

**Proposed Plan - North Alcoa Site-Operable Unit 1
East Saint Louis, Illinois
Saint Clair County
April 2012**

**United States Environmental Protection Agency
Region 5**

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List of Acronyms

AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BERA	Baseline Ecological Risk Assessment
BHHRA	Baseline Human Health Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
EJ	Environmental Justice
EJSEAT	Environmental Justice Strategic Enforcement Assessment Tool
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FFS	Focused Feasibility Study
IAC	Illinois Administrative Code
IB	Investigative Block
Illinois EPA	Illinois Environmental Protection Agency
IUECA	Illinois Universal Environmental Covenant Act
Mg/kg	Milligrams per kilogram
Mg/l	Milligrams per liter
MW	Monitoring Well
NCP	National Contingency Plan
ND	Not Detected
NPV	Net Present Value
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polychlorinated Biphenyl
RAA	Remedial Action Alternative
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objective
RDA	Residue Disposal Area
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SPL	Spent Pot lining
SVOC	Semi-volatile Organic Compound
Ug/l	Microgram per liter
VOC	Volatile Organic Compound

Introduction

This Proposed Plan presents the U.S. Environmental Protection Agency's (EPA) preferred alternative for the cleanup of soils at the North Alcoa Site, Operable Unit 1 (OU-1), in East Saint Louis, Saint Clair County, Illinois, and provides the rationale for this preference. In addition, this plan includes summaries of other cleanup alternatives evaluated for use at the Site. This OU-1 interim action will be the first of two operable unit actions to be taken at the Site and will address surface contamination in the area shown in Figure 5. OU-2 will address the remainder of the Site, including groundwater. As outlined below, EPA recommends RAA-2 as the preferred alternative for OU-1 at the Site.

EPA is issuing this Proposed Plan as part of EPA's public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and Section 300.430(f) (2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Section 300.430(f) (2). EPA, the lead agency for Site activities, together with the Illinois Environmental Protection Agency (Illinois EPA), the support agency, hereby issues this Proposed Plan for public comment.

The public comment period runs for 30 days from April 12, 2012 through May 14, 2012. EPA and Illinois EPA will be holding a public meeting in East Saint Louis on April 17, 2012.

This Proposed Plan summarizes Site-specific information such as Site characteristics and the nature and extent of contamination that is set in greater detail in the Focused Feasibility Study (FFS) report for OU 1, and other documents contained in the Administrative Record file for this Site. You are encouraged to review these documents to get a better understanding of the Site, Superfund activities that have been conducted at the Site, and the cleanup alternatives evaluated.

EPA may modify the recommended alternative or select another alternative based on information received during the public comment period. EPA encourages members of the public to review and comment on all of the alternatives presented in this Proposed Plan. EPA also encourages the public to review the documents in the Administrative Record to gain a more comprehensive understanding of the Site.

After review and consideration of information provided by the public during the comment period and at the public meeting, and consultation with the Illinois EPA, EPA will select a final cleanup plan for OU-1. The final cleanup plan for OU-1, which will be announced in local newspaper notices and presented in an EPA document called the Record of Decision (ROD), could differ from this Proposed Plan depending on information or comments EPA receives during the public comment period.

The Administrative Record repositories for this Site can be found at the following three physical locations:

**United States Environmental Protection Agency
Region 5
Superfund Records Center - 7th Floor
77 West Jackson Boulevard
Chicago, Illinois 60604**

Hours of operation 8:15 to 4:45 CST (Monday-Friday)

**City Clerk's Office
City of East Saint Louis
301 River Park Drive
East Saint Louis, Illinois 62201**

**East Saint Louis Public Library
5300 State Street
East Saint Louis, Illinois 62203**

Information for the North Alcoa Site can also be viewed on-line at
<http://www.epa.gov/region5/cleanup/northalcoa/>

In addition to the FFS for OU-1, the Administrative Record includes, but is not limited to, memoranda presenting human health and ecological risk assessment calculations completed pursuant to the Risk Assessment Guidance for Superfund (RAGS) as summarized in the FFS, and a geotechnical report summarizing a test strip pilot program evaluating the stability of cover materials over the Site waste. The Remedial Investigation and Feasibility Study was conducted under the supervision of EPA pursuant to an Administrative Order on Consent (RI/FS AOC).

Site Background

The Site is located in East Saint Louis, Saint Clair County, Illinois (See Figure 1). From approximately 1903 to 1957, Alcoa, Inc. conducted aluminum manufacturing and production operations at the former East Saint Louis Works facility on the south side of Missouri Avenue. Alcoa operated the facility primarily for the purpose of refining bauxite into alumina using the Bayer process which used hot sodium hydroxide in a pressurized digester to separate the aluminate liquor from the insoluble bauxite residue (red mud). In addition, the former East Saint Louis Works produced fluoride, as well as bauxite and fluoride based chemicals, including cryolite, aluminum fluorides and sodium acid fluoride. The residue remaining after alumina extraction during bauxite refining is known as "red mud" or after further processing, "brown mud." Both forms of bauxite residue were disposed of at the North Alcoa Site.

Beginning in the early 1900s, Alcoa placed the red and brown mud from manufacturing operations in disposal areas north of Missouri Avenue. Initially, the bauxite residue was disposed of at the edges of the former Pittsburg Lake. Over time, Alcoa constructed residue disposal areas (RDAs) at the Site that were contained within gypsum berms, which were constructed around the RDAs to contain the red and brown mud. The gypsum (calcium sulfate) was generated from Alcoa's hydrofluoric acid production process, which reacted fluorospar with sulfuric acid. Bauxite residue and gypsum are the primary waste products remaining at the Site. There are three RDAs, each of approximately 40 acres, at the Site. These RDAs are adjacent to one another and form a triangular shape (See Figure 1).

The dike in RDA 1 was breached historically (likely in the 1930s) and a deeply incised, dendritic drainage pattern has developed in this area towards the south, allowing bauxite waste to migrate and accumulate in on-Site areas to the south. Low lying areas outside of the RDAs consist of wet areas and uplands with various fill materials at the surface.

The bauxite residue generally consists of fine grained red or brown clay/silt material. The material has high moisture content, and below the near surface, it is a semi-solid. The bauxite residue is soft, highly plastic, and not suitable as a subgrade for building construction or redevelopment without extensive engineering. This material is thick (or viscous) under normal conditions, but thins or liquefies when shaken, agitated, or otherwise stressed. The residue has poor trafficability when wet and can be difficult to access without special equipment, even in dry conditions. Currently the majority of the bauxite materials in the RDAs are overlain with a thin organic layer, which in turn is overlain by heavy vegetation and water.

