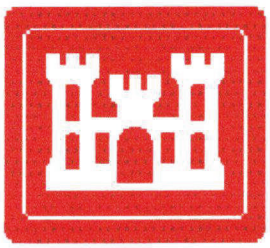
FINAL

COLONIE FUSRAP SITE
COLONIE MAIN SITE SOILS
RECORD OF DECISION

March 2015



U. S. ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT OFFICE

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

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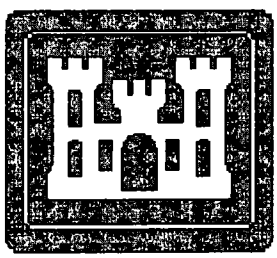

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APPENDIX

ACRONYMS AND ABBREVIATIONS

AEC	Atomic Energy Commission
ARAR	Applicable or Relevant and Appropriate Requirement
AM	Action Memorandum
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPCs	Contaminants of Potential Concern
DOE	Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
USEPA	U.S. Environmental Protection Agency
FSS	Final Status Survey
FUSRAP	Formerly Utilized Sites Remedial Action Program
HHRA	Human Health Risk Assessment
LUC	Land Use Control
mg/kg	milligram(s) per kilogram
MOA	Memorandum of Agreement
mrem/yr	millirem per year
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NL	National Lead
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
pCi/g	picocurie(s) per gram
PP	Proposed Plan
QA/QC	Quality Assurance/Quality Control
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
^{232}Th	Thorium-232
USACE	U.S. Army Corps of Engineers
USC	United States Code
^{238}U	Uranium-238
UU/UE	Unlimited Use/Unrestricted Exposure
VOC	Volatile Organic Compound
VP	Vicinity Property

I. DECLARATION

A. Site Name and Location

Main Site Soils Operable Unit
Colonie FUSRAP Site
1130 Central Avenue (New York State Route 5)
Town of Colonie, Albany County, New York

B. Statement of Basis and Purpose

This decision document presents the selected remedial action for Main Site Soils at the Colonie Formerly Utilized Sites Remedial Action Program (FUSRAP) Site located in the Town of Colonie, New York. The selected remedial action was chosen in accordance with the requirements of the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) as amended by *Superfund Amendments and Reauthorization Act* , 42 United States Code (USC) §9601-9675, the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP), as amended, 40 Code of Federal Regulations (CFR) Part 300 (Environmental Protection Agency [USEPA]. 1990). These decisions are based on information contained in the Administrative Record file for the Colonie Site and have been made by the United States Army Corps of Engineers (USACE) in coordination with the New York State Department of Environmental Conservation (NYSDEC). Comments on the *Proposed Plan* (PP) for the Colonie Main Site Soils Operable Unit (OU) were received from the State and local community and were considered during the selection of the final remedy. These comments, and associated responses, are documented in Section III – Responsiveness Summary. The NYSDEC has concurred with the Selected Remedy.

C. Assessment of the Site

The response action for impacted soil selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The results of the Remedial Investigation (RI) and Baseline Risk Assessment identified unacceptable risk at specific areas of the Site. Therefore, the USACE evaluated a number of remedial action alternatives and selected a remedial action. The Selected Remedy includes land use controls (LUCs). This remedial action provides a high level of protection to human health and the environment by ensuring that there will be no future exposure to subsurface soil.

D. Description of Selected Remedy

LUCs in the form of environmental easements will be placed on three discrete inaccessible locations within three of the 27 Final Status Survey (FSS) units of the Main Site. A risk assessment determined that these FSS units contained soil that posed excess risk. Two units posed risk to children from high lead concentrations and a third posed risk to residents from excess arsenic. The affected FSS units are Units 104, 124 and the North Lawn. The environmental easements will provide a means of protection based on both current and future

land use by placing restrictions on soil excavation, thus meeting the remedial action objectives (RAOs) established in Section H of the Decision Summary.

E. Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Since this remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure (UU/UE), a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, and will remain, protective of human health and the environment.

Five-year reviews for the Main Site soils will be conducted in compliance with CERCLA §121(c) and the NCP § 300.430(f)(4)(ii) to periodically assess the on-going protectiveness of the remedy. The Department of Energy (DOE) Office of Legacy Management will conduct the five-year reviews, as they are the land owner of record.

F. Authorizing Signatures

David J. Leach, SES
Director, Programs Directorate
North Atlantic Division, USACE

26 MAR 15
Date

II. DECISION SUMMARY

This section presents a summary of USACE decisions regarding soil present on the Colonie FUSRAP Main Site that has been identified as requiring LUCs.

A. Site Name, Location and Description

The USACE - New York District is conducting the environmental restoration of the Colonie FUSRAP Site (consisting of the Main Site OU, Groundwater OU and the Vicinity Properties OU [VPs]). The USACE - Baltimore District is providing technical support to the New York District for the Main Site, Groundwater and VP soils remediation phase of the project. USACE is utilizing the administrative, procedural, and regulatory provisions of CERCLA and the NCP to guide the remediation process at the Colonie Main Site.

The Colonie Main Site was owned and operated by National Lead (NL) Industries from 1937 to 1984. Authority for remediating the site was assigned to the DOE by Congress through the *Energy and Water Development Appropriations Act* of 1984. In October 1997, authority and funding for executing FUSRAP remedial activities was transferred from DOE to USACE by further Congressional action. The DOE Office of Legacy Management is the current owner of record for the Main Site.

The Colonie FUSRAP Site is composed of the 11.2-acre Main Site and 56 VPs. The Main Site is located at 1130 Central Avenue (New York State Route 5) in the Town of Colonie, Albany County, New York (Figure 1). As shown on Figure 2, the Main Site is bounded by a heavily wooded lot on the west (7 Railroad Ave), CSX (formerly Conrail) rail tracks on the southwest and south, active commercial properties on the east and northeast, New York State Route 5 (Central Avenue) on the north, and a Niagara Mohawk electrical substation on the northwest. The Main Site was historically used for industrial operations and is currently vacant land. The surrounding area consists of residential and commercial properties. The Town of Colonie has a population of approximately 81,000.

The Site has been divided into three OUs: 1) a groundwater OU, 2) a Main Site Soils OU, and 3) a VP OU. This ROD addresses only the Main Site Soils OU. The final remedy for the Groundwater OU was documented in the *Colonie FUSRAP Site Record of Decision, Colonie Site Groundwater* (USACE, 2010). The Vicinity Property OU is presently in the RI phase.

B. Site History and Enforcement Activities

B.1 Site History

Industrial operations at the Main Site began in 1923, when a facility was built for manufacturing wood products and toys. In 1927, the facility was converted to a brass foundry for manufacturing railroad components. In 1937, NL purchased the facility for conducting electroplating operations. Chemicals used in the plating operations included various acids, bases, metals, and degreasing solvents. NL also bought an adjacent lot that contained a portion of Patroon Lake.

Prior to 1941, NL began filling Patroon Lake with used casting sand. The lake was subsequently used for additional waste disposal through 1961. The used casting sands contained high

concentrations (percent levels) of heavy metals, primarily lead, copper and arsenic. These metals became part of the Site soils and required remediation.

Based on a review of historical surveys, aerial photographs, and results of previous investigations, one burial area (Patroon Lake area) and chemical contamination of surfaces within the processing building were identified as the most likely sources of organic contamination at the Main Site.

In 1958, the nuclear division of NL began producing items manufactured from uranium and thorium under a license issued by the Atomic Energy Commission (AEC). The plant handled enriched uranium from 1960 to 1972; during that time, NL held several contracts to manufacture fuel from enriched uranium for use in experimental nuclear reactors. Uranium, along with co-located metals contamination from other Site processes, was later remediated in Site soils.

The New York State Supreme Court shut down the NL plant in 1984 due to environmental concerns, and ownership of the Main Site was transferred to DOE. From 1984 to fall 1997, DOE investigated the Main Site and 56 VPs and initiated the restoration process. During this time, DOE addressed 53 VPs and demolished all NL buildings. In 1997, USACE assumed control of the cleanup of old AEC sites such as the Colonie Site from the DOE; this entailed control of all future investigation and cleanup activities. By the end of 2007, USACE had completed the removal of contaminated soils at the Main Site and the remaining three VPs.

B.2 Removal Action for Main Site Soils

Soil removal activities at the Main Site (including the adjacent Town of Colonie VP) were completed by USACE in accordance with the *Final Action Memorandum (AM)* (USACE, 2001). Removal activities were first initiated by USACE in 1999 and were based upon the results of a 1995 *Engineering Evaluation/Cost Analysis* (EE/CA) report and the original DOE AM (DOE, 1995 and 1997). The *EE/CA* and the DOE AM document the selected Alternative 3B, Moderate Excavation and Cap and Cover. Due to subsequent uncertainties regarding implementability, physical constraints of the Main Site and local community resistance, USACE re-evaluated the alternative when it assumed FUSRAP from DOE. Subsequently, USACE revised the 2001 AM to document the selection of Alternative 2B, Large-Scale Excavation and Disposal (rather than Alternative 3B). The 2001 AM (USACE, 2001) also provided revised cleanup criteria for metals and radiological constituents (uranium-238 [^{238}U] and thorium-232 [^{232}Th]) as follows: arsenic (7.4 milligrams per kilogram [mg/kg]); copper (1,912 mg/kg); lead (450 mg/kg); ^{238}U (35 picocuries per gram [pCi/g]); and ^{232}Th (2.8 pCi/g). These revised cleanup criteria are presented in Table 1.

In accordance with the removal action goals specified in the 2001 AM (see Table 2), USACE removed all radioactively-contaminated soils exceeding cleanup criteria regardless of depth, and excavated all accessible metals-contaminated soils exceeding criteria to a maximum depth of nine feet below original grade. USACE also removed soil containing volatile organic compounds (VOC) sources where they were encountered. This soil source removal has accelerated the cleanup of groundwater. These excavations generally extended to a maximum of five feet below the surface of the water table.

Once USACE determined that a soil excavation unit was clean, and after obtaining NYSDEC concurrence for each FSS Unit, the area was backfilled with certified clean fill material and restored (e.g., graded and seeded). Due to the unanticipated depth of radiologically

contaminated soils adjacent to the active CSX rail line, vertical sheet piling was installed to depths of as much as 50 feet below ground surface to facilitate remediation and to ensure the structural integrity of the active CSX rail line.

Once soil removal was completed, the requirements specified in the Multi-Agency Radiation Survey and Site Investigation Manual (Nuclear Regulatory Commission [NRC] (NRC, 2000)) were applied to conduct an FSS for the Main Site. The FSS is a detailed systematic sampling approach designed to obtain sufficient sample information to demonstrate that potential doses from remaining levels of radioactivity are below the cleanup criteria for each survey unit. USACE designated the entire site a Class 1 survey unit area. Class 1 survey unit areas are considered contaminated and require the highest degree of survey effort. USACE then performed an FSS at each of the 27 individual Class 1 survey units (Figure 3) as a means of demonstrating compliance with the soil cleanup criteria.

The individual results for metals were also compared to the appropriate cleanup criteria. In those cases where elevated individual sample results were above the criteria, the sample result was averaged with the adjacent two samples to determine if the average was above or below the cleanup criteria. If the average of the three samples was less than the cleanup criteria, the NYSDEC would require no further action in that portion of the unit (Shaw, 2010).

Residual soil concentrations for ^{238}U and ^{232}Th satisfied the ARAR-based cleanup criteria of 35 pCi/g and 2.8 pCi/g, respectively, for current and future use of the property that would allow unlimited use and unrestricted exposure. All average residual concentrations for individual metal constituents also satisfied the risk-based cleanup criteria from zero to nine feet below ground. Four individual soil sample results from locations up to nine feet below ground exceeded the metals cleanup criteria as follows:

- Survey Unit 104 (1.82 foot depth) – arsenic 85.4 mg/kg (cleanup criteria 7.4 mg/kg)
- Survey Unit 109 (2.4 foot depth) – arsenic 10.5 mg/kg
- Survey Unit 124 (5.3 foot depth) – copper 2,450 mg/kg (cleanup criteria 1,912 mg/kg) and lead 734 mg/kg (cleanup criteria 450 mg/kg)
- North Lawn (3.9 foot depth) - copper 4,340 mg/kg and lead 3,370 mg/kg

Because these discrete locations were not accessible for removal (e.g., they were located adjacent to active rail lines or utility power poles), NYSDEC required the implementation of LUCs in the form of an environmental easement designed to restrict the excavation of soil. The location of each area with respect to the FSS units is shown on Figure 3. Detailed information regarding site soil excavation activities can be located in the Post-Remedial Action Report (Shaw, 2010).

USACE has completed the excavation and off-site disposal of soils from the Main Site. A total of 135,244 cubic yards of soil was excavated from the Main Site (including the Town of Colonie VP). Main Site excavation activities were completed in January 2007 (URS, 2008). As well, a ROD was signed in April 2010 that addressed Main Site groundwater. The selected remedy consisted of Monitored Natural Attenuation with Land Use Controls.

C. Community Participation

Community participation activities provide the public with an opportunity to express its views on the preferred remedial action. USACE, in consultation with NYSDEC, considered public input from the community participation activities conducted during the public review of the PP for Colonie Main Site Soil.

The PP for Colonie Main Site Soil was released to the public in July 2014. The document was made available to the public in the *Administrative Record* maintained at the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, New York 12211. Notices of availability were published in local newspapers. A public comment period was held from July 24, 2014 to September 22, 2014. In addition, a public meeting was held on August 6, 2014. At this meeting, representatives from USACE provided information and answered questions regarding soil contamination at the Colonie Main Site and the proposed remedy. A response to the comments received during the comment period (including those from the public meeting) is included in the *Responsiveness Summary* in Section III of this ROD. A transcript of the public meeting is available to the public in the *Administrative Record* file and information repository.

