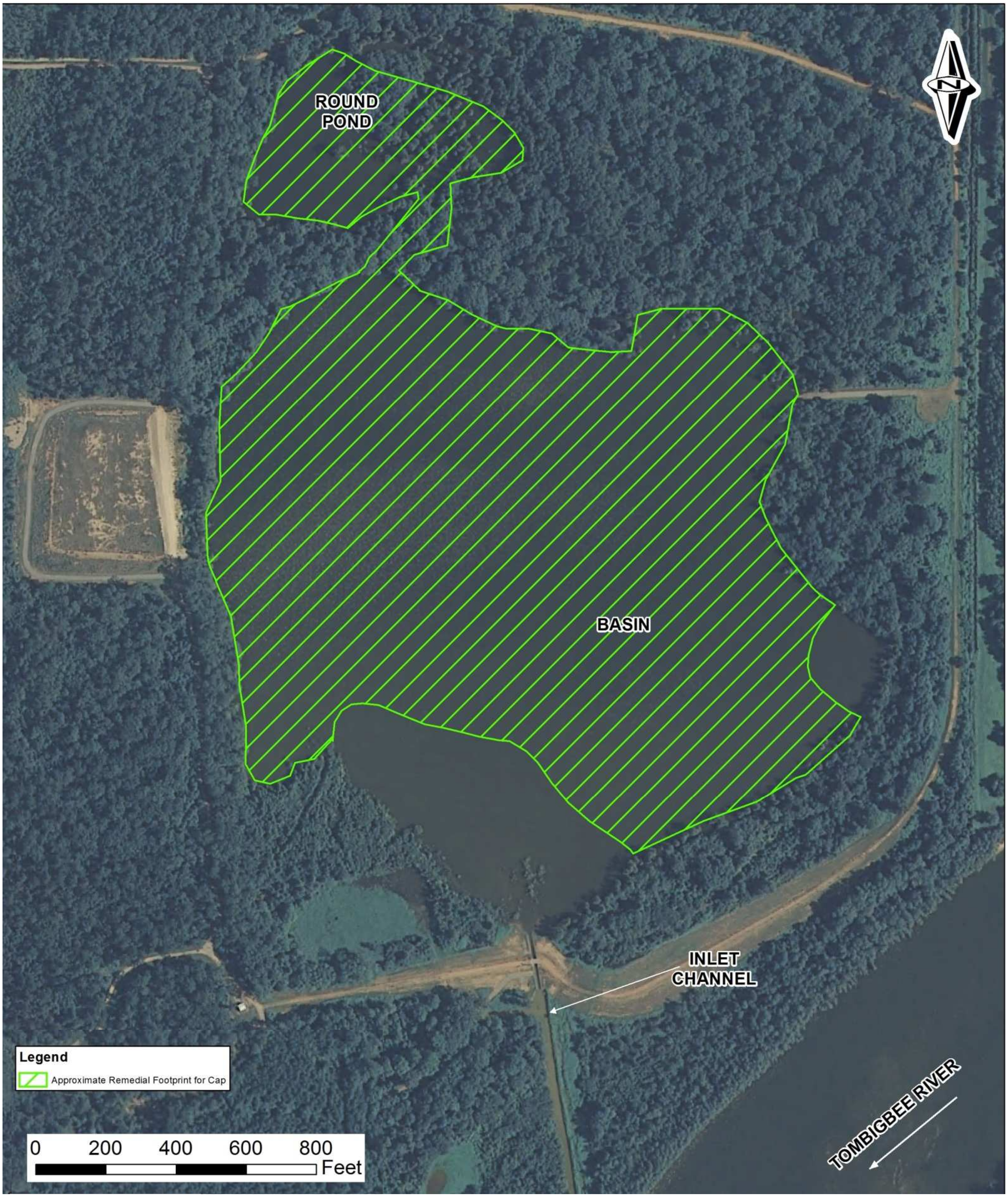

Figure 5. Approximate Remedial Footprint

contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after the completion of remediation to ensure that the remedy is, or will be, protective of human health and the environment.

Evaluation of Alternatives

The NCP establishes a framework of nine criteria for evaluating identified remedial alternatives. These nine criteria were used to evaluate the different remedial action alternatives individually and against each other in order to select a preferred remedy. The objective of this section is to summarize the evaluation that allowed the selection of a preferred alternative. The nine criteria are shown on Figure 6.