Another operation at the Site was the former cryolite recovery process, which involved stockpiling of spent pot liner (SPL), a listed hazardous waste (KO88), within the North Alcoa Site prior to processing in operations located south of Missouri Avenue in Investigative Block 3c (IB-3c). Sixteen piles of material in IB-3c were identified as containing spent pot liner material. In September 2006, this material was characterized as a principal threat waste. An expedited cleanup action was conducted by Alcoa and the City of East Saint Louis under the additional work provisions of the RI/FS AOC for the Site. See *Completion Report – Spent Pot liner Removal* (2006). The area totaled approximately 1.6 acres, and approximately 1,500 tons of material was removed for off-Site disposal. Alcoa placed a geotextile filter material over the removal area then covered that with approximately six inches of clean soil.

Regional land use in the vicinity of the Site includes residential, industrial and commercial uses, and parks. The property to the north and east of the Site is mapped as residential or urban land use. The area southwest of the Site and south of Missouri Avenue is industrial while land use within the Site is zoned industrial/commercial by the City of East St Louis.

In December 2002, Alcoa and the City of East Saint Louis signed an RI/FS AOC that required the performance of a Remedial Investigation/Feasibility Study (RI/FS) at the Site. EPA and the Illinois EPA have overseen all activities at the Site.

A public meeting was held on September 3, 2003, at City Hall in East Saint Louis, announcing the beginning of the RI/FS process and describing the upcoming Site investigation in more detail.

The Site was screened for environmental justice (EJ) concerns using Region 5's EJ Assist Tool (which applies the interim version of the national EJ Strategic Enforcement Assessment Tool (EJSEAT)). Census tracts with a score of 1, 2 or 3 are considered to be high priority potential EJ areas of concern according to EPA Region 5. This Site area is categorized with a score of 2, which means that Region 5 considers it a potential high priority EJ area of concern.

Site Characteristics

The North Alcoa Site consists of an approximate 400 acre parcel of land located in a mixed use area in East Saint Louis, Illinois. The Site is bounded on the north by Lake Drive, on the east by the Alton and Southern railroad, on the south by Missouri Avenue and on the west by 29th Street (See Figure 1). OU-1 is located within the Site boundaries, as depicted on Figure 1.

The Mississippi River is approximately three miles to the west of the Site. There are no significant surface water features located between the Site and the river. Frank Holten State Park is east of the Site, with several large lakes. These surface water features at the state park are not hydraulically connected to the North Alcoa Site via surface water pathways and are located upgradient. There are both temporary and perennial surface water drainage on-Site in the OU-1 footprint with some areas containing surficial ponding. These areas are located in IB-1a, IB-1b, IB-1c, and IB-4a. There are currently no storm drains or sewers that collect and funnel water away from the Site, resulting in these on-Site water features. The existing infrastructure in the area is not capable of accepting any surface water discharge from the Site mainly due to the conditions of the sewer infrastructure and the inability of the off-Site sewers to direct stormwater to existing wastewater treatment. As a result, all stormwater flow is currently managed on-Site providing a measure of flood protection to adjacent properties.

The Site contains the following four main disposal areas, each with a number of subareas, as identified in the FFS report. The RI refers to individual areas as Investigative Blocks, or IB areas. These disposal areas are as follows and identified on Figure 5.

IB-1 Residue Disposal Areas

- IB-1a RDA 1 (The Old Pond)
- IB-1b RDA 2 (The Brown Mud Pond)
- IB-1c RDA 3 (The Red Mud Pond)

IB-2 Gypsum Dike Areas

IB-3 Other Areas of Alcoa Activities

- IB-3a Brick Works/Childs Property
- IB-3b Redevelopment Area
- IB-3c SPL Stockpiling Area

IB-4 Areas of no Known Alcoa Activities

- IB-4a North Wet Area
- IB-4b Triangle Wet Area
- IB-4c Ball Fields
- IB-4d Berm Wet Area
- IB-4e Active Commercial Area

In order to characterize the nature and extent of contamination on the Site, Alcoa collected samples from soil (surface and subsurface), sediment, surface water, and groundwater from the Site (See Figures 2 and 3). RI sampling included monitoring for volatile organic compounds (VOCs), semi-volatile organics (SVOCs), polychlorinated biphenyl's (PCBs), pesticides, inorganic compounds and radionuclides.

Nature and Extent of Contamination

The remedial investigation included sampling of soils, sediment, surface water and groundwater, some of which were found to contain concentrations of various compounds above the Region 3 Regional Screening Levels (RSLs). RSLs are typically used as a preliminary screening tool to help to focus further characterization efforts and subsequent risk analyses for those contaminants exceeding an RSL.

The RI found red and brown mud in the OU-1 area contaminated with a combination of radium 226 (ranging from 0.19 pCi/g to 9.7 pCi/g) and radium 228 (ranging from 0.64 pCi/g to 40.0 pCi/g)

exceeding the standards listed at 40 C.F.R. Part 192, and arsenic (ranging to 119 mg/kg), aluminum (ranging to 109,000 mg/kg), lead (ranging to 2,250 mg/kg), thallium (ranging to 195 mg/kg) and vanadium (ranging to 1,220 mg/kg) exceeding the Region 3 RSLs in soils (RSL arsenic - 1.6 mg/kg; RSL aluminum – 99,000 mg/kg; RSL lead – 1,000 mg/kg; RSL thallium – 8.2 mg/kg; RSL vanadium – 520 mg/kg). In addition, the gypsum was found to be contaminated with lead exceeding EPA's industrial screening level of 800 ppm. Although the contaminants found in the red and brown mud are concentrated in the three RDAs, there are indications that red mud was deposited in other areas of the Site. Some of these areas are covered with a layer of black cindery material. During the RI investigation in 2006, the PRPs identified, characterized the nature and extent of, removed and properly disposed of, stockpiles of SPL waste, which is a listed hazardous waste (KO88). All of this data was subsequently included in the OU-1 risk assessment calculations for OU-1 that are presented below.

Groundwater is located approximately 8-16 feet below ground surface in the American Bottoms Aquifer and flows west/northwest away from the Site. Groundwater is not used as a drinking water source in the City and groundwater has been historically used primarily for industrial purposes. Site data indicates that groundwater does not discharge to on-Site surface water. A survey completed during the RI found no potable use wells in the Site vicinity. Use of groundwater within the City limits is restricted by a groundwater ordinance that was passed in 1997. However, this ordinance has not been reviewed for enforceability since it was put in place. Groundwater samples were collected at five locations during the RI. Preliminary analysis of the groundwater sampling results shows limited impacts from the Site in the OU-1 area, but the OU-2 ROD will finalize this analysis and select a final remedy for groundwater at the Site.

Relationship to other documents

The draft RI report for the Site (2005) was submitted to EPA in February 2005. The EPA and Illinois EPA (Agencies) provided initial comments in March 2005 and the RI report was revised and resubmitted to the Agencies in March 2009. The Agencies provided additional comments in April 2010 but the document has not been finalized for the Site to date. The baseline human health risk assessment (BHHRA) and the baseline ecological risk assessment (BERA) were submitted in February 2005. The Agencies provided comments in March 2005 and the documents were revised and resubmitted in April 2010. The final site-wide risk assessments have not been completed for the Site as of yet, but a risk assessment for OU-1 has been completed and is included in the FFS.