A community relations plan, available in the *Administrative Record* file, has been prepared and implemented to keep the public informed of site activities and to invite community input. As part of the plan, USACE has produced progress update fact sheets, maintained the *Administrative Record* files, issued press releases and legal notices, and maintained a project mailing list.

D. Scope and Role of Remedial Action

The scope of the soil remedial action initiated by USACE addresses subsurface soils located on the Main Site that were identified as presenting a risk for metals constituents. The role of the remedial action is to ensure that the Applicable or Relevant and Appropriate Requirements (ARARs) are met, that residual concentrations of metals constituents are protective of human health and the environment, and that the property could be released for beneficial reuse.

Soil removal activities have been conducted at the Main Site by USACE in accordance with the *Final* AM (USACE, 2001). In accordance with the removal action goals specified in the 2001 AM and shown in Table 2, USACE removed all radioactively-contaminated soils exceeding cleanup criteria, and excavated all accessible metals-contaminated soils exceeding cleanup criteria to a maximum depth of approximately nine feet below original grade. USACE also removed soil where VOC sources were encountered. These excavations generally extended to a maximum of five feet below the surface of the water table.

This Main Site Soils OU ROD covers all soil remediation at the Colonie FUSRAP site. However, much of that contamination was addressed pursuant to the 2001 Removal Action. This ROD recognizes that previous action and addresses the remaining contamination of subsurface soils which were inaccessible during the previous soil removal action (e.g., they were located adjacent to active rail lines or utility power poles) and were found to present a possible future risk from ingestion in the risk assessment performed for the RI (USACE, 2013). The specific soils are in exposure units (also known as "FSS units") 104, 124 and North Lawn.

USACE has determined that LUCs are an appropriate remedy and therefore the selected response action for the remaining soils that pose a risk at the Main Site.

E. Site Characteristics

E.1 Surface and Subsurface Features

The Colonie Site is located on the eastern edge of the Central Plateau physiographic province, with the Adirondack province to the north and the northern extension of the Valley and Ridge province to the east. The Colonie Site is located on relatively flat, slightly rolling terrain in the Pine Bush area within the Mohawk-Hudson lowland.

Maximum topographic relief across the 11.2-acre Site is about 15 ft. The highest point on the property, located in the northwest corner, has an elevation of approximately 235 ft above mean sea level (MSL). The land slopes gently from the northwest toward the south-southeast. A steep embankment exists between the CSX rail line, which parallels the southern Site boundary, and the properties along Yardboro Avenue.

An unnamed tributary of Patroon Creek, (a portion of which is an underground culvert) crosses the Site from the west to the south and east, ultimately discharging into Patroon Creek south of the Site. The unnamed tributary drains an area of approximately 300 acres in the Town of Colonie. The unnamed tributary is in an urban area; therefore, the stream has been significantly altered. During the early 1900s, a dam was constructed on the tributary to form Patroon Lake. Patroon Creek is a perennial stream that drains an area of approximately 13 square miles in Colonie and Albany. The drainage basin is mostly urban with commercial and residential properties. The creek is approximately 7 miles long, from its headwaters to where it discharges into the Hudson River.

Figure 4 provides a cross-section of the region's geological units, which comprise the Pine Bush Aquifer. A brief description of the geological units, from the uppermost unit to the lowermost unit, is provided below.

Artificial Fill and Flood Plain Sediments: This unit consists of fill materials placed at the Site, including Patroon Lake, and consists of gravel, sand, brick fragments, metal barrels, glass, foundry tools, foundry slag, and disturbed sediment. The Flood Plain Sediments unit represents thin deposits of materials related to sedimentation in the former Patroon Lake and from floods of the unnamed tributary of Patroon Creek.

Dune Sand: This unit is fine-grained sand that is light yellow-brown and cross laminated. Regionally, it is the unit that makes up the Pine Bush Aquifer. Based on lithologic logs, this unit is discontinuously distributed across the Site and is near the ground surface predominantly positioned above the water table.

Upper Silt: Previously referred to as the Upper Sand. This unit is composed of lake sand and lake silt and sand. Grain size analyses consistently show significant silt fractions in samples collected from this unit.

Upper Clay: This unit is most easily identified in conductivity logs and consists of a varied sequence of clay and silt.

Lower Silt: Previously referred to as Lower Sand. This unit consists predominantly of silt with some clay and lies above the Lower Clay.

Lower Clay: The clay is observed to be olive gray and very homogenous, showing few signs of silt or sand interbeds. Based on geophysical surveys, it was determined that no major channel cut features or topographic divides were apparent along the top of the Lower Clay. The absence of these features further supports geological background information and geotechnical testing that identify the Lower Clay as the basal hydrogeologic boundary.

Till: This unit is described as dark gray and poorly sorted (10% sand, 40% gravel, and 50% clay). One Site borehole penetrated the till at a depth of 160 ft below grade. Bedrock underlies this till.

The Upper Silt unit forms the shallow saturated zone at the Site. The base of the Upper Silt ranges from elevations of approximately 202 to 205 ft above MSL in the western portion of the Site. Water levels from December 2002 indicate a saturated thickness of more than 20 ft in the north portion of the Site to less than 15 ft in the south portion, near the property line. The thickness of the Upper Clay in the western portion of the Site ranges from approximately 12 to 15 ft. The top surface of the Lower Silt is typically encountered at approximately 190 ft above MSL and ranges from 10 to 15 ft thick. The top surface of the Lower Clay is encountered at elevations of 170 to 180 ft above MSL. At the Site, the Lower Clay unit is approximately 100 ft thick. Field tests conducted in 1984 and 1988 indicated permeabilities ranging from 0.04 to 109 feet per day (ft/d) in the Upper Silt unit and 0.29 to 37 ft/d in the Lower Silt unit.

Groundwater levels have been routinely measured in Site wells since 1988. Typically, shallow groundwater at the Site is encountered at less than 10 ft below grade. Water level measurements recorded at the Site indicate that groundwater flows generally to the southeast across the Site, as depicted on Figure 4. There is an observable downward gradient over the northern portions of the Site, with localized upward gradients near the unnamed tributary and Patroon Creek.

Groundwater level data provided in the groundwater RI indicate that the hydraulic gradient and general direction of groundwater flow in the Lower Silt unit closely resemble those in the shallow zone. The formations above the Upper Clay likely drain to the unnamed tributary and to Patroon Creek.

E.2 Sampling Strategy

An extensive amount of soil sampling occurred prior to the removal action that was implemented at the site. Any sample results that were taken in soils that have since been removed will not be discussed herein. However, current site conditions are a direct result of the prior removal action. Final confirmatory sampling performed as the removal action was completed along with post-removal action sampling summarized in the RI report (USACE, 2013) described the nature and extent of residual metals in Site soils. The large volume of confirmatory/post-removal action soil samples provides a comprehensive coverage of current site conditions.

Removal activities were first initiated in 1999 and were based on the results of a 1995 EE/CA report and the original DOE AM (DOE, 1997). The EE/CA and the DOE AM documents selected Alternative 3B, Moderate Excavation and Cap and Cover. Due to subsequent uncertainties regarding the ability to implement the selected alternative, the physical constraints of the Site, and local community resistance, the alternative was re-evaluated when USACE assumed responsibility for the Site. Based on this re-evaluation, the AM was revised and issued as Final in December 2001 to document selection of Alternative 2B, Large-Scale Excavation and Disposal (rather than Alternative 3B) (USACE, 2001b). Removal activities were performed in accordance with the revised 2001 AM resulting in the removal and offsite disposal of over 135,000 cubic yards of soil contaminated with radionuclides and metals.

E.2.1 Removal Action Confirmatory Sampling Program

As the removal action progressed, the site was divided into 27 discrete land parcels to facilitate confirmatory sampling in accordance with the FSS Plan (USACE, 2002). The parcels were based on radiological FSS sampling requirements and are referred to as survey units, as shown on Figure 3. Each survey unit was limited to a maximum size of 2,000 square meters and included nine or more sample locations. Sample density was approximately one sample every 200 square meters. Over 280 samples were collected and analyzed as part of the confirmatory sampling program.

Confirmatory samples were collected following completion of the removal action in each survey unit. These samples were analyzed for radionuclides, total arsenic, total copper, and total lead in accordance with USEPA Method SW-846 Methods 6010B and 6020A. In addition, in select portions of the Site, soil samples were collected and analyzed for VOCs after the excavation of metals contaminated soils was confirmed complete. The confirmatory sampling results were used in the RI report (USACE, 2013) to establish the nature and extent of metals in Site soils.

Samples were collected in accordance with the removal action Sampling and Analysis Plan (Shaw, 2005). Quality Assurance Project Plans were prepared and implemented to supplement the site-specific Sampling and Analysis Plans for the Site. The overall objective was to identify procedures for sampling, chain-of-custody, laboratory analysis, instrument calibration, data reduction and reporting, internal quality control, audits, preventive maintenance, and corrective actions (if required). The plan presented the field and laboratory quality assurance/quality control (QA/QC) policies and procedures that were followed during the implementation of the project. Specific QA/QC procedures employed and the results of QA/QC evaluations/surveillance are provided in the Sampling and Analysis Plan (Shaw, 2005) and the Post-Removal Action Report (Shaw, 2010).

E.2.2 Post-Removal Action Soil Sampling

In January 2013, additional soil sampling was conducted at the Site to provide better delineation of metals contaminants in excess of removal action cleanup goals that had not been previously remediated. The primary intent of the effort was to provide better vertical delineation and bound the depth of metals contaminated soils. Soil cores were collected at 14 locations with a direct push Geoprobe® sampling method to a depth of 20 feet bgs. Discrete samples for laboratory metals analyses were collected at two foot intervals starting below the removal action clean fill

depth to 20 feet bgs. A total of 71 samples were collected. The Appendix shows the sample results and sample locations.

Post-removal action sampling was established at ten locations where removal action confirmatory sampling results were above the removal action cleanup goal values. Of those ten locations only four were located in subsurface soils above a nine foot depth.

E.3 Nature and Extent of Contamination

With the completion of the removal action, the vast majority of contaminated soil was removed, disposed of offsite, and replaced with certified clean backfill soil. Currently, all surface soil and much of the shallow subsurface soil at the Site consists of this certified clean backfill.

Site soils characterization in the RI report is based on the removal action confirmatory sampling data and the January 2013 post-removal action sampling data. This comprehensive dataset is of sufficient quality and quantity to support decisions regarding remedial response activities.

The Appendix summarizes the post-removal sampling results. Figure 3 identifies the survey unit locations and boundaries on the Site.

No soils with radiological contamination were left on the Site above removal action goals after the side-wide cleanup.

After the soil removal action was completed (Shaw 2010), only four FSS units did not meet the removal action goals for one or more sample points containing arsenic, copper or lead. These sample points were in areas that were obstructed by fixed features such as telephone poles or fire hydrants where it was not safe to excavate. These sample points were therefore left intact and not removed during the removal action. Figure 3 shows the locations within the FSS units that had sample points containing metals above removal action goals. The total area of soils impacted above removal action levels was 9,500 square feet.

The potential for metals contamination in Site soils to impact other media (air, surface water, and groundwater) was also evaluated. Impacts to these media under current or reasonable future Site uses are considered insignificant or nonexistent. This is supported by the presence of significant quantities of certified clean backfill soil over all portions of the Site. Also, potential future disturbance of the soil through excavation would significantly dilute metals concentrations or would not affect contaminated areas at significant depth. Finally, data collected prior to completion of the removal action indicates no discernible impacts from metals in soils to groundwater, as the removal action eliminated the vast majority of metals contamination with the exception of metals contamination in inaccessible areas.

E.4 Groundwater Contamination

Site groundwater was previously investigated and addressed under a separate ROD (USACE, 2010), and will not be considered in this ROD. Only Main Site Soils are under consideration in this ROD.

F. Current and Potential Future Land Uses

F.1 Current Land Use

The Main Site is situated in an urban area consisting of both residential and commercial properties, located in the Industrial F zoning district. The definition of the Industrial F district states that prohibited uses include "any use which produces radiation, light, smoke, fumes, or odors of a noxious or harmful nature carrying beyond the limits of the premises." The Main Site was historically used for industrial operations and is currently vacant land.

Current land use surrounding the Main Site is somewhat more residential than commercial. The 2009 population estimate for the Town of Colonie is 81,591; the 2009 population estimate for Albany County is 304,204 (U.S. Census Bureau, 2010).

Public water in the Site area is provided by the Latham Water District in the Town of Colonie. The water sources include the Mohawk River, several supply wells, and several reservoirs.

F.2 Future Land Use

The most probable future land use at the Site is considered to be urban residential. In accordance with USEPA guidance for identifying a site's potential future land use, current land use, site setting, zoning laws/maps, and comprehensive community master plans were examined. The Town of Colonie's master plan indicates future commercial use for the Central Avenue strip. However, the fact that residential property currently borders the Site on two sides supports the use of urban residential cleanup criteria. Future projected use will likely result in concentrated mixed use development with high population characteristics of an urban residential scheme.

G. Summary of Site Risks

The risk assessment estimates potential risks posed by the Main Site if no actions were taken. It provides the basis for taking action and identifies contaminants and exposure pathways that need to be addressed by the remedial action. This section summarizes the results of the risk assessment for the Colonie Main Site soils.