In selecting a preferred cleanup alternative, EPA uses the following criteria to evaluate alternatives screened in the FS. The first two criteria are threshold criteria and must be met for an option to be considered further. The next five are balancing criteria for weighing the merits of those that meet the threshold criteria. The final two criteria are used to modify EPA's proposed plan based on state and community input.

Overall Protection of Human Health and the Environment

Threshold criteria are termed as such because they must be fully satisfied or the remediation alternative cannot be accepted under CERCLA. Alternative 1 does not meet this criterion because it would not reduce contaminant concentrations in sediment to levels protective of piscivorous birds and mammals at the Site, and lack of ICs and ECs could result in increased risk to human health from consumption of fish in OU-2. Capping alternatives, 2A, 2B, and 2C, isolate contaminants in sediment from contact with other media and reduce their uptake into the food chain, thus protecting human health and the environment. Alternative 3, which involves dredging, removes most of the contamination from the environment in OU-2, but carries a risk of residual contaminants and promotes resuspension that could prevent the achievement of RAOs and temporarily increase contaminant concentrations in surface water and biota.

Figure 6. Criteria for Comparison of Alternatives

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternative 1, No Action, does not comply with ARARs because the PRGs for sediment would not be met. Capping Alternatives 2A, 2B, and 2C comply with ARARs. The dredging Alternative 3 may or may not comply with ARARs depending upon the amount of resuspension and residuals remaining after dredging. There is concern that mercury remaining in dredge residuals and resuspended sediment in Alternative 3 will result in noncompliance with ARARs based on the estimated amount of residuals and resuspension (5 to 10%).

Long-term Effectiveness and Performances

Modeling using site-specific data has predicted that Alternatives 2A, 2B, and 2C, would be effective in the long term. Alternative 3, Hydraulic Dredging, would be effective as long as residuals and resuspension are closely controlled.

Short-term Effectiveness

Alternative 3 is not considered effective in the short term. The capping Alternatives 2A, 2B, and 2C would effectively isolate the contaminated sediment in the short term. Short-term effects from capping may occur due to resuspension during cap placement (Figure 7), and destruction of benthic habitat, but these effects would be temporary and reversible. Adverse, short-term impacts, such as increases of mercury concentrations in fish tissue and surface water, are expected to occur with the dredging (Alternative 3) due to resuspension that occurs during implementation.

Reduction of Toxicity, Mobility or Volume (TMV) Through Treatment

Capping Alternatives 2A, 2B, and 2C would provide an element of treatment to reduce mobility and toxicity (bioavailability) through physical isolation, stabilization, and chemical immobilization of the contaminants in sediment under the cap. The dredging Alternative 3 would reduce volume through mass removal, not through treatment, and it would temporarily increase COC mobility through release and resuspension. The dredging alternative would also increase the volume of contaminated sediment by increasing the water content through hydraulic dredging.

Implementability

ICs and ECs are already implemented at OU-1. Alternative 2A capping is implementable with well-proven technologies and equipment. Uncertainties are associated with the dry capping alternatives (2B and 2C), such as the ability to segregate and dewater the Basin/Round Pond and the ability to create a stable working surface. Additional time, materials, and labor would be required for Alternatives 2B and 2C. Alternative 3 dredging is implementable with proven technologies and equipment.

Cost

Costs for the five remedial alternatives are presented in Table 1. No cost is associated with Alternative 1. Present worth costs are based on the capital costs incurred during the first year and operation, maintenance, and monitoring (OM&M) for 30 years, using a 7% annual discount rate.

Table 1. Total and Present Worth Costs for Olin McIntosh OU-2 Remedial Alternatives

Remedial Alternatives	Total Cost	Present Worth
Alternative 1		
No Action	$0	$0
Alternative 2A		
In-situ Capping	$15,000,000	$14,700,000
Alternative 2B		
Dry Capping and In-situ Capping	15,600,000	$15,300,000
Alternative 2C		
Dry Capping	$17,000,000	$16,700,000
Alternative 3		
Hydraulic Dredging with Onsite Disposal	$55,200,000	$54,000,000
Hydraulic Dredging with Offsite Disposal	$69,800,000	$69,400,000

Accuracy range for the costs presented in Table 1 is –30% to +50%.

State Acceptance

The State of Alabama has been actively involved in the process of evaluating Olin OU-2 and evaluating the cleanup alternatives presented in the FS and this Proposed Plan. At this time, the State is analyzing EPA's preferred alternatives for Olin OU-2, which is summarized below.