The FFS for OU-1 summarizes the key information and data from the draft RI and risk assessment reports for the OU-1 area and was approved by EPA in April 2012. EPA will approve the RI/FS for the remainder of the Site before we issue the OU-2 ROD.

Scope and Role of Operable Unit

EPA's investigation and evaluation of cleanup options has been organized by operable units, or OUs. This action is the first of two operable unit actions taken at the Site. The area covered by this operable unit is shown in Figure 5, and will encompass the actions necessary to address surface contamination and manage stormwater on-Site within the area shown on this figure. This area includes all of IB-1, IB-2, some of IB-3 and IB-4. The remaining operable unit action (OU-2) will address the rest of the Site outside of this footprint and will also address groundwater as a final action, including the finalization of risk assessments for the remainder of the Site. OU-1 will be designed to be consistent

with the final action taken for the rest of the Site in the subsequent action. EPA will announce a separate public comment period in the future during which comments will be accepted on the OU-2 alternatives.

Summary of Site Risks

Human Health

The PRPs conducted a baseline human health risk assessment (BHHRA) which evaluated risks and hazards to human health and the environment from exposure to contaminants in OU-1 at the Site, in present and reasonably anticipated future exposure scenarios.

The risk assessment evaluated the following exposure scenarios:

- Current/future resident
- Current/future Site trespasser
- Current/future construction worker
- Current/future industrial worker
- Future sports player
- Future youth ball player

EPA's target risk range for Site cleanups is 1×10^{-4} to 1×10^{-6} which translates to excess cancer risks from the range of one in ten thousand to one in a million. EPA takes action when risks exceed the 10^{-4} level based on reasonably anticipated future land use and Site specific exposure scenarios.

The BHHRA for the Site identified unacceptable cancer risk and/or a non-cancer Hazard Index greater than 1 from exposure to on-site residents via ingestion, inhalation, and external exposure in IB-1, IB-2, and IB-4 (See Table 1). The BHHRA also identified unacceptable cancer risk for commercial/industrial exposure via ingestion, inhalation, and external exposure in IB-1 (See Table 2).

The majority of the carcinogenic risks calculated for human health are from exposure to radium 226 and radium 228. The majority of the non-cancer risk for human health is from exposure to vanadium.

Ecological Risks

A baseline ecological risk assessment was also conducted which concluded that no unacceptable ecological risk exists in the OU-1 area. It is expected that final grading and the installation of an appropriate cover system will provide additional protection for future ecological receptors from any contaminated media in the OU-1 area.

It is the lead Agency's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in this Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances, 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) are specific goals developed to protect human health and the environment based on unacceptable risks calculated in a risk assessment. The RAOs provide the basis for developing cleanup options that will be protective of human health and the environment at a Superfund Site. The RAOs address Site-related receptor and pathway risks and hazards exceedances based on the results of the BHHRA.

EPA has established the following RAOs for this Site as outlined in the OU-1 FFS for the Site.

Prevent future direct contact exposure by humans working in industrial exposure scenarios to soil with lead concentrations greater than 800 mg/kg, which is the EPA screening level for industrial/commercial exposure.

Prevent human exposure (through absorption, ingestion and/or external radiation) from contaminants exceeding the EPA baseline risk range of 10^{-4} to 10^{-6} , including radium and other radionuclides and vanadium found in bauxite residue and gypsum waste.

Summary of Remedial Alternatives

CERCLA Section 121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, comply with applicable or relevant and appropriate requirements, and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable.

Since the SPL waste in IB-3c was removed from the Site during the RI, it is not included in the remedial alternatives considered below.

The three remedial alternatives that were evaluated in the FFS for OU-1 include:

RAA 0 – No Action

EPA includes a “No-Action” alternative as a basis for comparison to the other cleanup alternatives. The no further action alternative does not include any physical remedial measures to address any Site-related media. Since no action would be taken, this option would not protect human health and the environment from either current or future risk.

Estimated Capital Costs: \$0

Estimated O&M Costs: \$0

Estimated Present Worth Cost: \$0

RAA-1 – Restricted Access

This alternative consists of physical and institutional controls (ICs) via easement/restrictive covenants to prohibit access to the bauxite disposal areas and the gypsum areas. A fence restricting access would be constructed around the area comprised of IB-1, IB-2 and IB-4a. This alternative includes an Illinois Universal Environmental Covenant Act (IUECA) which precludes land uses inconsistent with the

remedy, and maintaining the installed fencing and other site access controls. Institutional controls would be created by implementing durable environmental easement/restrictive covenants compliant with IUECA for these areas to ensure long term protection. This alternative would not comply with the Illinois solid waste regulation 35 IAC 807.305(c) final cover ARAR.

Estimated Capital Cost: \$546,000
Estimated Annual O&M Cost: \$44,000
Estimated Present Worth Costs: \$650,000

RAA-2 – Containment with Placement of an ARAR-Compliant Cover and On-Site Stormwater Management

This alternative consists of placement of a two foot cover over the OU-1 area, in compliance with the cover requirements identified at 35 IAC 807.305(c) and 35 IAC 807.502 (See Figure 6). The OU-1 area would be regraded to provide a sustainable slope and would be covered with a two foot thick soil layer to prevent direct contact. Stormwater within the OU-1 area would be managed in storm water basins designed to contain a 100 year storm water event on-Site. The design would utilize the existing Site ponded areas as part of the design of the stormwater retention system. This alternative would also include monitoring of the installed cover and the stormwater ponds to ensure long term performance.

Institutional controls would be created by implementing durable environmental easement/restrictive covenants compliant with IUECA for these areas as provided in RAA-1.

Prior to implementing the soil cover, Site preparation activities would include installation of security fencing and preparation of access roads and staging areas. A pre-design field investigation to fill in remaining engineering data gaps may be implemented as part of the final design preparation.

Estimated Capital Costs: \$24,520,704
Estimated Annual O&M costs: \$38,000
Estimated Present Worth Costs: \$24,990,000

Detailed Evaluation of Alternatives

EPA uses nine criteria as required by Superfund law, to evaluate and compare cleanup alternatives. The nine criteria fall into three groups: “threshold criteria” are requirements that each alternative must meet in order to be eligible for selection; “balancing criteria” are used to weigh major trade-offs among alternatives, and “modifying criteria” may be considered during the FS, but can be fully considered only after public comment is received on the Proposed Plan. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other alternatives under consideration. The “Detailed Analysis of Alternatives” can be found in the FFS.

Threshold Criteria

Overall Protection of Human Health and the Environment

This evaluation criterion assesses whether each remedial alternative protects human health and the environment. This assessment focuses on how an alternative achieves protection over time and

indicates how each source of contamination would be minimized, reduced, or controlled through treatment, engineering, or institutional controls. The evaluation of the degree of overall protection associated with each alternative is based largely on the exposure pathways and scenarios set forth in the baseline human health risk assessment.