G.1 Human Health Risk Assessment

A human health risk assessment (HHRA) was performed to address residual metals contaminants in accordance with USEPA guidance. Details of the HHRA may be found in the Colonie FUSRAP RI Summary Report (USACE 2013).

Under the Main Site's current land use, which consists of unused open space, there is no exposure to contaminants which are currently in subsurface soils. During the removal action, soils that exceeded the cleanup levels were excavated. This was followed by fence-to-fence removal of at least six inches of soil. All excavated soils were replaced with clean fill, which limits exposure to contaminated soils. There were however, four discrete areas onsite that could not be accessed for various reasons and from which soils were not excavated. These areas were the subject of the HHRA because all other onsite soils met removal action objectives or had been excavated and then replaced with clean fill.

G.1.1 Identification of Contaminants of Potential Concern

The contaminants of potential concern (COPCs) were lead, arsenic and copper (USACE 2001a) in Site subsurface soils only. Radionuclide and VOC contaminants are no longer considered to be COPCs in Site soils (as a result of the completed removal action) and were not evaluated in the HHRA. Since levels of lead, arsenic and copper remained onsite above cleanup goals after the removal action (in only a few discrete places, see Figure 3) they remain COPCs and were evaluated in the HHRA.

G.1.2 Exposure Assessment

The HHRA considered exposures to subsurface soils by future residents and future construction workers at the Site. The exposures considered in the assessment are presented in detail in Table 4. The future resident scenario included both adults and children; future workers were assumed to be adults. Non-cancer hazards were evaluated separately for both child and adult future residents. Cancer risks were evaluated using an age-adjusted approach for a resident that assumes the resident lives on the site for 70 years, 6 years as a child and the remainder as an adult. The HHRA assumed that soils may be brought to the surface during construction activities to a depth of 9 feet (potentially occurring during foundation and footer excavation and general grading) and be available for daily contact.

For purposes of the HHRA, exposure was assumed to take place in FSS units that contained a soil sample with levels of COPCs above cleanup goals. FSS units that met these criteria for possible future exposure were the following: 104, 109, 124, and the North Lawn. As a result of the large scale removal action, radionuclide concentrations at all Site locations are less than the removal action cleanup goals. VOC concentrations meet New York State guidance. Radionuclide and VOC contaminants are therefore no longer considered COPCs in Site soils and were not evaluated in the HHRA.

G.1.3 Risk Characterization

In the Baseline Risk Assessment, USACE utilized USEPA's Risk Assessment Guidance for Superfund (RAGS) equations to perform the risk characterization for exposure pathways involving subsurface soil (USEPA 1989).

For carcinogenic and non-carcinogenic chemicals, USACE calculated the incremental lifetime cancer risk and hazard index, respectively, for each receptor in each exposure unit (the FSS unit). The resulting incremental lifetime cancer risks indicate a probability of developing cancer and are compared to the risk range specified in the NCP of 10^{-6} to 10^{-4} (one in 1 million to one in 10,000) (USEPA 1990). Incremental lifetime cancer risks are considered acceptable if less than 10^{-6}; incremental lifetime cancer risks greater than 10^{-4} are considered unacceptable risks. Risks that fall between 10^{-6} and 10^{-4} are generally referred to as within the "acceptable risk range".

Lead was evaluated by using two lead models: the Integrated Exposure Uptake Biokinetic Model (IEUBK) and the Adult Lead Model (ALM) to evaluate children and workers respectively that might come into contact with site soils. These models were developed by the USEPA as there is far more known about lead toxicity than that for nearly every other contaminant. The models' input is the mean site lead concentration; the output is the blood lead concentration for hypothetical children (IEUBK) or adult female worker (ALM) that are exposed to the site soil. Receptor blood lead concentrations that have a probability of greater than 5 percent to be above

10 (µg/dL) are considered to be too high. In such cases, remedial action is necessary to ensure that lead in soil does not come into contact with site receptors. At exposure units 124 and the North Lawn, acceptable blood lead concentrations were exceeded for hypothetical children coming into contact with the soil. The ALM model on the other hand did not show adverse risks to adult workers.

For non-carcinogenic chemicals USACE compared estimated exposure levels to reference values which are safe for even sensitive populations. When the exposure level exceeds the reference value there may be a concern for potential noncarcinogenic effects. Where the total hazard index is less than or equal to unity (e.g., 1.0 or 1.0E+00), it is believed that there is no appreciable risk that non-cancer adverse health effects will occur (USEPA 1989). A hazard index less than one is considered acceptable.

Table 5 shows the non-cancer hazard indices, the cancer risks and the lead risks for metals in the four FSS units for which risk characterization was warranted. Highlighted values indicate that the dose and risk assessment results exceed the acceptable dose and risk criteria specifically for future residents only. The hazard index of 1.4 in exposure unit 104 was due to arsenic in subsurface soils. Exposure unit 109 did not pose an unacceptable risk; exposure units 124 and North Lawn both posed unacceptable risks to future resident children exposed to lead in subsurface soils. As the Table 5 data indicates elevated hazards and risks, USACE decided that evaluation and further response action was necessary and appropriate at FSS units 104, 124 and North Lawn. These additional FUSRAP response actions are due to the identified COPCs arsenic and lead. It should be noted that copper did not pose an excess risk at the identified FSS units and therefore is not a COPC.

G.2 Ecological Risk Assessment

A baseline ecological risk assessment was not performed as all contaminated soil samples were at depths considered to be unavailable to ecological receptors. For this reason there was no ecological risk assessment presented in the RI report. Therefore, the development of cleanup criteria to protect ecological resources was not warranted.

G.3 Baseline Risk Assessment Summary

In summary, arsenic in site subsurface soils at exposure unit 104 and lead in subsurface soils at exposure units 124 and North Lawn are driving the need to address site risks. USACE evaluated future land use scenarios for exposure to subsurface soils that included a future resident and future construction worker. Results of the HHRA indicate that exposure to COPCs in subsurface soil may result in unacceptable risks. Therefore, the response action selected in this ROD is necessary to protect human health or welfare from actual releases of hazardous substances into the environment.

A baseline ecological risk assessment was not performed as all contaminated soil samples were at depths considered to be unavailable to ecological receptors. As a result, no response action is necessary to protect ecological receptors.

H. Remedial Action Objectives

RAOs specify the requirements that remedial alternatives must meet in order to protect human health and the environment. Essentially, they provide the basis for identifying and evaluating remedial alternatives. USACE established RAOs for the Colonie FUSRAP Main Site Soils to eliminate or minimize potential human exposure to soils impacted by the FUSRAP-related COPCs identified as exceeding the standards established in ARARs and the site-specific remediation goals. A completed remedial action will result in post-remediation site conditions that allow for long-term protection of human health and the environment.

H.1 Soil-specific Remedial Action Objectives

USACE selected media-specific RAOs based on the nature and extent of contamination, the potential for human exposure, and the most reasonable future land use assumptions. RAOs provide goals for protecting human health and the environment from media-specific constituents. The RAOs for the COPCs in Site soils are designed to:

- Prevent direct contact with soil having arsenic concentrations in excess of an arithmetically determined mean background concentration of 7.4 mg/kg.
- Prevent direct contact with soil having lead concentrations exceeding 450 mg/kg, which would result in unacceptable risks due to lead blood levels above 10 µg/dL.

As extensive onsite soil removal has been completed, the current RAOs are meant to prevent direct contact with Site soils that remain in place due to their inaccessibility which present a possible future risk to receptors (see Section G of the Decision Summary). The USACE identified three discrete soil locations that were inaccessible due to their proximity to active rail lines or utility power poles and thus were not excavated. These three locations (shown on Table 3) are subject to the RAOs listed above.

H.2 Applicable or Relevant and Appropriate Requirements

The identification and evaluation of the ARARs is an integral part of the remedial process. Section 121 of CERCLA specifies that remedial actions for cleanup of hazardous substances must comply with the requirements or standards under promulgated Federal environmental or state environmental laws that are applicable or relevant and appropriate to the hazardous substances at a site. Protection of human health and the environment is presumed if the remedial action complies with the ARARs.

I. Description of Alternatives

Based on the RI and Baseline Risk Assessment results, USACE developed and evaluated four remedial alternatives in the Feasibility Study for addressing soil contamination.

- Alternative 1: No Further Action
- Alternative 2: LUCs
- Alternative 3: Soil Excavation and Off-Site Disposal
- Alternative 4: Soil Excavation, Solidification, On-Site Disposal, and LUCs

Remedial alternatives for soil as presented for consideration in the PP are summarized below.

I.1 Remedial Alternatives

In addition to the "No Further Action" alternative, USACE evaluated three alternatives to address soil contamination. Two of the alternatives (2 and 4) employ LUCs to restrict access and protect workers during remedial action activities. Two alternatives (3 and 4) employ removal (excavation) technologies using standard construction equipment and rely on off-site and on-site disposal of contaminated soil respectively.

Alternative 1 – No Further Action: The No Further Action alternative is considered in accordance with the NCP, 40 CFR 300.430(e)(6). The No Further Action alternative would leave the property in its current condition. This alternative provides a comparative baseline against which other alternatives can be evaluated. Under this alternative, no remedial action will be taken, and any identified contaminants are left "as is," without the implementation of any containment, removal, treatment, or other protective actions. Under the No Further Action alternative, LUCs would not be maintained. The No Further Action alternative is not considered an acceptable remedial alternative, as it does not assure protection of human health and the environment and does not comply with ARARs.

Alternative 2 – Land Use Controls: Alternative 2 is LUCs. The LUCs would be in the form of an environmental easement as described below and would apply only to those portions of the site requiring a remedial action. As discussed previously, areas requiring a remedial action are FSS units 104 and 124 and the North Lawn area.

The U.S. Government would execute an environmental easement, which would consist of, at a minimum, a restriction on digging with powered equipment in the areas where residual contamination exists unless appropriate safety measures were taken as detailed in an approved Site Management Plan. The Site Management Plan will include an emergency repair process coordinated with affected utilities. The environmental easement would be recorded after the signing of this ROD.

Under this alternative, no further cleanup would be taken for the Site; rather, administrative protections would be put in place to ensure that contact with contaminated soils would not occur. Since this alternative does not allow for UU/UE, five-year reviews would be required to evaluate whether the remedy continues to be protective of human health and the environment.

Alternative 3 – Soil Excavation and Off-Site Disposal: Alternative 3 involves the excavation and removal of contaminated soil to achieve the RAOs. Following excavation, post-remedial sampling would be conducted to ensure the remedy is protective. No LUCs would be required once the contaminated soil is removed. This alternative provides a high level of protectiveness to human health and the environment through removal of contaminated soil resulting in unrestricted future use of the property. Contaminated soils would be transported to a Resource Conservation and Recovery Act (RCRA) Subtitle C (hazardous waste) or D (solid waste) facility, as appropriate. To estimate transportation costs, it is assumed that an approved disposal facility such as US Ecology in Idaho will be utilized.

Excavation

It is important to note that if this material had been readily accessible, it would have been removed during the completed removal action. The contaminated soils are located in the areas of semi-permanent physical obstructions including high voltage power line support poles, active

rail lines, and a fire hydrant/water main that limited the Corps' ability to remove this material. To remove these soils, electrical power lines that supply the Town of Colonie and a portion of the City of Albany would need to be re-routed. Water lines that support fire suppression needs for the community would be required to be shut down and excavation adjacent to Central Avenue would require partial or complete lane closures. These removal actions would require extensive coordination with local authorities and utility companies as well as long lead time.

Contaminated soils are typically excavated with conventional earth moving equipment, such as backhoes and excavators. Backhoes with smaller buckets or smaller earth moving equipment can remove contaminated soils from difficult to reach locations next to structures or culverts, or in proximity to utility lines. Sheet-pile walls or trench boxes would likely be required to stabilize soils near semi-permanent physical obstructions (including high voltage power line support poles and a fire hydrant/water main) as well as to protect workers. Electrical power lines would need to be re-routed and fire suppression water lines would be temporarily shut off. Excavation adjacent to Central Avenue would require partial or complete lane closures.

Excavation would continue until delineated contamination areas are removed. Backfilling and compaction would be conducted behind excavation activities to reduce the time areas of the excavation remain open.

Transportation and Disposal

Waste may be transported in bulk or in containers by rail or truck. Some disposal sites have rail access and facilities for offloading rail cars or boxes. For the purpose of evaluation, it was assumed that rail cars would be used to transport materials out of the state (except for adjacent states), while trucks would be used to transport the materials within close proximity of the Site and into adjacent states for disposal.

Waste shipments would be labeled according to applicable US Department of Transportation and USEPA regulations. Transport of contaminated soil would comply with applicable State and Federal regulations. Designated routes would be traveled and an emergency response program would be developed to address potential accidents.

Characterization data for metals in areas that would be excavated under Alternative 3 indicates that much, if not all, excavated soil will need to be managed as hazardous waste and require treatment (stabilization) to meet land disposal restriction requirements. Furthermore, while all portions of the site meet the ^{238}U RAO (35 pCi/gram), characterization data indicate that ^{238}U concentrations as high as 31 pCi/gram are present in the potential excavation areas. As such, transportation and disposal costs were developed based on the assumption that all soil requiring disposal would be transported to a Subtitle C facility that allows this type of low-activity radioactive waste if it is present.