State acceptance will be described in the ROD and any comments will be addressed in the Responsiveness Summary.

Community Acceptance

This Proposed Plan provides the opportunity for the public to provide comments on EPA's Preferred Alternative for Olin McIntosh OU-2. Community acceptance of the Preferred Alternatives will be evaluated after the 30-day public comment period and will be described in the ROD and Responsiveness Summary.

Summary of Analysis

The No Action (Alternative 1) will result in unacceptable risk to human health and the environment. Dredging (Alternative 3) can be expected to result in adverse short-term effects, such as increases in fish tissue and surface water concentrations of mercury. Dredging may also not be effective in the long term based on the amount of resuspension and residual concentrations associated with dredging and debris removal. Dredging is also more costly.

There is more certainty that capping (Alternatives 2A, 2B, and 2C) will be protective of human health and the environment, will comply with ARARs, and would effectively isolate the sediment from humans and the environment. The current information and predictive modeling tools indicate capping will be effective in the long term. While the costs of the different capping Alternatives (2A, 2B, and 2C) are comparable, there is more certainty with the implementation of 2A. Uncertainties associated with 2B and 2C include disruption due to flooding.

Based on these considerations, EPA selected the proposed Alternative 2A over other alternatives because it is expected to achieve substantial and long-term risk reduction through isolation and immobilization of COCs, and is expected to allow the property to be used for the reasonably anticipated future land use, which is ecological. Alternative 2A reduces the risk within a reasonable time frame (10 years) and at less cost than Alternative 3. The proposed Preferred Alternative can change in response to public comment or new information.