Alternatives RAA-0 and RAA-1 are not protective of human health and the environment because they do not address the risks posed by exposure to Site contamination as presented in the risk assessment. RAA-1 restricts access to the bauxite and gypsum areas with fencing that must be maintained, but does not provide a cover to prevent contact with these materials. Alternative RAA-2 is protective of human health and the environment as it includes placement of a cover over the waste materials that eliminates exposure and addresses risk. The ponds contain an organic layer that has developed over the bauxite, which includes vegetation and standing water that will be maintained in the remedy design to provide protection against contact with any exposed bauxite material over the long term.

Compliance with ARARs

This evaluation criterion addresses whether alternatives meet applicable or relevant and appropriate Federal and State requirements.

The ARAR analysis included in the FFS identified the ARAR requirement for OU-1 to be a soil cover complying with the provisions of 35 IAC 807.305(c) over the soils, which includes two feet of suitable material defined as uncontaminated, cohesive soil that can be compacted and closure of the Site consistent with 35 IAC 807.502 to minimize further maintenance and control post-closure releases. The ARAR analysis included in the FFS also determined that there was no ARAR for the pond areas.

Alternatives RAA-0 and RAA-1 do not comply with the appropriate ARARs for the waste material cover. RAA-2 would be designed and implemented to comply with all Site ARARs. Specifically, the soil cover over the waste materials and post-closure maintenance would comply with 35 IAC 807.305(c) and 35 IAC 807.502 requirements.

Balancing Criteria

Long-Term Effectiveness and Permanence

The evaluation of alternatives under this criterion addresses the results of a remedial action in terms of the risk remaining at the Site after response objectives have been met.

RAA-0 and RAA-1 are not effective in the long term nor are they permanent. However, in the pond areas, fencing, existing vegetation and standing water could help to prevent exposure to waste materials. The test strip field work has demonstrated that the RAA-2 soil cover would provide both protectiveness and permanence over the long term, as summarized in the data analysis contained in the Phase 2 geotechnical report. The organic material, vegetative cover and standing water in the ponds would provide both protectiveness and permanence over the long term, as summarized in the Administrative Record. Implementation of the required operation and maintenance will ensure that these soil covers will be effective over the long term.

Reduction of Toxicity, Mobility or Volume

This evaluation criterion addresses the statutory requirement for selecting remedial actions that employ treatment technologies that reduce the toxicity, mobility, or volume of the hazardous constituents present in the impacted media to the maximum extent practicable.

The containment technologies identified in RAA-1 and RAA-2 are not treatment technologies and therefore, do not reduce toxicity, mobility or volume within the soil matrix. Treatment of high volume, low toxicity soils is not feasible at the Site. Alcoa's 2006 SPL removal work removed principal threat waste for off-Site disposal. Treatment of the wastes currently on-Site to reduce toxicity, mobility or volume is not practicable.

Short Term Effectiveness

This evaluation criterion addresses the effects of the alternatives during the construction and implementation phases (i.e., remediation risks) until the remedial action objectives are met.

RAA-1 can be implemented in the shortest timeframe without any adverse impacts from the installation of access restrictions such as fencing and could be completed in a matter of months. RAA-2 can be completed in one to two construction seasons. Any adverse impacts to workers or to the surrounding area from regrading of the waste materials, the reconfiguration of the on-Site ponds, and the installation of the soil cover can be properly managed through Site specific health and safety planning and compliance with standard cover installation practices. Minimal environmental impacts are anticipated from the cover construction.

Implementability

This evaluation criterion considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

All alternatives are readily implementable. Installation of fencing is a typical construction activity. Development of and implementation of enforceable restrictive covenants is also a typical activity. The existing Site zoning and restrictions can be readily updated as part of this criterion and the City of East Saint Louis has indicated a willingness to complete this task quickly. Most tasks in RAA-2 are common, reliable construction activities that do not entail any significant technical difficulties. Some aspects of this alternative, such as constructing a cover over semi-solid bauxite materials will require specific expertise to implement. That expertise is readily available.

Cost

The estimated capital, Net Present Value (NPV) and O&M costs for the remedial alternatives are as follows:

	RAA-1 Restricted Access	RAA-2 ARAR cover
Capital Costs	\$546,000	\$24,520,704
Annual O&M Costs	\$44,000	\$38,000
Present Worth Costs	\$650,000	\$24,990,000

Modifying Criteria

State/Support Agency Acceptance

The State of Illinois supports the preferred alternative, RAA-2.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD for the Site. EPA encourages public comment on all of the alternatives presented in this Proposed Plan.

Summary of Preferred Alternative

The preferred alternative for cleaning up OU-1 at the North Alcoa Site is Alternative RAA-2.

RAA-2 addresses three RDAs by clearing vegetation, consolidating waste, regrading soil and constructing two-foot soil covers complying with solid waste landfill requirements, enhancing control of surface stormwater by re-contouring the edges of existing ponds, backfilling gullies, and providing ditches, piping, dikes and berms.

The preferred alternative meets the threshold criteria and provides the best balance of EPA's evaluation criteria and was selected over the other alternatives because it is expected to prevent future exposure to contaminated soils through the installation and maintenance of an ARAR compliant cover, management of on-Site stormwater to minimize the risk of flooding adjacent properties, and installation of appropriate fencing around OU-1 with additional fencing around the stormwater ponds.

The preferred alternative also reduces risk within a reasonable timeframe and provides for long term reliability of the selected remedy.

Based on the information available at this time, EPA and Illinois EPA believe that the preferred alternative would be protective of human health and the environment, would comply with ARARs, would be cost effective, and would utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The preferred alternative can change in response to public comment or new information.

Community Participation

EPA and Illinois EPA are providing information to the public regarding the investigation and cleanup of the North Alcoa Site through public meetings, the Administrative Record file for the Site, and announcements through the local news media. EPA and Illinois EPA encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