Alternative 4 – Soil Excavation, Solidification, On-Site Disposal, and Land-Use Controls:
Contaminated soils are typically excavated with conventional earth moving equipment, such as backhoes and excavators. Backhoes with smaller buckets or smaller earth moving equipment can remove contaminated soils from difficult to reach locations next to structures or culverts, or in close proximity to utility lines. Sheet-pile walls, trench boxes, utility re-routings, and road closures would be necessary as described above for Alternative 3.

Excavation would continue until delineated contamination areas are removed. Backfilling and compaction would be conducted behind excavation activities to reduce the time areas of the excavation remain open.

Soils would be stabilized on-site by mixing with cement. The resulting stabilized material would be placed in an on-site construction and demolition land disposal unit meeting the substantive standards of 40 CFR Part 257, Subpart A. LUCs, consisting of an environmental easement, fencing and signage would be implemented to restrict access to the disposal unit and its contents. Periodic maintenance would also be necessary to ensure the integrity of the disposal area. Five-year reviews would be required to evaluate whether the remedy continues to be protective of human health and the environment.

I.2 Common Elements and Distinguishing Features of Each Alternative

The following common elements would be implemented for Alternatives 2, 3 and 4:

- Close coordination of remediation and monitoring activities with the NYSDEC
- Five-year reviews would be conducted in accordance with CERCLA and the NCP. The reviews would provide the opportunity for DOE Office of Legacy Management or NYSDEC to evaluate the effectiveness of the remedial action and to confirm that land use assumptions and property ownership have not changed (note - five-year reviews would not be needed under Alternative 3).

I.3 Expected Outcomes of Each Alternative

Alternative 1, No Further Action, would not be protective of human health and the environment, would not achieve remediation goals, and therefore is not a viable alternative for the FUSRAP remediation at the Colonie Main Site Soils. Alternative 2, LUCs, would provide a means to limit potential future exposure to residual metals concentrations in soil that exceed RAOs. Alternative 3, Excavation and Off-site Disposal would attain RAOs by completely removing soils that exceed remedial action goals. Alternative 4 would attain RAOs by making the onsite contaminants inaccessible and thus unavailable for future exposure.

J. Comparative Analysis of Alternatives

As presented in this section, the advantages and disadvantages of each alternative were compared against the nine CERCLA evaluation criteria established by USEPA in Section 300.430(d)(9)(iii) of the NCP. Evaluations of two criteria (Overall Protection of Human Health and the Environment and Compliance with ARARs) relate directly to statutory findings and must be met. These are known as Threshold Criteria. Five of the criteria are referred to as Balancing Criteria and are used to weigh major tradeoffs among the alternatives. The two remaining criteria, State Acceptance and Community Acceptance, are the Modifying Criteria and are evaluated after the PP comment period. These criteria are addressed in the Responsiveness Summary. The nine criteria are:

- **Overall Protection of Human Health and the Environment:** addresses whether or not an alternative provides adequate protection and describes how exposure risks are

eliminated, reduced, or controlled through treatment or institutional controls such as LUCs.

- **Compliance with ARARs:** addresses whether an alternative will meet all ARARs.
- **Long-Term Effectiveness and Permanence:** refers to the ability of the alternative to protect human health and the environment over time, once cleanup levels have been met.
- **Reduction in Toxicity, Mobility, or Volume through Treatment:** refers to anticipated ability of the remedy to reduce the toxicity, mobility, or volume of the hazardous components through treatment technologies.
- **Short-Term Effectiveness:** refers to the speed with which the alternative achieves protection and addresses the impacts to the community and site workers during the time it takes to complete the remedial action.
- **Implementability:** is the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the action.
- **Cost:** evaluates the estimated capital and operation and maintenance costs.
- **State Acceptance:** indicates whether, based on its review of the RI, FS, and Proposed Plan, NYSDEC concurs with, opposes, or has no comment on the preferred alternative.
- **Community Acceptance:** comments received from the community during the Proposed Plan comment period are addressed in Section III, Responsiveness Summary.

J.1 Threshold Criteria

The two threshold criteria discussed below must be met for an alternative to be considered viable.

J.1.1 Overall Protection of Human Health and the Environment

The "No Further Action" alternative (Alternative 1) does not provide adequate protection of human health and the environment, as the RAOs would not be achieved. Human exposure to contaminants of concern at unacceptable levels could occur in the future if no remedial action is taken.

Alternative 2, LUCs would be protective of human health and the environment because the LUCs would prevent human exposure to residual metals concentrations that exceed cleanup criteria. LUCs would be put in place to prevent digging in three isolated locations where these metals concentrations exist. Alternative 3, Soil Excavation and Off-Site Disposal would also provide overall protection of human health and the environment by entirely removing the areas with residual metals concentrations that exceed cleanup criteria. Alternative 4, Soil Excavation, Solidification, On-Site Disposal, and LUCs provides overall protection of human health and the Environment through mixing the excavated soils with concrete and then placing the solidified material into a disposal cell on-site and then preventing any future disturbance of or tampering with the disposal area by institution of LUCs.

J.1.2 Compliance with ARARs

For Alternative 4 only, 40 C.F.R. Part 257 Subpart A provides criteria for a Construction and Demolition Landfill that does not accept hazardous waste and is thus identified as an ARAR, as

this alternative creates an onsite construction and disposal cell. If the soil was a hazardous waste and was placed in such an onsite cell, the soil would have been treated to stabilize the lead and arsenic. Since Alternative 4 involves disposal on-site, the treatment requirements of RCRA, 40 C.F.R. 268.40, .49(c), and .48, would also be ARARs.

All alternatives (except the No Further Action alternative), comply with ARARs, if identified.

J.2 Primary Balancing Criteria

The five primary balancing criteria discussed below are used to identify major trade-offs among the alternatives.

J.2.1 Long-Term Effectiveness and Permanence

Alternatives 2, 3, and 4 achieve long-term effectiveness and permanence in different ways. Alternative 2, in the form of environmental easements, is expected to provide a high degree of reliable protection of human health and the environment. Alternative 3 will meet this criterion by removing the contamination from the site entirely. Alternative 4 will meet this criterion by making the onsite contaminants inaccessible and unavailable for future exposure.

The No Action Alternative will not provide long-term protection of human health and the environment. No physical remedial actions or access restrictions to metals-contaminated soils will be implemented under this alternative. Therefore, this alternative is rated as poor by USACE with respect to this criterion.

J.2.2 Reduction in Toxicity, Mobility, or Volume Through Treatment

Of the three alternatives being weighed in this analysis, Alternative 4 provides the greatest reduction of mobility of the contaminants by mixing them with cement so that they are unavailable to move through the subsurface. Alternatives 2 and 3 are poor at meeting this criterion as treatment is not considered. None of the alternatives are useful at either reducing toxicity or reducing volume of contamination due to the nature of the contamination (metals).

J.2.3 Short-Term Effectiveness

Alternatives 3 and 4 will take significant time to implement as the contaminated soils are in locations that are currently inaccessible for various reasons (e.g., near fire hydrants, under power poles, etc.). The contaminants' inaccessibility is the reason they were not excavated during past removal actions (Shaw, 2010). Furthermore, Alternatives 3 and 4 both involve soil excavation, resulting in brief periods during soil transport when workers or residents may be exposed to soil contamination and contaminants may be released to the environment. However, Alternative 2 shares none of the short-term effectiveness drawbacks as the other alternatives (e.g. – the soil will not be disturbed) and therefore is preferable for this criterion.

The No Further Action Alternative will also not have significant short-term effects (either negative or positive) on worker or community health. No remedial actions will be implemented under this alternative.

J.2.4 Implementability

Alternative 2 is highly implementable as the DOE Office of Legacy Management, the current owner of the Colonie Main Site, has agreed to implement the proposed LUCs. Communication with all stakeholders is ongoing and gives Alternative 2 a high expectation for success. On the

other hand, Alternatives 3 and 4 both rely on having to remove subsurface soils from currently inaccessible locations, making these alternatives technically challenging and highly reliant on future stakeholder coordination. All three alternatives are administratively feasible.

J.2.5 Cost

The total costs for each alternative (present worth with an accuracy of +50% to -30%) are estimated as follows:

Alternative 2:	Cost (minus Long Term Monitoring (LTM)):	0.28 million
	LTM Cost:	$0.30 million
	Total Cost:	$0.58 million
Alternative 3:	Total Cost:	$1.55 million (there is no LTM)
Alternative 4:	Cost (minus LTM)	$1.46 million
	LTM Cost:	$0.58 million
	Total Cost:	$2.04 million

Costs are generally a function of soil volume to be removed and whether the soil will be treated. Alternative 3, involving soil excavation and transport off-site for eventual disposal, is the second most costly alternative. Alternative 4, with the addition of LTM costs which encompasses both excavation and solidification is the most costly alternative. Alternative 2 with the implementation of LUCs is the least expensive.

J.3 Modifying Criteria

These criteria are formally evaluated after the public comment period.

J.3.1 State Acceptance

Comments from the state indicated support for the Proposed Plan as presented, including the preferred alternative. No comments on the other alternatives were offered.

J.3.2 Community Acceptance

During the public comment period, community members expressed a preference for Alternative 3 rather than the Preferred Alternative, Alternative 2. Community members who attended the public meeting and submitted written comments preferred Alternative 3 because no contamination would remain at the site. They would like to see a modified Alternative 3, which would include the excavation and offsite disposal of all ten locations where confirmatory results were above removal action cleanup goal values, rather than only the three locations where unacceptable risks were identified. Although the community's desire for removing all contamination from the site is understandable, only the three areas found to present an unacceptable risk meet the criteria for a response action under CERCLA.

In response to public and NYSDEC concerns regarding enforcement of LUCs, Alternative 2 – LUCs has been revised to specify an Environmental Easement, rather than a deed restriction, as the mechanism for implementing institutional controls. Environmental easements are granted by

the title owner of the property to the NYSDEC, remain in place through property transactions, and are enforceable in perpetuity. Environmental easements have proven to be an effective means of encouraging redevelopment consistent with the property restriction in place.

K Principal Threat Wastes

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained. There are no principal threat wastes left in the Site soils. Low-level threat wastes are source materials that generally can be reliably contained and would present only a low level of risk in the event of release. The USEPA expects that treatment will be the preferred means to address the principal threats posed by sites in general wherever practicable. The remaining metals contamination in Main Site Soils is considered a low-level threat waste due to the inability of the contaminants to move in the environment.

L. Selected Remedy

Alternative 2, LUCs, is the Selected Remedy for the Main Site Soils at the Colonie FUSRAP Site. USACE coordinated with NYSDEC prior to selecting this remedy.

L.1 Summary of the Rationale for the Selected Remedy

The LUCs Alternative is preferred over the other Alternatives because:

- LUCs are effective in both the short and long term in protecting the public and workers from onsite exposures and the possible spread of contamination through transportation.
- Implementation of LUCs is expected to manage risk in the most cost effective and easily implemented manner.
- LUCs provide measures to prevent potential future onsite exposure to residual soil contaminant concentrations at depth through the placement of environmental easements. These easements will prohibit soil excavation at the three discrete locations found to present an unacceptable risk.

Based on currently available information, USACE believes that the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs between the three alternatives with respect to the balancing criteria. The State agrees with the Preferred Remedy selection; however, the Community does not. The LUCs Alternative was selected based on the relative merits of the alternatives to address the types and levels of metals contamination currently present at the Main Site, in accordance with CERCLA criteria.

L.2 Detailed Description of the Selected Remedy

USACE would implement LUCs by filing environmental easements that establish the land use restrictions to be employed to ensure that the property is safe for its intended future use. Once USACE transfers full control of the property back to DOE, the DOE Office of Legacy Management, as the current owner of the Colonie site, will implement the LUCs. Such LUCs would be detailed in an approved Site Management Plan. These controls would be designed to account for the potential future onsite residential land use by limiting potential exposure of future onsite residents to residual metals contamination at depth by restricting soil excavation at Survey Units 104, 124 and North Lawn.

L.3 Cost Estimate for the Selected Remedy

Total present worth costs for the Selected Remedy is estimated to be $584,978.

L.4 Expected Outcomes of the Selected Remedy

USACE has determined that the Selected Remedy is considered a permanent solution, will attain ARARs, satisfy RAOs and be protective of human health and the environment. Successful implementation of the Selected Remedy will allow release of the property for beneficial reuse as soon as the environmental easements can be implemented and overseen by the state.

M. Statutory Determinations

The selected remedy must satisfy the statutory requirements of CERCLA Section 121 and the NCP. The remedy must be protective of human health and the environment; attain ARARs or provide the rationale for an ARAR waiver; be cost effective; and use permanent solutions and alternative treatment technologies to the maximum extent practicable. The following sections describe the manner in which the selected remedy satisfies each of these requirements.

M.1 Protection of Human Health and the Environment

The Selected Remedy will protect human health and the environment through the implementation of LUCs (environmental easements). These environmental easements will prohibit excavation beyond specific depths (to be determined in the environmental easements) at three discrete, inaccessible locations across the Main Site where residual metals concentrations in soil exceed the cleanup criteria. LUCs have the additional benefit of avoiding the potential of spreading contamination during soil excavation and transport, either on or off site. While the statutory preference for treatment versus reliance on administrative controls as a means to prevent exposure will not be met through LUCs, the Selected Remedy will be protective.

M.2 Compliance with ARARs

New York State allows for a site-specific standard under NYCRR Section 375-6.9. The site-specific cleanup levels for the COPC metals arsenic (7.4 ppm) and lead (450 ppm) were established by the 2001 AM for the soil removal action and, though not an ARAR, were determined to be protective of human health and the environment.