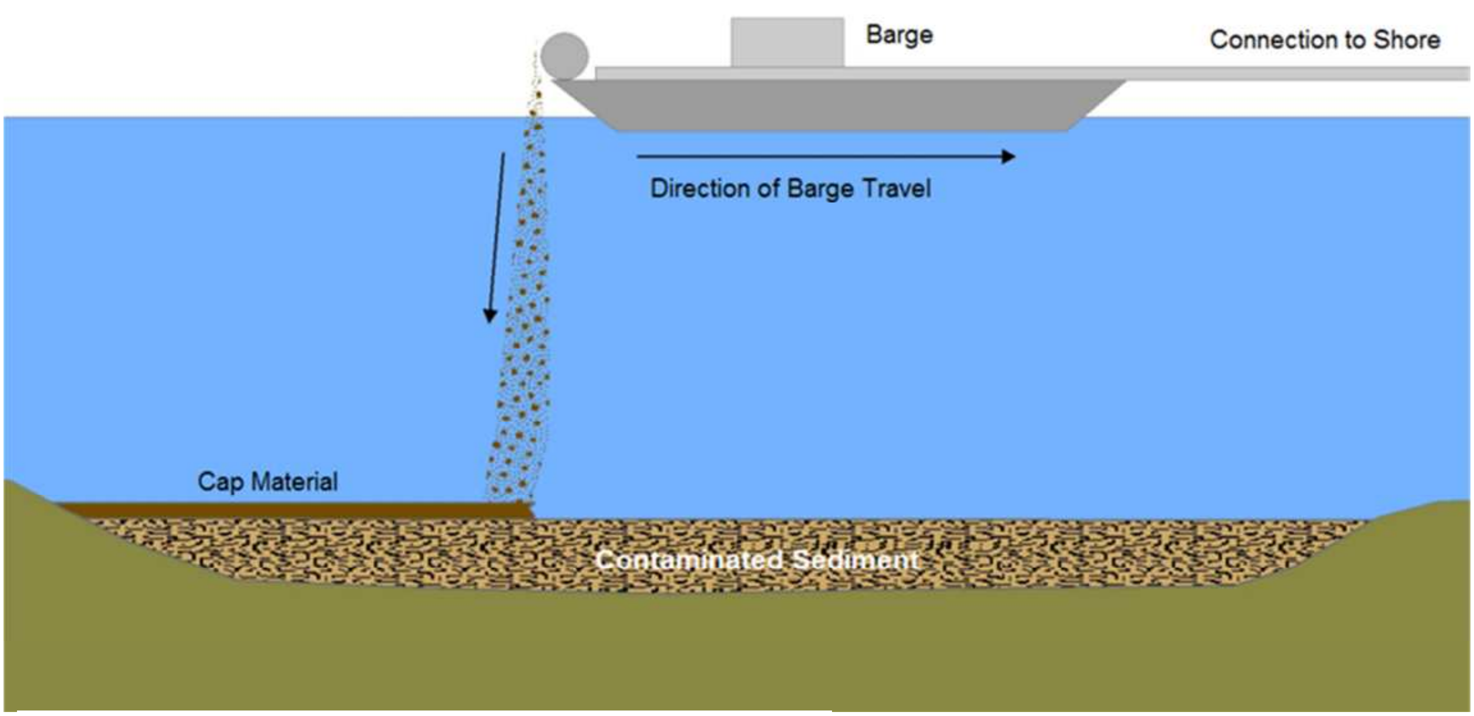

Figure 7. A Typical Placement of Granular Cap Material

EPA's Preferred Alternative

Based on the information currently available, EPA believes the chosen Preferred Alternative 2A meets the threshold Criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA Section 121(b):

- **Be protective of human health and the environment;**
- **Comply with ARARs;**
- **Be cost effective;**
- **Use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and**
- **Capping of mercury contaminated sediments has been demonstrated to be reliable for this type of contamination and provides an element of treatment to reduce mobility and toxicity (bioavailability) through physical isolation, stabilization, and chemical immobilization of the contaminants under the cap.**

The NCP establishes an expectation that EPA will use treatment to address the principal threat posed at a site wherever practicable (Section 300.430(a)(1)(iii)[A]). In practice, the "principal threat" concept is applied by EPA to the characterization of "source materials" at a Superfund site. A source material includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, 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 present a significant risk to human health or the environment should exposure occur. The Olin OU-2 mercury contaminated sediments are not readily classifiable as principal threat wastes despite the inherent toxicity of mercury and demonstrated mobility which has contaminated surface water. However, capping alternatives have been demonstrated to be reliable containment remedies for this type of contamination.

Alternative 2A, In-situ capping consists of a multi-layered engineered cap. The cap materials and thickness will be determined during remedial design. In habitat areas, the uppermost layers of caps will be designed using suitable habitat materials. Reactive materials, containing sequestering materials, may be used to reduce the potential for contaminants to migrate through the cap. The ICs, including deed and use restrictions currently in place as a result of OU-1 would be amended to include the OU-2 remedial footprint; and ECs, including the berm and gate system, signs, fencing, and security monitoring, would be employed to limit risks to human receptors. Alternative 2A includes long-term monitoring that would include cap maintenance; topographic surveys; sediment samples, surface water and porewater monitoring; fish tissue and other biota monitoring. Because this alternative would result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a CERCLA statutory review would be conducted every five years after the completion of remediation to ensure that the remedy is, or will be, protective of human health and the environment. Additional sampling will be performed in the channel connecting Round Pond to the Basin and the perimeter of the floodplain soils that are often inundated; and the former wastewater and discharge ditch to further refine the remedial footprint.

HOW THE PUBLIC CAN COMMENT

The 30-day public comment period for the Proposed Plan is May 22, 2013 through June 21, 2013.

Submit Comments:
There are two ways to provide comments during this period:
- Offer oral or written comments during the public meeting
- Provide written comments by mail or e-mail

Public Meeting:
An open house and public meeting will be held May 22, 2013 from 5:00 p.m. - 7:00 p.m. at the McIntosh Town Hall. An information open house will be held from 5:00 to 6:00 p.m. A formal public meeting will begin at 6:00 p.m. where EPA will present the findings of the Olin McIntosh OU-2 RI and FS and the rationale behind the proposed Preferred Alternative.

Written comments on this Proposed Plan will be accepted from May 22 through June 21, 2013, and should be mailed or emailed to:

Ms. Beth Walden
Superfund Remedial Branch
U.S. Environmental Protection Agency
61 Forsyth Street
Atlanta, Georgia 30303
walden.beth@epa.gov

Information Repositories:

Information concerning the Olin OU-2 Site may be found at the following locations:

Olin McIntosh OU-2 Information Repository:

McIntosh Volunteer Town Hall
206 Commerce Street
McIntosh, AL 36553
(251) 944-2428
Local Contact: Sharon Rose-Eckridge, City Clerk

USEPA Region 4 Records Center
61 Forsyth Street
Atlanta, GA 30303
(404) 562-8946

Electronic documents are posted at the EPA Region 4 webpage:

http://www.epa.gov/region4/foiapgs/readingroom/index.htm

Mailing List Additions:

Anyone wishing to be placed on the mailing list for this Site should send his/her request to Beth Walden, EPA Project Manager.