Figure 1: Site Map

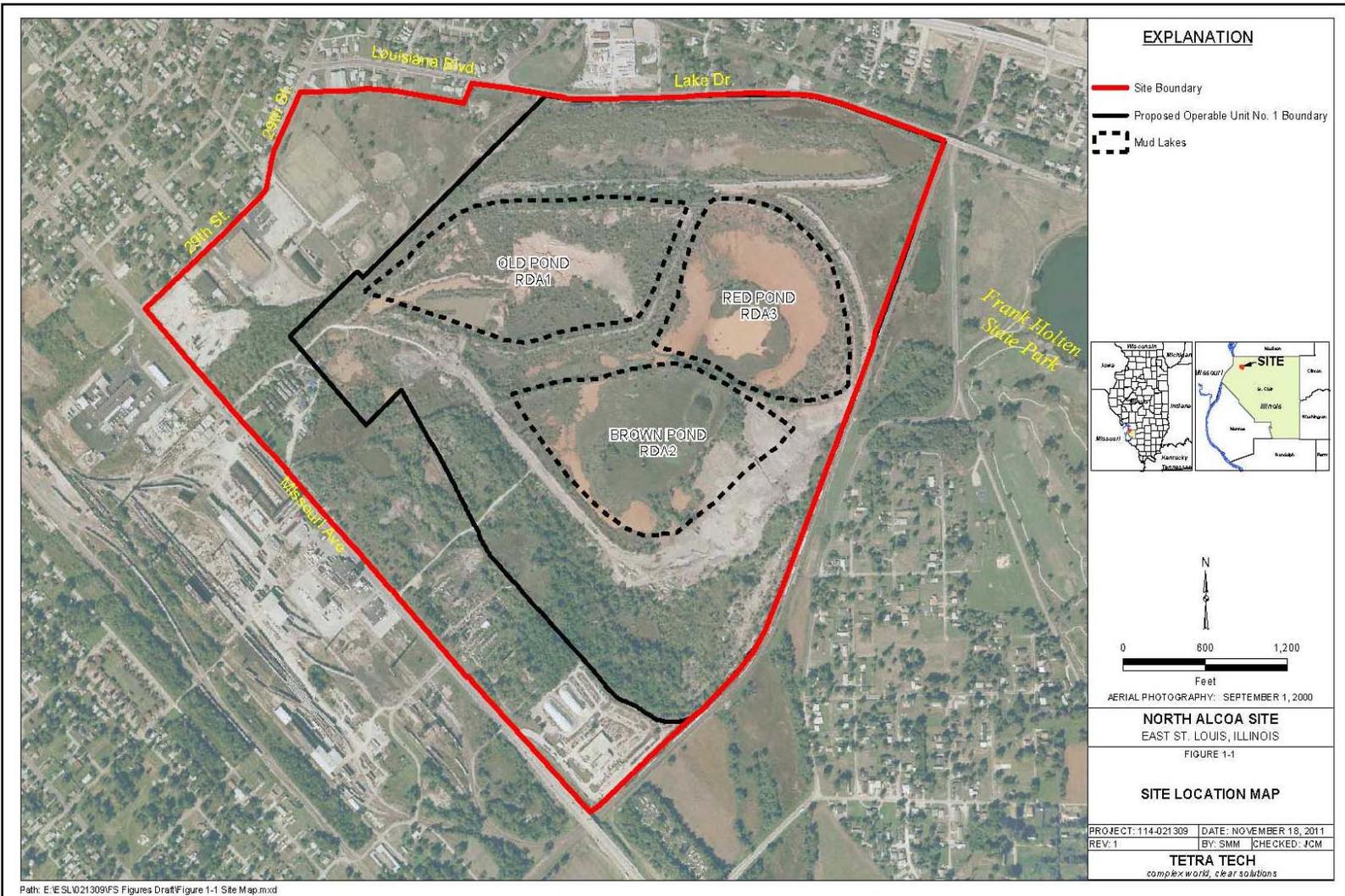


Figure 2: RI Sampling Locations

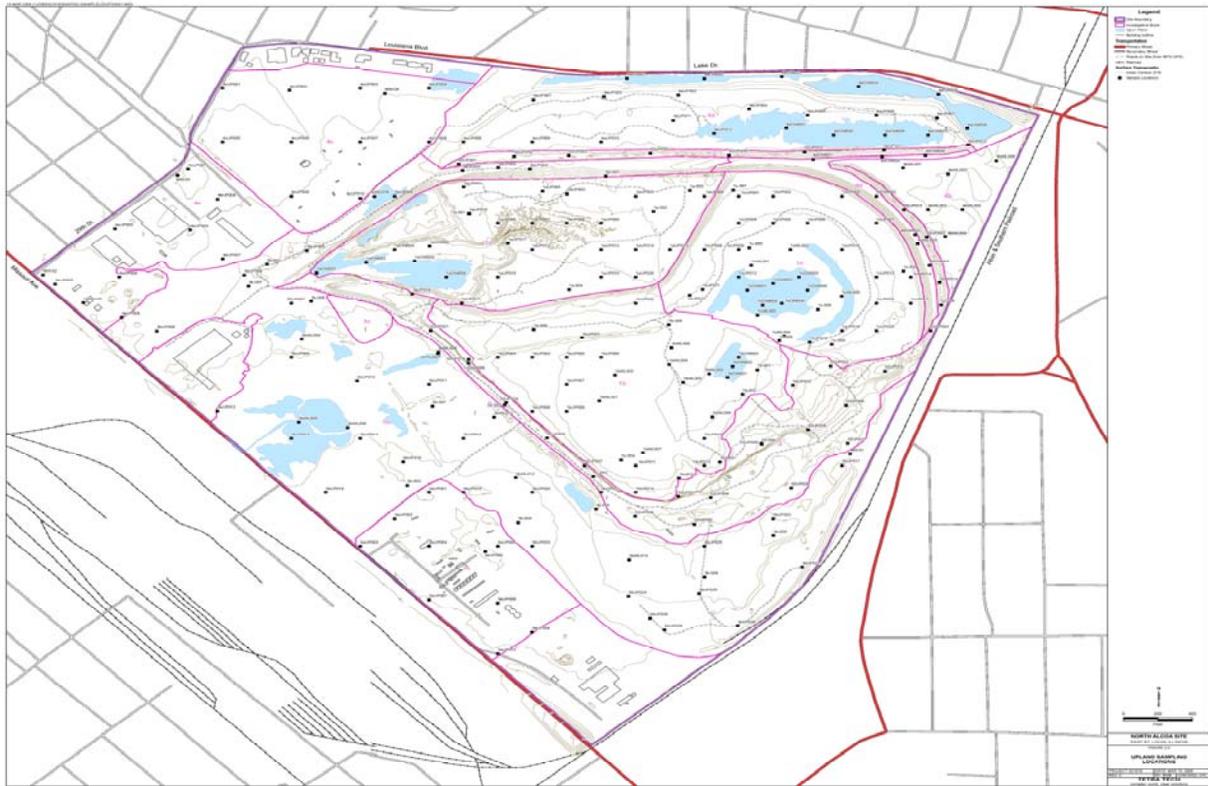


Figure 3 Radiological Sampling Locations

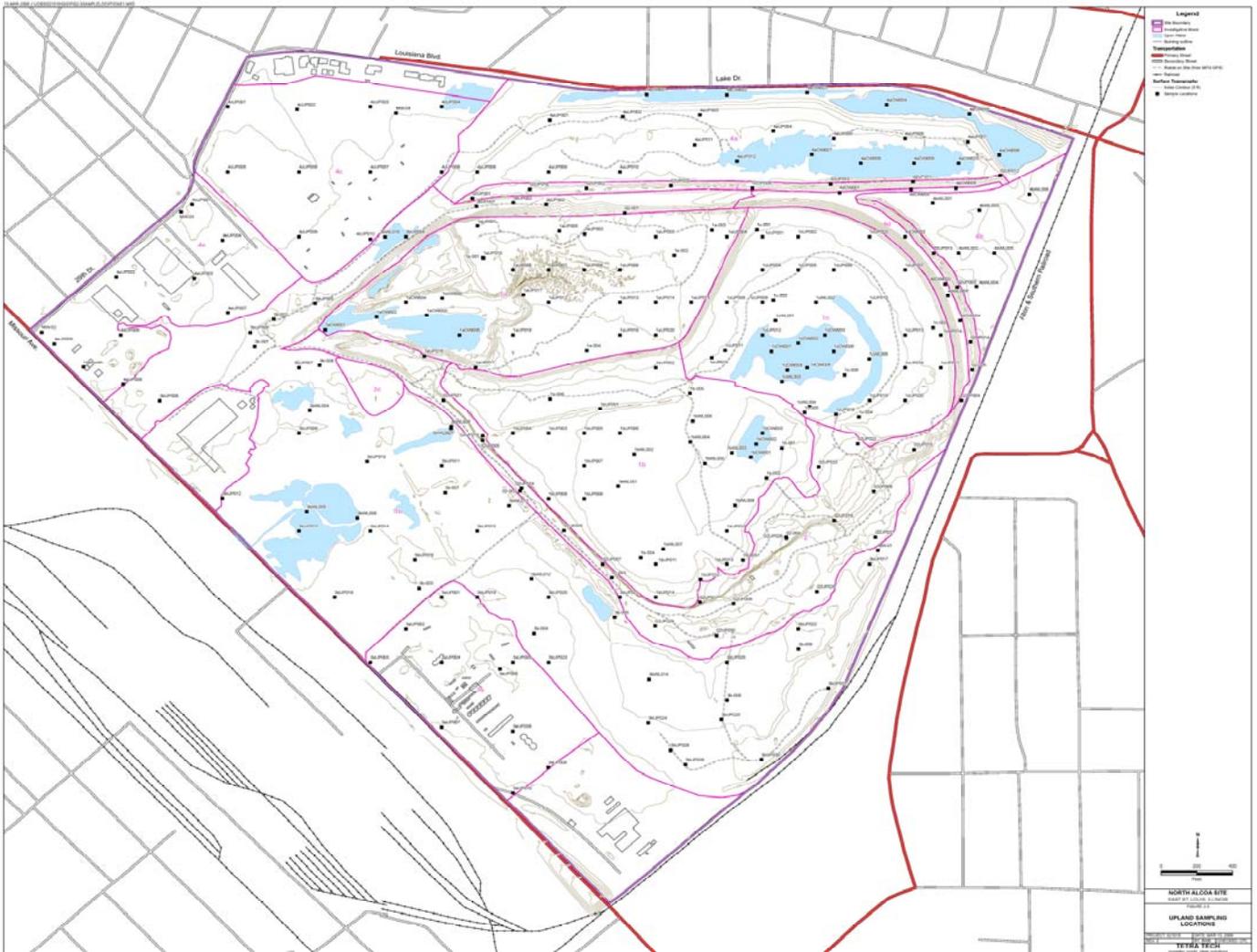


Figure 4 Groundwater Sampling Locations

25-JAN-2005 N:\ARCP\2\020209\PLT\RI-0410\FIG2-6.MONWELLS.MXD



EXPLANATION	
	Initial Site Boundary
	Railroads
	Roads
	Investigative Blocks
	Monitoring Well

N

0 600 1,200

Feet

NORTH ALCOA SITE	
EAST ST. LOUIS, ILLINOIS	
FIGURE 2-6	
GROUNDWATER	
MONITORING WELL	
LOCATIONS	
PROJECT: 021018	DATE: MAR 17, 2009
REV: 1	BY: BWB CHECKED: CL
TETRA TECH	
<small>complex world. clear solutions</small>	