M.3 Cost-Effectiveness

Based upon a review of the three main alternatives, USACE has determined that the Selected Remedy is the most cost-effective and represents a reasonable value while ensuring protection of human health and the environment.

M.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

While the Selected Remedy does not utilize alternative treatment technologies, it does satisfy the criteria for long-term effectiveness by reducing potential exposure to residual metals concentrations in soil by limiting access to and restricting use of the contaminated soil. The Selected Remedy does not present short-term risks. Implementation of environmental easements is a routine real estate process often used at sites in the State of New York. Once environmental

easements are recorded, DOE will evaluate the effectiveness of the Selected Remedy and current land use considerations during the CERCLA 5-year review process.

M.5 Preference for Treatment as a Principal Element

LUCs would not satisfy the preference for treatment as a principal element of the Selected Remedy. Although the volume and toxicity of the metals in soil will not be reduced by the Selected Remedy, it is expected that potential exposure will be decreased by limiting access and restricting use through environmental easements, thus making the selected alternative protective of human health and the environment.

M.6 Five-Year Review Requirements

Five-year reviews for the Main Site Soils will be conducted in compliance with CERCLA §121(c) and the NCP § 300.430(f)(4)(ii). These reviews will periodically assess the ongoing protectiveness of the Selected Remedy, current and future land use, and site ownership. The DOE Office of Legacy Management will conduct the five-year reviews, pursuant to the DOE and USACE FUSRAP Memorandum of Agreement (MOA) and Congressional direction.

III. RESPONSIVENESS SUMMARY

A. OVERVIEW

The USACE released the PP for the Main Site Soils OU - Colonie FUSRAP Site for public comment in July 2014. An initial public comment period was held from July 24, 2014 to August 23, 2014. The USACE hosted a public meeting on August 6, 2014, during which USACE presented the preferred alternative, and took questions and comments from the public. A transcript of the public meeting has been placed in the Administrative Record for the site. During the public meeting and subsequently, USACE received several requests to extend the public comment period. In response to those requests, the public comment period was extended by 30 days, to end on September 22, 2014.

The USACE's preferred alternative for the Main Site Soils OU as presented in the PP and at the public meeting was Alternative 2, LUCs. Under this alternative, no further cleanup would be undertaken for the Site; rather, protections known as institutional controls would be put into place to ensure that contact with contaminated soils would not occur. Since this alternative does not allow for unlimited use and unrestricted exposure (UU/UE), five-year reviews would be required to evaluate whether the remedy continues to be protective of human health and the environment.

Based on the comments received, the public preferred Alternative 3, Soil Excavation and Off-Site Disposal, over Alternative 2, LUCs. The NYSDEC concurred with USACE's selection of Alternative 2 as the preferred alternative.

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Public concern related to uranium releases from the NL plant arose even before the site was assigned to DOE under FUSRAP as citizen groups called for attention to the issue. During the history of public involvement at the site under FUSRAP, the DOE and then the USACE have utilized a variety of methods to engage and inform the public, including answering media inquiries and conducting media tours, issuing news releases and newsletters, and holding public meetings.

Below is a chronology of significant community involvement events:

- A public meeting in Albany on February 14, 1984 to discuss plans for the site.
- A public meeting in Colonie on July 2, 1984 to discuss remedial action plans with affected property owners and to answer questions from the public.
- Personal contacts with owners of residential and commercial properties remediated in 1984, 1985 and 1988.
- An October 1987 onsite meeting between DOE staff, representatives of the Superfund Monitoring Project and a former NL employee who pointed out areas of suspected buried contamination. Members of the media also attended.
- In April 1988, DOE published a Notice of Intent (a NEPA term for an Environmental

Impact Statement [EIS]) in the Federal Register to publicly announce that an EIS was being initiated; the EIS would culminate in a ROD on how the site should be remediated.

- A public meeting on April 25, 1988 to solicit public comments and concerns related to the site. At the time, the Colonie Site was part of a combined environmental review process that included three other FUSRAP sites. As a result of public comment, DOE agreed to manage the Colonie Site as a separate action. Due to this change, DOE determined that an Environmental Assessment (EA) rather than an EIS would be required for the site.
- DOE held several meetings in December 1988 with Colonie officials, district congressional staff, and concerned citizens. These meetings captured public concerns and communicated DOE progress on the site. Between 1984 and 1988 DOE remediated 53 vicinity properties. From 1992 to 1996 DOE demolished all remaining NL buildings.
- DOE prepared an EE/CA in 1995 to determine the best cleanup approach for site contaminants. The recommended alternative was 3-B. which included 1) excavation and off-site disposal of material containing uranium 238 above 100 picocuries per gram and thorium above 15 picocuries per gram; 2) onsite consolidation of material between 35 picocuries and 100 picocuries under an engineered 18-inch gravel and earthen cap. Public input on the EE/CA remedy selection process was obtained during a public comment period.
- USACE conducted 31 community interviews from November 15 – 20, 1999 with residents, local business owners, elected officials, media representatives, representatives of public agencies and representatives of environmental activist groups.
- An August 24, 2000 Open House was held to update the community.
- USACE prepared a public involvement plan in October 2000 to identify local community concerns and set forth a strategy for on-going, two-way communication between USACE and the community.
- Due to physical constraints of the site and negative public reaction regarding the proposal to store encapsulated radioactive waste onsite (e.g., alternative 3-B), USACE reevaluated the EE/CA alternatives and recommended alternative 2-B: Large scale excavation and off-site disposal with no on-site storage of contaminated material. A public meeting was held July 11, 2001 regarding this proposal.
- During the removal action (2000 – 2007), fact sheets were mailed semi-annually or as circumstances warranted to a community mailing list and made available in the Information Repository at the William K. Sanford Town Library and on the project website. In addition, periodic open houses were held to share information and gather community feedback.

C. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

Major issues and concerns associated with the Main Site – Soils OU PP expressed as written or oral comments during the public comment period are addressed below. Comments have been summarized and categorized by topic.

1. Long-Term Risk to Future Generations and Risk in Relation to Maintaining Deed Restrictions

Comment: A commenter at the public meeting raised concerns about the level of contamination to remain onsite and the level of effort and funding required to enforce LUCs in perpetuity because the residual metals contaminants will not degrade. A letter signed by 25 citizens expressed similar concerns and requested that Alternative 3 - Soil Excavation and Off-Site Disposal be selected rather than Alternative 2 – LUCs. The letter noted potential risk to future generations and the cost of maintaining deed restrictions.

Response: *The extent of residual soil contamination posing a potential risk to future residents is limited to the three areas with physical obstructions. During the site-wide removal action, excavation in these areas was performed as close to the obstruction as safely possible before being halted. This resulted in an estimated 796 cubic yards of soil above cleanup criteria immediately surrounding the obstructions. Clean fill has been placed up to the point where it was no longer safe to excavate. The cost of maintaining LUCs was included in the cost estimate for the Site.*

Areas identified for LUCs in the PP are conservatively estimated at 2,500 sq feet in the area identified as the North Lawn, 5,200 sq feet in the area identified as Unit 104 and 1,800 sq feet in the area identified as Unit 124, totaling approximately 9,500 square feet or less than one-quarter acre. This represents approximately 2% of the entire 11.2-acre Main Site. In addition, the only potential exposure concern is ingestion of contaminated soil. The shallowest contamination is 1.8 feet below ground surface, so any exposure would have to include the unlikely scenario of the soil being brought to the surface and either directly ingested (such as a child eating the soil) or through transfer (not washing hands before eating) and it assumes that there is no mixing with the clean fill soil that is already at the surface and uncontaminated.

In response to public and NYSDEC concerns regarding enforcement of LUCs, the USACE has revised Alternative 2 – LUCs to specify that an Environmental Easement (EE), rather than a deed restriction, will be the mechanism for implementing the institutional controls. EEs are granted by the title owner of the property to the NYSDEC, remain in place through property transactions, and are enforceable in perpetuity. In addition to being filed in the County Clerk's office, EEs are enforced by NYSDEC. When a local government receives a building or other permit application affecting land use or development of property subject to an EE, the local government must refer the application to NYSDEC. NYSDEC then evaluates the application for consistency with the EE in place, and notifies the local government of their determination. The affected local government may not issue the permit until it receives approval from NYSDEC. New York State currently has over 200 EEs in place. EEs have proven to be an effective means of encouraging redevelopment consistent with the property restriction in place.

2. Clarification Regarding Number of Locations with Contamination Exceeding Clean-up Goals

Comment: A comment made during the public meeting and again in the letter signed by 25 local citizens expressed a preference to address all ten areas with metals concentrations that exceed remediation goals rather than just the three areas that have calculated risk.

FUSRAP sites including Colonie are addressed by direction of statute, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA requires a Risk Assessment during the RI phase in order to characterize current and potential future threats to human health and the environment posed by site contamination. Based on the Risk Assessment for the Main Site Soils OU, only the three locations identified in the PP were found to present an unacceptable risk to reasonably anticipated potential future residents. Under CERCLA, only those areas presenting an unacceptable risk justify a response action. Stated another way, remediation is tied to reduction of risk; therefore if only three of the 10 areas pose a potential risk, only those three areas get carried forward to a response action.

Although only three areas as identified will be subject to LUCs, a Site Management Plan will be prepared as part of the EE. The Site Management Plan will identify all ten locations with residual contamination exceeding cleanup criteria, and include descriptions of the residual contamination and steps to take if redevelopment of the site would cause a potential exposure.

3. Contamination in the Vicinity of the Water Main along Central Avenue

Comment: Residual soil contamination in the area identified as the North Lawn is adjacent to a fire hydrant on the water main that runs along Central Avenue. Several commenters voiced concerns regarding the potential spread of contamination and impacts to the water supply should the water main along Central Avenue rupture.

Response: *There would be no impact to the public water supply should the water main along Central Avenue break. Water needs in the vicinity of the Colonie FUSRAP site are served by the Latham Water District. Latham's raw water sources are the Mohawk River and five wells located on Onderdonk Avenue. The raw water sources are pumped to the Mohawk View Water Treatment Plant for chemical and physical treatment before being pumped into the distribution system. Even if a break were to occur at the point where the metals contamination along Central Avenue is located, there is no pathway for water that comes in contact with the contaminated soil to make its way into the water supply.*

Regarding the potential spread of contamination, the metals contamination in the vicinity of the fire hydrant is found at a depth of approximately 4ft below ground surface. If the break occurred at that specific location, it is conceivable that some of the lead and copper which has attached itself to the soil particles would be brought to the surface by water flowing from the break. Much of this sediment-laden water would flow into storm drains; however some percentage of the contaminated soil would be carried by the water topographically down-gradient. USACE believes that this scenario does not pose exposure risks because the total volume of contaminated

soil is small (estimated to be approximately 278 yards), and the water would act to disperse the contaminated soils, in effect diluting them. Because the only potential risk from the lead and copper is ingestion, and the contaminated soil would be effectively diluted by the flowing water, it is extremely unlikely that there would be any risk in the event of a water main break.

4. Comparative Analysis of Alternatives

Comment: One commenter stated that the comparative analysis of alternatives (Table 4 of the Proposed Plan) was skewed and inaccurate. Specifically the commenter felt Alternative 3 was rated unfairly low for several criteria.

Response: Some aspects of a CERCLA Comparative Analysis are not intuitive and therefore may seem subjective. One such example is the Reduction of Toxicity, Mobility and Volume through Treatment screening criterion. CERCLA has a statutory preference for a permanent reduction of contamination through treatment, so if the alternative being evaluated only moves contaminated material from one place (e.g.. a site) to another place (e.g.,. a disposal facility), that alternative can only be rated as not favorable. This is the case for Alternative 3 because it only moves the residual metals contamination from the Colonie site to a disposal facility. There is no actual reduction of toxicity, mobility or volume.

Alternative 3 was rated moderately favorable for Short-Term Effectiveness because the contaminated soils are located adjacent to utilities. Excavation of these materials would require extensive coordination with local authorities and utility companies that would involve long-lead times. Additionally, Alternative 3 includes soil excavation that for brief periods may expose workers to soil contaminants; this also contributed to the moderately favorable rating.

Alternative 3 was rated moderately favorable for Implementability, specifically the Technical Feasibility facet of Implementability, because of the difficulty in removing material adjacent to utilities. The difficulty in accessing these contaminated soils is the reason they were not addressed during the site-wide removal action, and it is the primary reason Alternative 3 received a moderately favorable rating for Technical Feasibility in the PP.

5. Remediation Costs

Comment: One commenter requested individual cost estimates for excavation and off-site disposal for each of the three areas of concern if they were to be addressed separately.

Response: *Individual costs were not generated. There would be no benefit to soil removal in only one or two areas because LUC requirements would still be applicable for the remaining area(s).*

6. Future Land Use Determination

Comment: Several commenters expressed a desire to see the property used for commercial development or as a highway on/off ramp rather than for residential use in the future.

Response: The USACE would not be directly involved in site re-use because the Department of Energy (DOE) is the owner of record for this property. DOE would work with the General Services Administration (GSA) to determine the appropriate method to excess the property, based upon the established GSA real property screening process.

7. Recouping Remediation Costs

Comment: A comment generated at the public meeting and raised again in the letter signed by 25 local citizens suggested the U.S. Department of Justice sue NL Industries for cost recovery.

Response: Alternative 2 was recommended after consideration of the relative merits of the alternatives to address the nature and extent of contamination present at the site, without regard to funding sources. Therefore, any future cost recovery does not factor into the evaluation or recommendation of an alternative.

Additionally, several questions from the community were either incompletely or inadequately addressed at the Public Meeting. They are reproduced below along with USACE responses.