GLOSSARY OF TERMS

Applicable or Relevant and Appropriate Requirements (ARARs): Federal, state, and local regulations and standards determined to be legally applicable or relevant and appropriate to remedial actions at a CERCLA site.

Benthic Habitat: The collection of invertebrates living on or in water body (sea or lake) bottoms.

Cofferdams: Structures that isolate a portion of a waterway to limit impacts from construction disturbance. Cofferdams can include, but are not limited to, sheetpile, sandbags, Portadam®, Aquabarrier®, or culverts placed on end (e.g. vertically). Cofferdams do not include earthen dams.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law (also known as Superfund) that established a program to identify hazardous waste sites and procedures for evaluating sites to be protective of human health and the environment.

Crop Protection Chemicals (CPC): Crop protection chemicals includes pesticides, herbicides, insecticides, fungicides, as well as biotechnology products and they help control the thousands of weed species, harmful insects, rodents, fungus and numerous plant diseases that afflict crops.

Dichlorodiphenyltrichloroethane (DDT): An organochlorine insecticide no longer registered for use in the United States. It is an insecticide highly toxic to biota, including humans. This is a persistent biochemical which accumulates in the food chain.

When DDT is broken down in soil, it usually forms dichlorodiphenyldichloroethylene (DDE) or dichlorodiphenyldichloroethane (DDD).

Ecological Risk Assessment: Ecological risk assessment is a process for systematically evaluating the likelihood of adverse ecological effects as a result of exposure to contaminants.

Engineering Controls (ECs): Means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination.

Feasibility Study (FS): A study to identify, screen, and compare remedial alternatives for a site.

Hexachlorobenzene (HCB): HCB is a fully chlorinated industrial hydrocarbon chemical. It is insoluble in water, but is very soluble in fat, oils, and organic solvents. HCB is one of the most persistent environmental pollutants, and bioaccumulates in the environment, in animals, and in humans. It is not currently manufactured as a commercial product in the United States.

Human Health Risk Assessment: The process of estimating the potential risk of contaminants on a human population under defined conditions. This information enables those concerned to determine whether any clean-up is warranted or other actions need to be taken.

In-situ Capping: In-situ capping is a containment technology that involves isolating contaminated sediments from the surrounding aquatic environment using layers of geologic and synthetic materials.

Institutional Controls (IC): These are defined as non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a response action. ICs are typically designed to work by limiting land or resource use or by providing information that helps modify or guide human behavior at a site.

Mercury: It is a chemical element with the symbol Hg. This metal and most of its compounds are extremely toxic. Methylmercury is the most common form of organic mercury found in the environment. Environmental methylmercury arises from the methylation of inorganic mercury by microorganisms in soil and sediments, in air or under water.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The regulatory basis for government responses to oil and hazardous substances spills, releases, and sites where these materials have been released.

No Action: The No Action option includes no controls for exposure and no long-term management measures. Because no cleanup activities would be implemented, long-term human health and environmental risks for the site essentially would be the same as those identified in the baseline risk assessment.

Preliminary Remediation Goals (PRGs): These are risk-based tools for evaluating and cleaning up contaminated sites. They are being used to streamline and standardize all stages of the risk decision-making process.

Record of Decision (ROD): A decision document that identifies the remedial alternatives chosen for implementation at a CERCLA site; the ROD is based on information from the RI Report and FS and on public comments and community concerns.

Remedial Action Objective (RAO): Describes what the site cleanup is expected to accomplish.

Remediation Goal (RG): A chemical concentration limit that provides a quantitative means of identifying areas for potential remedial action, screening the types of appropriate technologies, and assessing a remedial action's potential to achieve the RAO.

Remedial Investigation (RI): The first of two major studies that must be completed before a decision can be made about how to clean up a site (the FS is the second study). The RI is designed to evaluate the nature and extent of contamination and to estimate human health and ecological risks posed by chemicals of potential concern at a site.

Solid Waste Management Unit (SAMUs): A site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste.

Toxicity, Mobility or Volume (TMV): Degree to which an alternative reduces (a) the harmful nature of the contaminants, (b) their ability to move through the environment, and (c) the amount of contamination at the site.

U.S. Environmental Protection Agency (EPA): The federal regulatory agency responsible for administration and enforcement of CERCLA (and other federal environmental regulations).