Figure 5: Operable Unit 1 Boundary Map

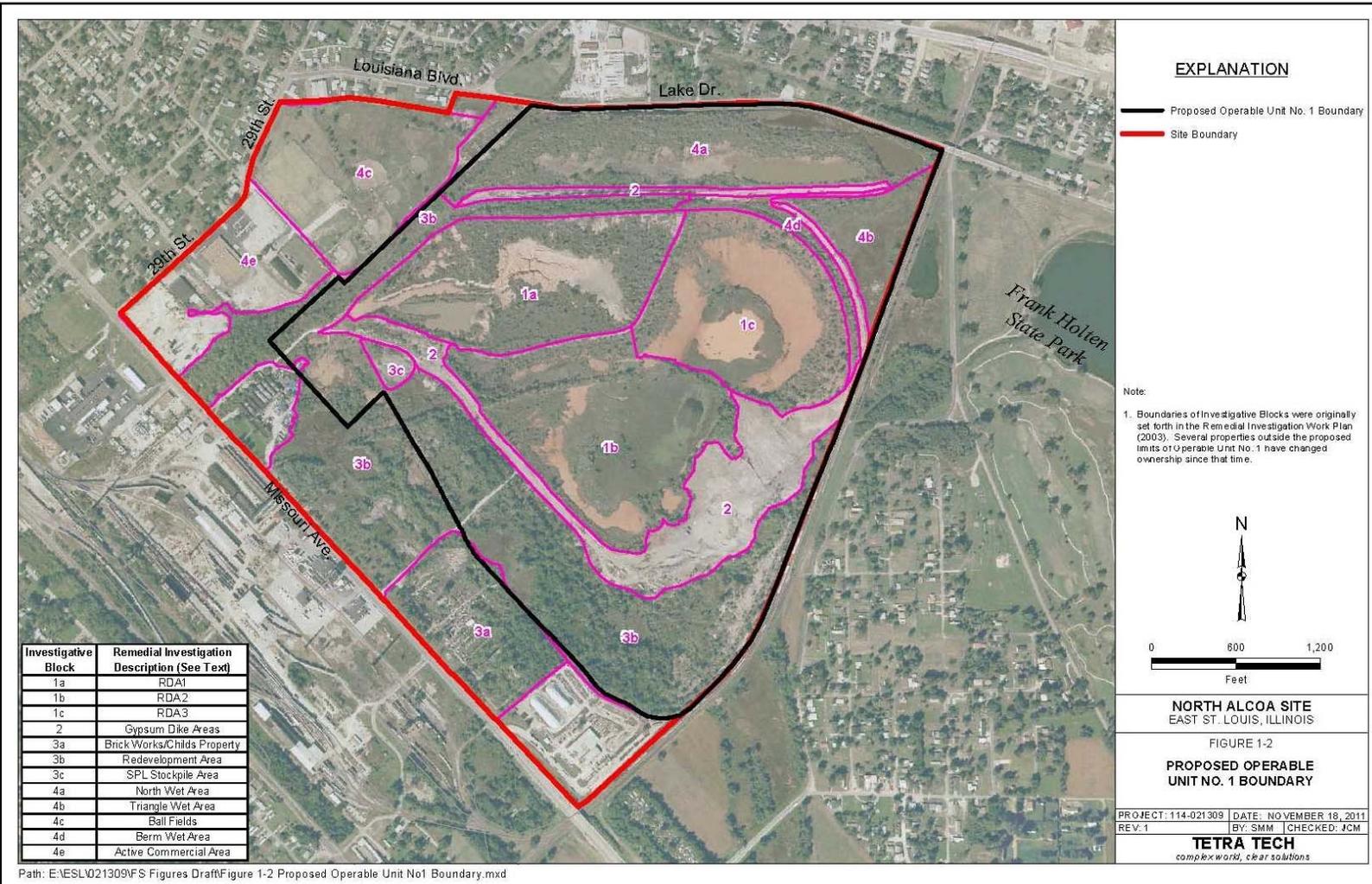


Figure 6 Cap Construction Details

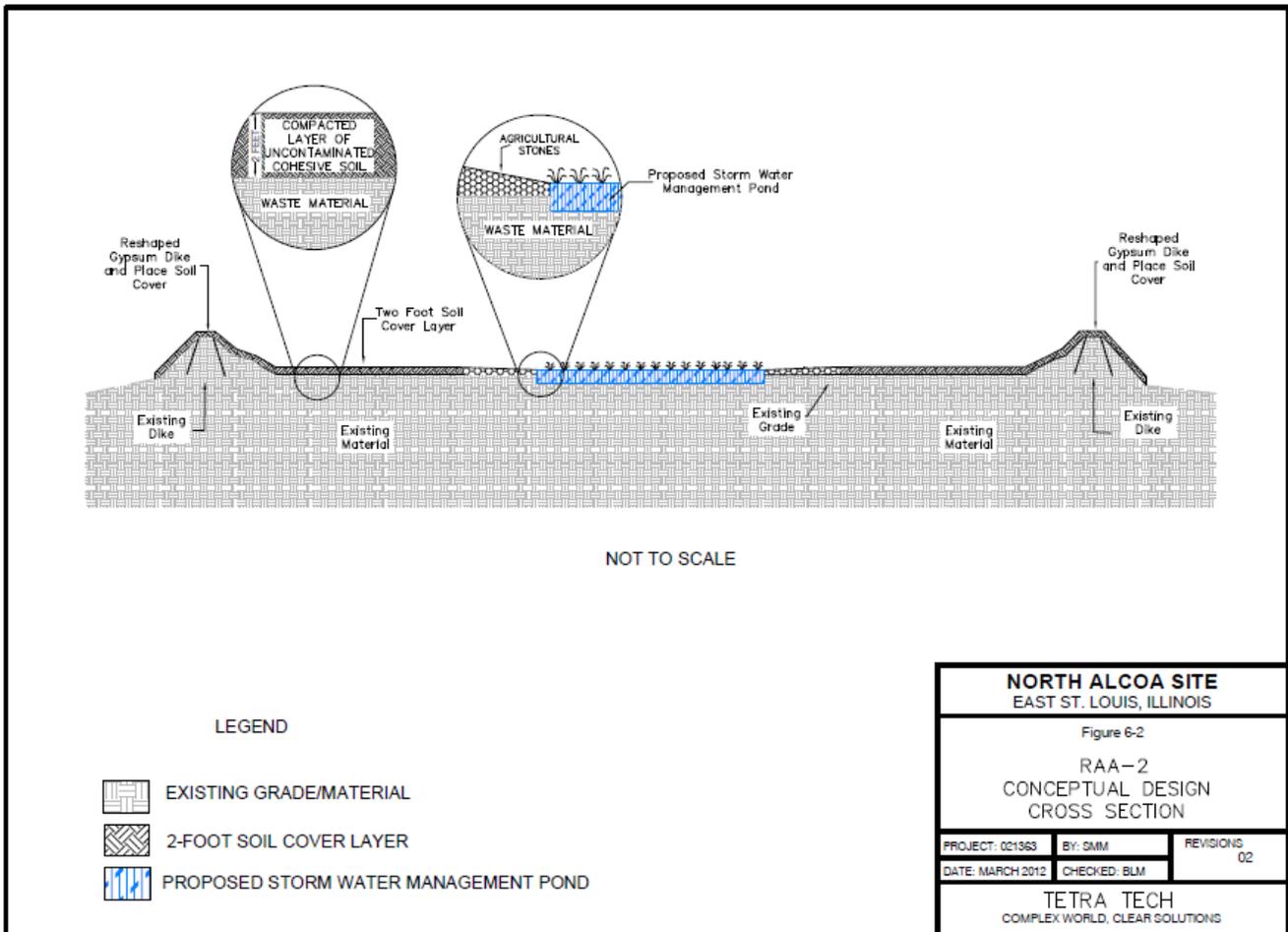


Table 1

**DRAFT FINAL HYPOTHETICAL RESIDENTIAL RECEPTOR (0-2 ft EPCs)
100% of daily soil ingestion rate**

IB-1

Radiation exposure for resident IB-1

COPC	Cancer risks		
	Ing	Inh	Ext
Ra226+D	1.68E-06	3.78E-09	5.15E-04
Ra228+D	1.52E-05	6.82E-09	2.99E-03
Th-232	1.92E-06	5.64E-08	8.30E-08
U-238+D	1.06E-06	1.02E-08	2.31E-05
Total=	1.99E-05	7.72E-08	3.52E-03

IB-2

Radiation exposure for resident IB-2

COPC	Cancer risks		
	Ing	Inh	Ext
Ra226+D	2.09E-07	4.72E-10	6.44E-05
Ra228+D	1.08E-06	4.83E-10	2.12E-04
Th-232	1.36E-07	4.00E-09	5.88E-09
U-238+D	1.97E-07	1.88E-09	4.27E-06
Total=	1.62E-06	6.83E-09	2.80E-04

IB-4

IB-4a 0-2ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Aluminum	8.63E-01	9.28E-02	-
Arsenic	9.70E-01	1.06E-01	5.37E-05
Benzo(a)pyrene	-	-	2.21E-06
Totals	1.83E+00	1.99E-01	5.59E-05

IB-4c 0-2ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	7.00E-01	7.65E-02	3.88E-05

IB-1 Chemicals of concern

COPC	Total Health Risk		
	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Aluminum	6.40E-01	6.88E-02	-
Arsenic	8.58E-01	9.25E-02	4.74E-05
Chromium (total)	-	-	-
Chromium(III) calculated	4.07E-03	4.36E-04	-
Chromium(VI) calculated	3.39E-01	3.64E-02	6.24E-05
Vanadium	1.63E+00	1.74E-01	-
Total	3	0.4	1.E-04

IB-2 Chemicals of concern

COPC	Total Health Risk		
	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	3.69E-01	3.98E-02	2.04E-05
Vandium	1.20E+00	1.28E-01	-
Totals	1.56E+00	1.68E-01	2.04E-05

IB-4e 2-10ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	7.33E-01	8.02E-02	4.07E-05

Lifetime excess cancer risks from hypothetical residential exposure scenario to IB-1

Lifetime excess cancer risks =	4.E-03
Child Non-cancer risks =	3
Adult Non-cancer risks =	0.4

Lifetime excess cancer risks from hypothetical residential exposure scenario to IB-2

Lifetime excess cancer risks =	3.E-04
Child Non-cancer risks =	1.56
Adult Non-cancer risks =	0.2

Lifetime excess cancer risks from hypothetical residential exposure scenario to IB-4a

Lifetime excess cancer risks =	6.E-05
Child Non-cancer risks =	1.83
Adult Non-cancer risks =	0.2

Bold value: summed risks that are greater than the EPA risk range of 10^{-6} to 10^{-4} or HI greater than 1.