1. Can we get an easier to read chart that lists the levels of contamination for the COPCs?

Response: *Yes, Table 3 of the Proposed Plan was emailed to the requester on August 7, 2014*

2. Why is overall protection for the removal alternative only rated as "good"?

Response: *A table was presented in the presentation titled "Comparative Analysis of Alternatives". In that table the overall protection of all three alternatives (other than "No Action") were rated as "adequate". However, The Comparative Analysis of Alternatives table shown during the presentation was in error. Overall Protection of Human Health and Environment was rated as "Favorable" in the Proposed Plan for the removal alternative (Alternative 3 – Soil Excavation and Off-Site Disposal).*

3. Does the cost estimate for the LUCs alternative count the cost of Five-year reviews and maintenance over the next hundreds of years?

Response: *In accordance with CERCLA guidance, the costs for Five-year reviews are included for a 30-year period.*

4. Why wasn't treatment rated for all the alternatives?

Response: Treatment was only applicable to 1 of the 4 remedies considered.
Treatment was not a component of Alternatives 2 and 3. Since there is a statutory preference for permanent reduction through treatment, and only Alternative 4 includes a treatment component, Alternative 4 received a moderately favorable for Reduction of Toxicity, Mobility and Volume through Treatment while Alternatives 2 and 3 received not favorable ratings.

5. Are you going to seek cost recovery from National Lead?

Response: *The agency that can bring cost recovery actions is the Department of Justice. Typically, on FUSRAP sites where the government does not own the property, we submit a referral to the Department of Justice recommending cost recovery. Due to actions of other agencies prior to USACE taking responsibility for this site, no referral is appropriate in this matter.*

6. How did you get the contamination levels for the three hot spots? Averaging over the whole site or across each hot spot? How was your average created?

Response: *The levels are based on field delineation and post-remedial action sampling data. Concentrations were averaged within each 200 square meter FSS unit. However, site wide average concentration numbers are available in the RI report. Averages reported in the RI were determined for each FSS unit.*

7. Is it correct that you made the hot spots significantly higher than your average?

Response: *Yes and that was based on analytical results provided from our state certified laboratory.*

8. Do you have any averages on the hot spots?

Response: *Yes and this information can be found in the RI Report which was approved by the NYSDEC.*

9. If you were to adopt the removal alternative, would you truck the contamination through my neighborhood?

Response: *The contaminated soil would be loaded into roll off containers or intermodal containers and trucked to a trans load facility in Selkirk, NY.*

10. How would you get the dirt out of these inaccessible areas?

Response: *Shoring of the subsurface soils, redirection of utilities, excavation of the soils and then off-site disposal.*

11. Why can't we take advantage of the Corps replacing these old water mains with Federal money rather than when they burst later?

Response: *FUSRAP funds can only be utilized to address contamination. Even if Alternative 3 – Soil Excavation and Off-Site Disposal was the selected remedy, it would not include replacement of the water main.*

12. How old is the water main?

Response: The water mains along Central Avenue near the town/city line were installed in 1935.

13. If not replaced now, how would you deal with the water main if it were to burst later?

Response: *When Land Use Controls with an Environmental Easement (EE) is the selected remedy in New York, the NYSDEC requires that a Site Management Plan (SMP) be prepared. The SMP will include the methods necessary to ensure worker safety during any work on the main in the vicinity of remaining contamination. It will also include instructions for handling and disposal of contaminated soil. The SMP is maintained by the NYSDEC and recorded with the County Clerk.*

14. Can I get the NYDEC no further action letter for my property at 24 Yardboro Avenue?

Response: *The Statement of Certification prepared by the Department of Energy for the property at 24 Yardboro Avenue was emailed to the owner on August 6, 2014.*

15. Is 78 Yardboro one of the houses that you are going to be doing additional sampling at?

Response: *Yes. Indoor dust was sampled in non-living areas of 78 Yardboro Avenue in 2011; USACE would like to sample living areas of the residence during the Indoor Dust Remedial Investigation.*

In addition, two misstatements were made at the Public Meeting. The following clarifies those misstatements:

1. Here you say that Overall Protectiveness and Compliance with ARARs were rated as "adequate". Since these two criteria are threshold criteria they are not rated other than to note if the alternative meets these criteria or not.

Response: *The Comparative Analysis of Alternatives table shown during the presentation was in error. The table has been corrected to show the Threshold criteria of Overall Protection of Human Health and Environment and Compliance with ARARs as either meeting or not meeting the criteria. Alternatives 2, 3 and 4 all met both Threshold criteria (see Table 6).*

2. In response to the third comment I list above, you say "My recollection of it off the top of my head was 30 years and then it gets reevaluated at that point." As you know, we do get to use a 30 year estimate period along with recognition that the maintenance and 5 year reviews will go on for a much longer time, however there is no reevaluation at the 30 year point.

Response: *In response to the question from the audience if estimated costs for land use controls are projected out 30 years, in accordance with CERCLA guidance.*

IV. REFERENCES

DOE, 1995. Engineering Evaluation/Cost Analysis for the Colonie Site, U.S. Department of Energy, September 1995.

DOE, 1997. *Colonie Site Action Memorandum for Removal Action,* U.S. Department of Energy, February, 1997

NRC, 2000. Multi-Agency Radiation Survey and Site Investigation Manual , Revision 1. NUREG-1575, EPA 402 R-97-016, DOE/EH-0624. U.S. Nuclear Regulatory Commission, Department of Defense, Department of Energy, and Environmental Protection Agency. U. S. Government Printing Office. Washington, D.C. August 2000.

Shaw 2005 *Sampling and Analysis Plan, (Revision 5),* issued by Shaw Environmental, Inc. (April, 2005)

Shaw, 2010. *Final Post- Remedial Action Report, Colonie FUSRAP Site.* Shaw Environmental, Inc. for the U.S. Army Corps of Engineers – New York District. January, 2010.

USACE, 2001a. *Final Action Memorandum – Revising DOE Action Memorandum dated February 14, 1997: Soil Removal at the Colonie Site.* U.S. Army Corps of Engineers – New York District. October 2001.

USACE, 2001b. *Final Technical Memorandum in support of a Revised Action Memorandum– Colonie Site, Colonie, NY.* U.S. Army Corps of Engineers – New York District. January 2001.

USACE, 2008. *Final Town of Colonie Vicinity Property Report, Colonie FUSRAP Site.* U.S. Army Corps of Engineers – New York District. September 2008.

USACE, 2010. *Colonie FUSRAP Site Record of Decision, Colonie Site Groundwater.* U.S. Army Corps of Engineers – New York District. April 2010.

USACE, 2013. *Colonie FUSRAP Site Main Site Soils Remedial Investigation Summary Report.* U.S. Army Corps of Engineers – New York District. September, 2013

USACE, 2014. *Colonie FUSRAP Site Record of Decision, Colonie Vicinity Property Soils U.S. Army Corps of Engineers – New York District. February 2013.*

USC, 1980. 42 USC §9601, et. seq, *Comprehensive Environmental Response, Compensation, and Liability Act* 1980.

USEPA. 1988. CERCLA Compliance with Other Laws.

USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002. December.

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U.S. Census Bureau, 2010. U.S. Census Bureau, Population Estimates Program, Washington, DC, Internet Release Date: March 9, 2010.

TABLE 1: SELECTED CLEANUP CRITERIA FOR COLONIE MAIN SITE SOILS

Contaminant	Selected Cleanup Criteria [1]
Uranium-238	35 (pCi/g)[2]
Thorium-232	2.8 (pCi/g)[2]
Lead, total	450 (mg/kg)
Copper, total	1,912 (mg/kg)
Arsenic, total	7.4 (mg/kg)

Notes:
pCi/g = picocuries per gram
mg/kg = milligram per kilogram
[1] The cleanup goals are based on urban residential use
[2]Cleanup goals represent values in excess of background (Action Memorandum, USACE 2001)
Table reference: Action Memorandum, USACE 2001

TABLE 2: REMOVAL ACTION GOALS FOR COLONIE MAIN SITE SOILS

Removal Action Goals
Excavation and off-site disposal of site material(s) with ^{238}U levels greater than or equal to 35 pCi/g, regardless of the depth at which these materials are encountered.
Excavation and off-site disposal of site material(s) with Th-232 levels greater than or equal to 2.8 pCi/g, regardless of the depth at which these materials are encountered.
Excavation and off-site disposal of site material(s) with total lead levels greater than or equal to 450 mg/kg encountered at depths of nine (9) feet or less below original grade
Excavation and off-site disposal of site material(s) with total copper levels greater than or equal to 1,912 mg/kg encountered at depths of nine (9) feet or less below original grade
Excavation and off-site disposal of site material(s) with total arsenic levels greater than or equal to 7.4 mg/kg encountered at depths of nine (9) feet or less below original grade
Excavation of a minimum of six (6) inches of material from the entire site, fence line to fence line, prior to the execution of Final Status Surveys over the entire site
Placement of a minimum of six (6) inches and average of two (2) feet of clean backfill soil over the site.

Notes:
^{238}U = uranium-238
^{232}Th = thorium-232
pCi/g = picocuries per gram
mg/kg = milligrams per kilogram
Table reference: Action Memorandum, USACE 2001a

TABLE 3: LAND USE CONTROL DATA POINTS FOR THE MAIN SITE SOILS

Unit	Sample	Depth (ft bgs)	Arsenic	Lead
104	CFS-104-002	1.82	**85.4**	232
124	CFS-124-011R	5.30	3.1	**734**
North Lawn	CFS-NLF-012R	3.90	7.3	**3,370**
AM Criteria (mg/kg)			7.4	450

Notes:

Refer to Figure 3 for location of land use control data appoints
AM = 2001 Action Memorandum (USACE, 2001a)
ft bgs = feet below ground surface
mg/kg = milligram per kilogram
BOLD = concentrations exceeding AM criteria (see Table 1)
Per removal action goals (Table 2), AM criteria applicable to 0-9 ft bgs depth.
Table reference: Final Post Remedial Action Report (Shaw, 2010).

TABLE 4: EXPOSURE PATHWAYS

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure
Future	Soil	Soil	Subsurface Soil	Hypothetical Resident	Adult	Dermal Ingestion Inhalation	Quant Quant Quant	Future residents may come into contact with soils that have been brought to the surface. Future residents may ingest soil that has been brought to the surface.
					Child	Dermal Ingestion Inhalation	Quant Quant Quant	Future residents may come into contact with soils that have been brought to the surface. Future residents may ingest soil that has been brought to the surface.
				Adult Worker	Adult	Dermal Ingestion Inhalation	Quant Quant Quant	Future workers may come into contact with soils that have been brought to the surface. Example: Installation of footings. Future workers may incidentally ingest subsurface soils that have been brought to the surface. Future workers may inhale soil dust from subsurface soils that have been brought to the surface.

TABLE 5: SUMMARY OF CANCER RISKS, HAZARD INDICES AND LEAD RISK PER EXPOSURE UNIT

Survey Unit Exposure		Site Health Effects		
		Cancer Risk	Hazard Index	Lead Model Risk
EXPOSURE UNIT 104				
Future Resident	Subsurface Soils	1.E-04	1.4	No
Future Worker		1.E-05	0.1	No
EXPOSURE UNIT 109				
Future Resident	Subsurface Soils	2.E-05	0.3	No
Future Worker		1.E-06	0.0	No
EXPOSURE UNIT 124				
Future Resident	Subsurface Soils	1.E-05	0.3	Yes
Future Worker		4.E-07	0.02	No
EXPOSURE UNIT North Lawn				
Future Resident	Subsurface Soils	1.E-05	0.6	Yes
Future Worker		1.E-06	0.03	No

TABLE 6: COMPARATIVE ANALYSIS OF ALTERNATIVES

	Screening Criterion	Alternative 2: Land Use Controls (LUCs)	Alternative 3: Soil Excavation and Off-Site Disposal	Alternative 4: Soil Excavation, Solidification and On-Site Disposal and LUCs
Threshold	Overall Protection of Human Health and Environment	●	●	●
	Compliance with ARARs	●	●	●
Balancing	Long-Term Effectiveness	◑	●	●
	Reduction of Toxicity, Mobility and Volume Through Treatment[1]	○	○	◑
	Short-Term Effectiveness	●	◑	◑
	Implementability	●	◑	◑
	Technical Feasibility	●	◑	◑
	Administrative Feasibility	●	●	●
	Availability of Materials and Services	●	●	●
	Cost[2]	**$0.585 million**	**$1.546 million**	**$1.465 million**
Modifying[3]	Regulator Acceptance	●	○	○
	Community Acceptance	○	○	●
	Recommended	●		

● Favorable ('YES' for threshold criteria)