Table 2

**DRAFT FINAL HYPOTHETICAL FULL-TIME INDUSTRIAL/COMMERCIAL RECEPTOR (0-2 ft EPCs)
100% of daily soil ingestion rate**

IB-1

Radiation exposure for worker IB-1

COPC	Cancer risks		
	Ing	Inh	Ext
Ra226+D	5.53E-07	3.33E-09	1.36E-04
Ra228+D	5.03E-06	6.00E-09	7.89E-04
Th-232	6.35E-07	4.97E-08	2.19E-08
U-238+D	3.51E-07	8.94E-09	6.09E-06
Total=	6.56E-06	6.79E-08	9.31E-04

IB-2

Radiation exposure for worker IB-2

COPC	Cancer risks		
	Ing	Inh	Ext
Ra226+D	6.91E-08	4.16E-10	1.70E-05
Ra228+D	3.56E-07	4.25E-10	5.59E-05
Th-232	4.50E-08	3.52E-09	1.55E-09
U-238+D	6.50E-08	1.65E-09	1.13E-06
Total=	5.35E-07	6.01E-09	7.40E-05

IB-4

IB-4a 0-2ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Aluminum	0.00E+00	4.43E-02	-
Arsenic	0.00E+00	4.93E-02	7.92E-06
Totals	0.00E+00	9.36E-02	7.92E-06

IB-1 Chemicals of concern

COPC	Total Health Risk		
	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Aluminum	0.00E+00	3.29E-02	-
Arsenic	0.00E+00	4.36E-02	7.00E-06
Chromium (total)	-	-	-
Chromium(III) calculated	0.00E+00	2.07E-04	-
Chromium(VI) calculated	0.00E+00	1.73E-02	9.32E-06
Vanadium	0.00E+00	8.28E-02	-
Total	0.00E+00	0.2	1.6E-05

IB-2 Chemicals of concern

COPC	Total Health Risk		
	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	0.00E+00	1.87E-02	3.01E-06
Vandium	0.00E+00	6.09E-02	-
Totals	0.00E+00	0.08	3.01E-06

IB-4c 0-2ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	0.00E+00	3.56E-02	5.72E-06

IB-4e 2-10ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	0.00E+00	3.73E-02	5.99E-06

Lifetime excess cancer risks from worker exposure scenario to IB-1

Lifetime excess cancer risks =	1.E-03
Adult Non-cancer risks =	0.2

Lifetime excess cancer risks from worker exposure scenario to IB-2

Lifetime excess cancer risks =	8.E-05
Adult Non-cancer risks =	0.08

Lifetime excess cancer risks from worker exposure scenario to IB-4a

Lifetime excess cancer risks =	8.E-06
Adult Non-cancer risks =	0.09

Bold value: summed risks that are greater than the EPA risk range of 10^{-6} to 10^{-4} or HI greater than 1.

Table 3

DRAFT FINAL TRESPASSER¹ 20 DAY/YEAR SUMMARY SHEET (0-2 ft EPCs)
100% of daily soil ingestion rate

IB-1

Radiation exposure for trespasser IB-1

COPC	Cancer risks		
	Ing	Inh	Ext
Ra226+D	1.06E-07	9.01E-11	6.28E-06
Ra228+D	9.65E-07	1.62E-10	3.64E-05
Th-232	1.22E-07	1.34E-09	1.01E-09
U-238+D	6.74E-08	2.42E-10	2.81E-07
Total=	1.26E-06	1.84E-09	4.30E-05

IB-2

Radiation exposure for trespasser IB-2

COPC	Cancer risks		
	Ing	Inh	Ext
Ra226+D	1.33E-08	1.13E-11	7.85E-07
Ra228+D	6.83E-08	1.15E-11	2.58E-06
Th-232	8.64E-09	9.53E-11	7.17E-11
U-238+D	1.25E-08	4.48E-11	5.20E-08
Total=	1.03E-07	1.63E-10	3.42E-06

IB-4

IB-4a 0-2ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Aluminum	1.23E-02	7.06E-03	-
Arsenic	1.41E-02	7.98E-03	1.93E-06
Totals	2.64E-02	1.50E-02	1.93E-06

IB-4c 0-2ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	1.00E-02	5.77E-03	1.38E-06

IB-4e 2-10ft bgs

COPC	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	1.06E-02	6.04E-03	1.46E-06

IB-1 Chemicals of concern

COPC	Total Health Risk		
	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Aluminum	9.14E-03	5.23E-03	-
Arsenic	1.25E-02	7.05E-03	1.71E-06
Chromium (total)	-	-	-
Chromium(III) calculated	5.81E-05	3.32E-05	-
Chromium(VI) calculated	4.84E-03	2.77E-03	2.23E-06
Vanadium	2.32E-02	1.32E-02	-
Total	0.05	0.03	3.94E-06

IB-2 Chemicals of concern

COPC	Total Health Risk		
	Child Non-Cancer	Adult Non-Cancer	Lifetime Cancer Risk
Arsenic	5.30E-03	3.03E-03	7.33E-07
Vandium	1.70E-02	9.74E-03	-
Totals	2.23E-02	1.28E-02	7.33E-07

Lifetime excess cancer risks from trespasser exposure scenario to IB-1	
Lifetime excess cancer risks =	5.E-05
Child Non-cancer risks =	0.05
Adult Non-cancer risks =	0.03

Lifetime excess cancer risks from trespasser exposure scenario to IB-2	
Lifetime excess cancer risks =	4.E-06
Child Non-cancer risks =	0.02
Adult Non-cancer risks =	0.01

Lifetime excess cancer risks from trespasser exposure scenario to IB-4a	
Lifetime excess cancer risks =	2.E-06
Child Non-cancer risks =	0.03
Adult Non-cancer risks =	0.02

¹ 1 Trespasser assumed to be a local resident - older child/adolescent (6-16 years old) through adult years for 30 years total Exposure Duration.