◑ Moderately Favorable

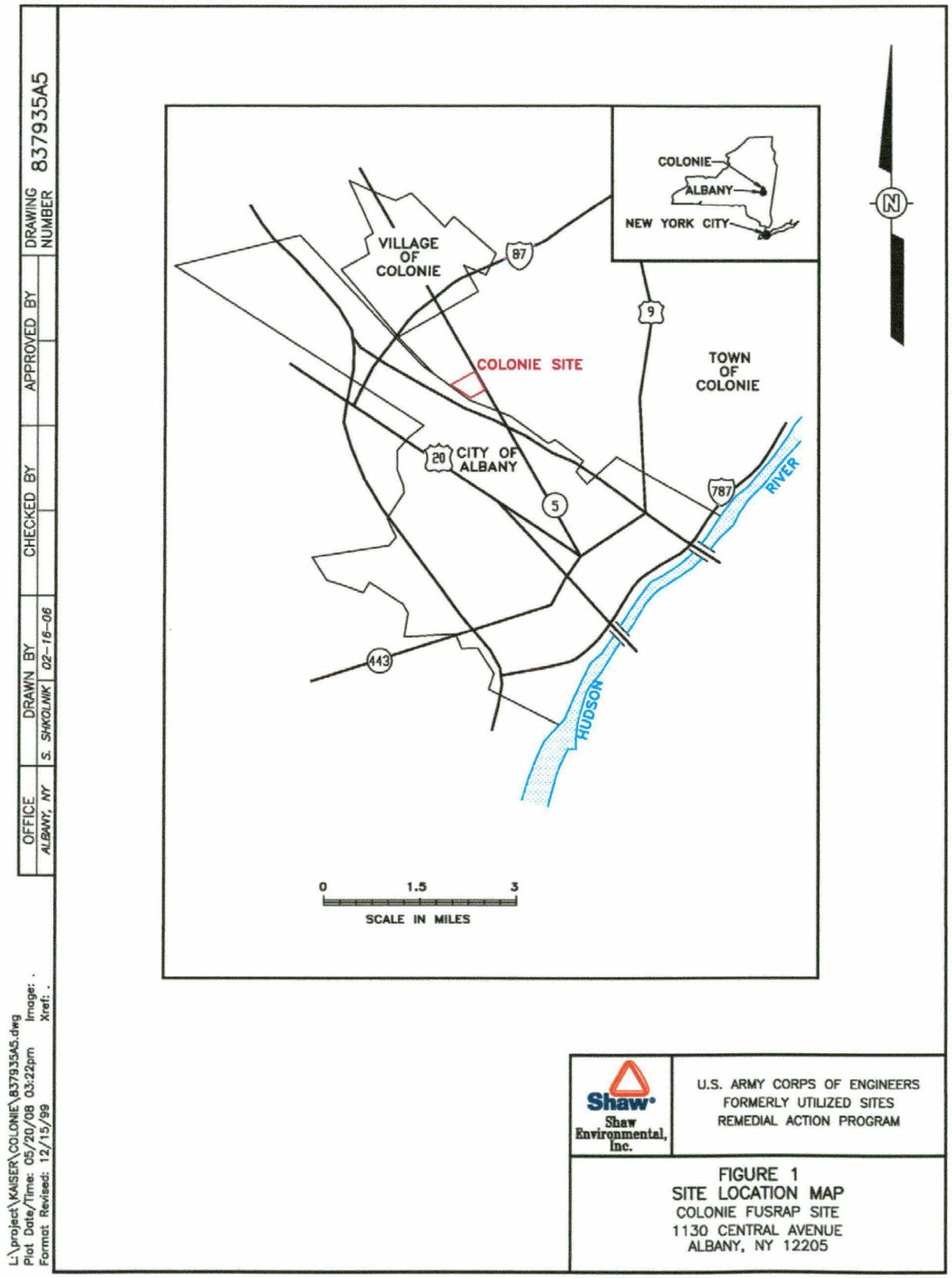
○ Not Favorable ('NO' for threshold criteria)

1 – While excavation and landfill disposal reduce toxicity, mobility, and volume at the property, the statutory preference is permanent reduction through treatment; therefore, this criterion is not assessed as 'Favorable'.

2 – Costs are detailed in Appendix B.

3 – The Modifying criteria of regulator and community acceptance are 'To Be Determined' following review and input from these parties.

FIGURES


COLONIE
ALBANY
NEW YORK CITY
VILLAGE OF COLONIE
87
9
COLONIE SITE
TOWN OF COLONIE
20
CITY OF ALBANY
5
787
RIVER
443
HUDSON
0 1.5 3
SCALE IN MILES
N
OFFICE ALBANY, NY
DRAWN BY S. SHKOLNIK 02-16-06
CHECKED BY
APPROVED BY
DRAWING NUMBER 837935A5
L:\project\KAISER\COLONIE\837935A5.dwg
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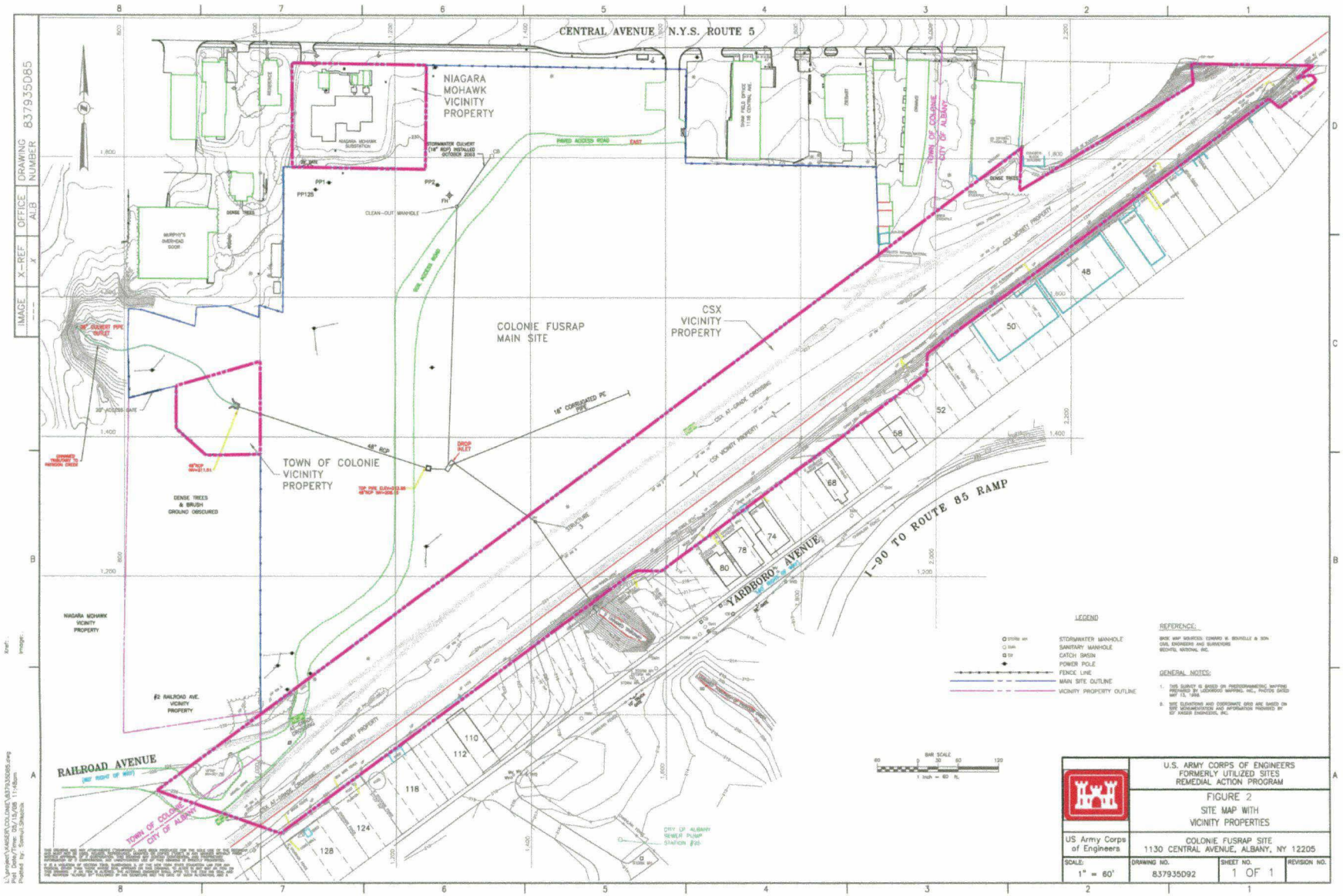
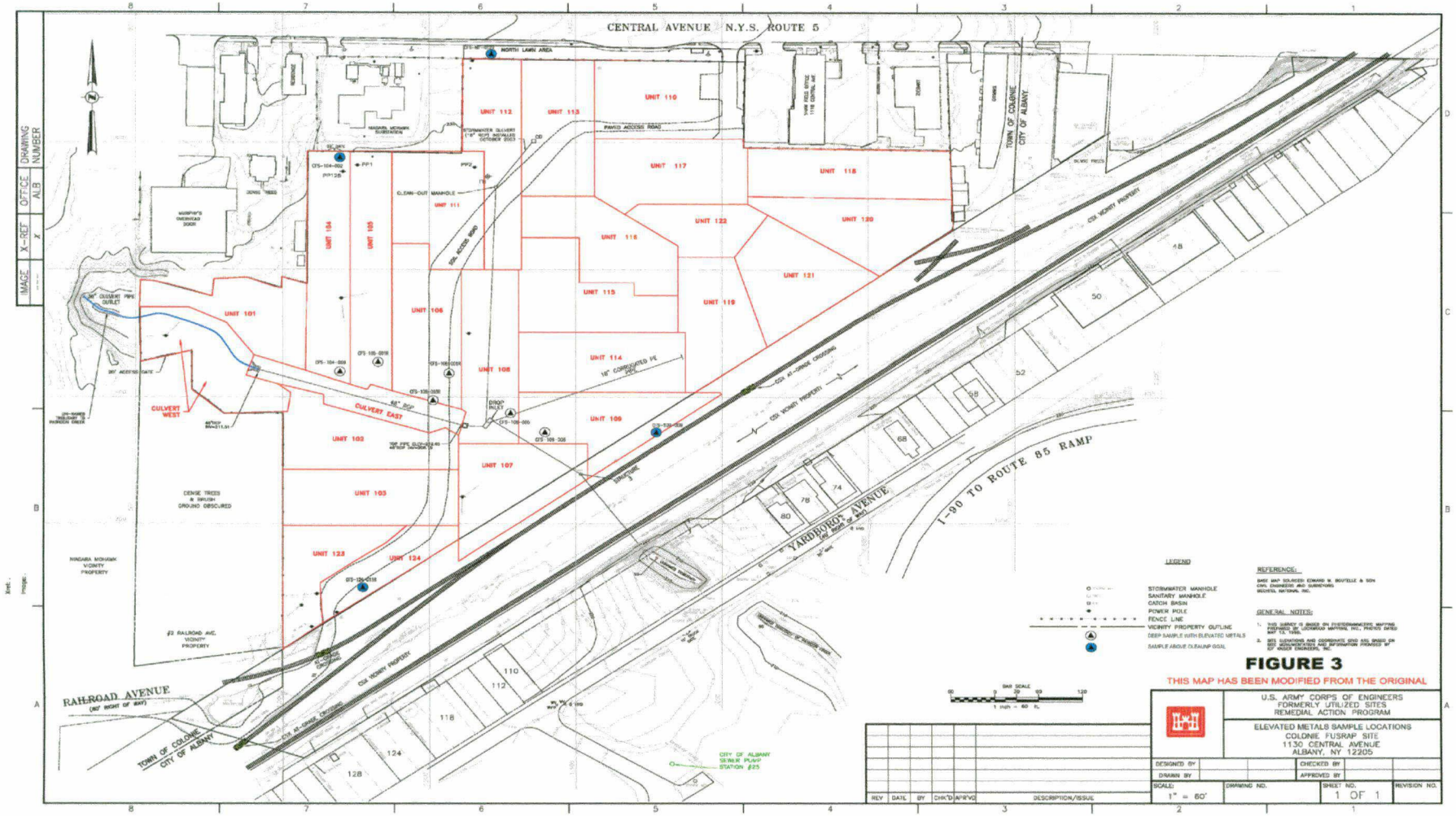
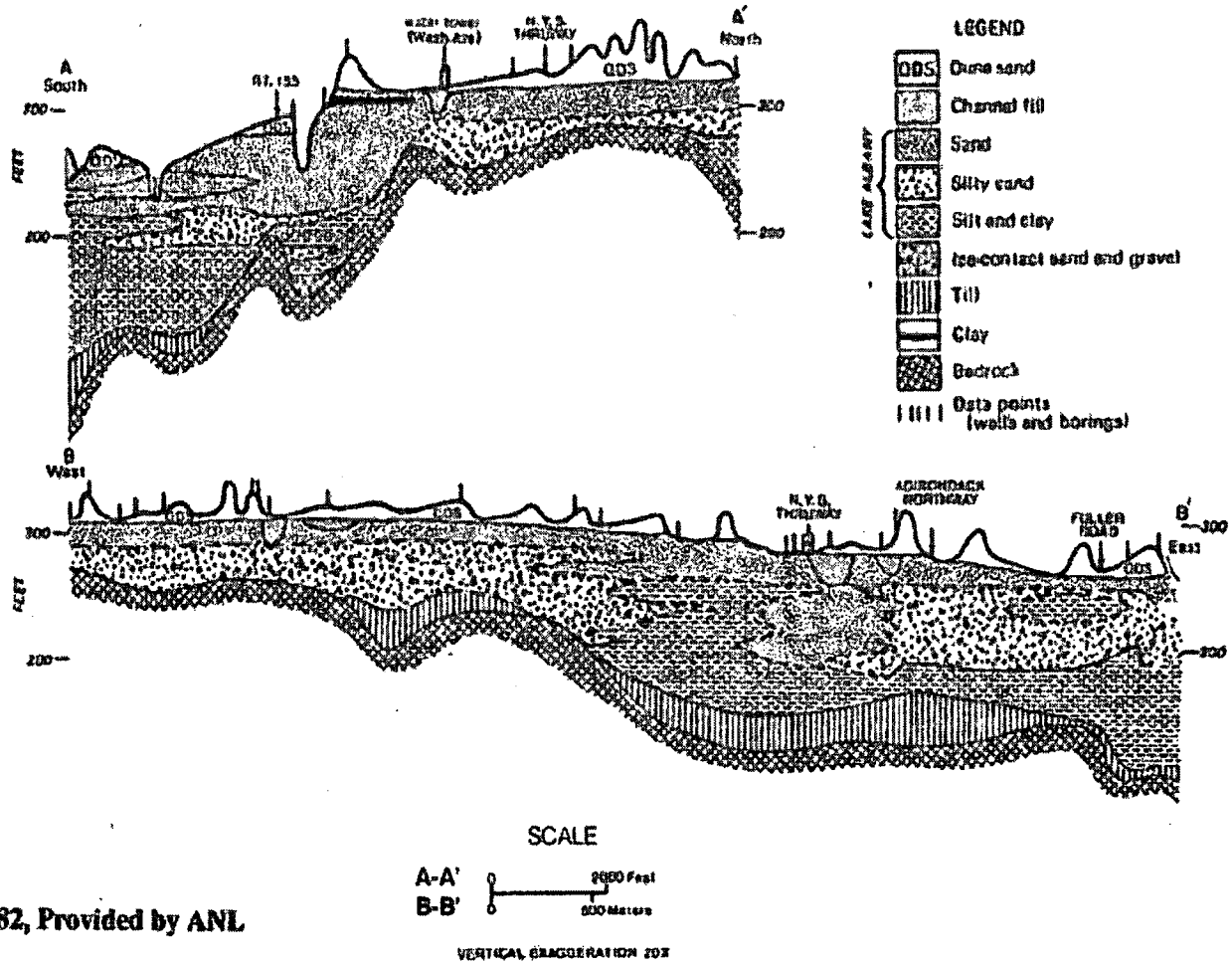
Format Revised: 12/15/99 Xref: .
Shaw
Shaw Environmental, Inc.
U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
FIGURE 1
SITE LOCATION MAP
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205


CENTRAL AVENUE - N.Y.S. ROUTE 5
NIAGARA MOHAWK VICINITY PROPERTY
COLONIE FUSRAP MAIN SITE
CSX VICINITY PROPERTY
TOWN OF COLONIE VICINITY PROPERTY
I-90 TO ROUTE 85 RAMP
YARDBORO AVENUE
RAILROAD AVENUE
NIAGARA MOHAWK VICINITY PROPERTY
82 RAILROAD AVE. VICINITY PROPERTY
DENSE TREES & BRUSH GROUND OBSCURED
TOWN OF COLONIE
CITY OF ALBANY
LEGEND
STORMWATER MANHOLE
SANITARY MANHOLE
CATCH BASIN
POWER POLE
FENCE LINE
MAIN SITE OUTLINE
VICINITY PROPERTY OUTLINE
REFERENCE:
GENERAL NOTES:
BAR SCALE
1 inch = 60 ft.
U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM
FIGURE 2
SITE MAP WITH VICINITY PROPERTIES
US Army Corps of Engineers
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE, ALBANY, NY 12205
SCALE: 1" = 60'
DRAWING NO. 837935092
SHEET NO. 1 OF 1
REVISION NO.
IMAGE
X-REF
OFFICE ALB
DRAWING NUMBER 837935085


CENTRAL AVENUE N.Y.S. ROUTE 5
RAILROAD AVENUE
(80' RIGHT OF WAY)
YARDBOROUGH AVENUE
I-90 TO ROUTE 85 RAMP
TOWN OF COLONIE
CITY OF ALBANY
UNIT 101
UNIT 102
UNIT 103
UNIT 104
UNIT 105
UNIT 106
UNIT 107
UNIT 108
UNIT 109
UNIT 110
UNIT 111
UNIT 112
UNIT 113
UNIT 114
UNIT 115
UNIT 116
UNIT 117
UNIT 118
UNIT 119
UNIT 120
UNIT 121
UNIT 122
UNIT 123
UNIT 124
CULVERT WEST
CULVERT EAST
NORTH LAWN AREA
CSX MONIT PROPERTY
CSX AT-GRADE CROSSING
CITY OF ALBANY SEWER PUMP STATION #25
#2 RAILROAD AVE. VICINITY PROPERTY
NIAGARA MOHAWK VICINITY PROPERTY
DENSE TREES & BRUSH GROUND OBSCURED
LEGEND
STORMWATER MANHOLE
SANITARY MANHOLE
CATCH BASIN
POWER POLE
FENCE LINE
VICINITY PROPERTY OUTLINE
DEEP SAMPLE WITH ELEVATED METALS
SAMPLE ABOVE CLEANUP GOAL
REFERENCE:
GENERAL NOTES:
FIGURE 3
THIS MAP HAS BEEN MODIFIED FROM THE ORIGINAL
U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
ELEVATED METALS SAMPLE LOCATIONS
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205
DESIGNED BY
DRAWN BY
CHECKED BY
APPROVED BY
SCALE: 1" = 60'
DRAWING NO.
SHEET NO. 1 OF 1
REVISION NO.
REV | DATE | BY | CHK'D | APRVD | DESCRIPTION/ISSUE



Source: Dineen, 1982, Provided by ANL

FIGURE 4: GEOLOGICAL CROSS-SECTION

APPENDIX

CONFIRMATORY SAMPLE METALS RESULTS

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-101-001	7/9/2002	6.8	630	623	CFS-101-Duplicate Surveyed depth 2.58 ft. below original grade.
CFS-101-002	7/9/2002	5.1	281	268	Surveyed depth 4.78 ft. below original grade.
CFS-101-003	7/9/2002	4.4	19	16.6	NYSDEC and USACE Split. Surveyed depth 6.0 ft. below original grade.
CFS-101-004	7/9/2002	1.5	4.2	3.1	Surveyed depth 7.36 ft. below original grade.
CFS-101-005	7/9/2002	4.2	272	226	USACE Split Sample. Surveyed depth 0.6 ft. below original grade.
CFS-101-006	7/9/2002	1.9	11.5	12.9	USACE Split Sample. Surveyed depth 4.2 ft. below original grade.
CFS-101-007	7/9/2002	8.7	231	221	Surveyed depth 5.35 ft. below original grade.
CFS-101-008	7/9/2002	4	32.6	24.7	NYSDEC and USACE Split. Surveyed depth 15.88 ft. below original grade.
CFS-101-009	7/9/2002	8.2	303	271	Surveyed depth 10.90 ft. below original grade.
CFS-101-010	7/9/2002	5.7	603	405	USACE Split Sample. Surveyed depth 15.30 ft. below original grade.
CFS-102-001	7/9/2002	4	26.8	14	NYDEC Split sample. Surveyed depth 13.7 ft. below original grade.
CFS-102-002	7/9/2002	2.5	691	208	Surveyed depth 7.25 ft. below original grade.
CFS-102-003	7/9/2002	4.5	1010	544	Surveyed depth 5.5 ft. below original grade.
CFS-102-004	7/9/2002	3.3	77.7	51.4	Surveyed depth 10.1 ft. below original grade.
CFS-102-005	7/9/2002	11.7	649	490	NYSDEC and USACE Split. Surveyed depth 4.05 ft. below original grade.
CFS-102-006	7/9/2002	2.4	126	61.3	Surveyed depth 8.62 ft. below original grade.
CFS-102-007	7/9/2002	2.9	39.6	27.1	Surveyed depth 6.87 ft. below original grade.
CFS-102-008	7/9/2002	4.9	56.7	30.5	Surveyed depth 6.94 ft. below original grade.

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-102-009	7/9/2002	3.2	150	106	CFS-102-Duplicate. Surveyed depth 12.62 ft. below original grade.
CFS-102-010	7/9/2002	5.3	52.7	28.2	Surveyed depth 8.2 ft. below original grade.
CFS-103-001	8/20/2002	4.4	77.7	42.8	Surveyed depth 9.65 ft. below original grade.
CFS-103-002	8/20/2002	6.9	19.5	6.3	Surveyed depth 9.88 ft. below original grade.
CFS-103-003	8/20/2002	4.3	68.4	30.2	Surveyed depth 7.96 ft. below original grade.
CFS-103-004	8/20/2002	6	52.5	31.1	Surveyed depth 7.86 ft. below original grade.
CFS-103-005	8/20/2002	2.2	6.2	3	Surveyed depth 3.09 ft. below original grade.
CFS-103-006	8/20/2002	3.8	396	238	NYSDEC split sample. Blind Duplicate (CFS-103-Duplicate. Surveyed depth 10.6 ft. below original grade.
CFS-103-007	8/20/2002	4.1	186	89.9	Surveyed depth 11.35 ft. below original grade.
CFS-103-008	8/20/2002	4.4	16.3	5.2	USACE split sample
CFS-103-009R	8/28/2002	2.6	207	74.7	Resample from CFS-103-009 after excavation. Surveyed depth 6.8 ft. below original grade.
CFS-103-010	8/20/2002	5.5	34.9	16.4	Surveyed depth 4.25 ft. below original grade.
CFS-104-001	9/4/2002	2.5	27.7	48.3	NYSDEC QA split sample. Surveyed depth 2.55 ft. below original grade.
CFS-104-002	9/4/2002	85.4	234	232	Surveyed depth 1.82 ft. below original grade.
CFS-104-003	9/4/2002	2.1	32.3	16.2	Surveyed depth 2.3 ft. below original grade.
CFS-104-004	9/4/2002	2.3	57.1	46.5	Surveyed depth 2.1 ft. below original grade.
CFS-104-005	9/4/2002	1.7	41.7	22.6	Surveyed depth 2.4 ft. below original grade.
CFS-104-006	9/4/2002	2.3	48.6	79	Surveyed depth 2.59 ft. below original grade.

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-104-007	9/4/2002	2.2	199	148	NYSDEC QA split sample. Surveyed depth 7.95 ft. below original grade.
CFS-104-008	9/4/2002	2.6	248	180	USACE QA split sample Surveyed depth 12.67 ft. below original grade.
CFS-104-009	9/4/2002	243	6490	5270	Surveyed depth 13.3 ft. below original grade.
CFS-105-001R	9/13/2002	6.1	2060	1780	Surveyed depth 13.35 ft. below original grade after re-excavation per USACE direction.
CFS-105-002	9/10/2002	2.1	157	121	Surveyed depth 10.52 ft. below original grade.
CFS-105-003	9/10/2002	2.7	167	105	CFS-105-Duplicate. Surveyed depth 5.4 ft. below original grade.
CFS-105-004	9/10/2002	2.3	137	79.7	USACE QA Split Sample. Surveyed depth 3.2 ft. below original grade.
CFS-105-005	9/10/2002	2.2	103	38.9	Surveyed depth 2.65 ft. below original grade.
CFS-105-006	9/10/2002	2.4	13.5	6.2	Surveyed depth 2.72 ft. below original grade.
CFS-105-007	9/10/2002	2.6	43.6	27	NYSDEC QA split sample. Surveyed depth 2.58 ft. below original grade.
CFS-105-008	9/10/2002	7.3	631	420	Surveyed depth 2.6 ft. below original grade.
CFS-105-009	9/10/2002	2.4	20.5	11.1	Surveyed depth 2.4 ft. below original grade.
CFS-106-001 R	9/26/2002	3.3	1340	1430	NYSDEC QA Split. Depth below orig. grade = 12.5'
CFS-106-002 R	9/26/2002	6.4	132	94.9	NYSDEC Split. Depth below orig. grade = 14.0'
CFS-106-003 R	9/26/2002	3.8	5840	5440	USACE and NYSDEC Split. Depth below orig. grade = 14.0'
CFS-106-004 R	9/26/2002	5.6	54.7	41.1	Depth below orig. grade = 12.1'
CFS-106-005 R	9/26/2002	1.6	12.9	19.6	Depth below orig. grade = 12.2'
CFS-106-006 R	9/26/2002	2.7	66.2	59.3	Depth below orig. grade = 8.2'

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-106-007 R	9/26/2002	2.5	14	5.5	Depth below orig. grade = 9.1'
CFS-106-008	9/20/2002	2.3	63.7	61.3	Depth below orig. grade = 4.1'
CFS-106-009	9/20/2002	1.4	100	81.5	Depth below orig. grade = 3.3'
CFS-106-010	9/20/2002	2.3	338	231	Depth below orig. grade = 4.3'
CFS-107-001	10/29/2002	5.7	122	115	Surveyed depth 13.3 ft. below original grade.
CFS-107-002	10/29/2002	1.7	33.9	18.5	Surveyed depth 9.48 ft. below original grade.
CFS-107-003	10/29/2002	5.7	144	106	USACE Split Sample. Surveyed depth 8.19 ft. below original grade.
CFS-107-004	10/29/2002	5.2	47.7	23.5	Surveyed depth 7.91 ft. below original grade.
CFS-107-005R	11/11/2002	3.5	10.2	6.9	Resample of CFS-107-005.
CFS-107-006	10/29/2002	4.9	44	20.5	Surveyed depth 13.49 ft. below original grade.
CFS-107-007	10/29/2002	6.3	705	280	Surveyed depth 6.30 ft. below original grade.
CFS-107-008	10/29/2002	4.1	154	107	Surveyed depth 1.47 ft. below original grade.
CFS-107-009	10/29/2002	3	634	463	NYSDEC Split Sample. Surveyed depth 6.92 ft. below original grade.
CFS-107-010	10/29/2002	15.3	584	354	NYSDEC Split Sample. Surveyed depth 1.42 ft. below original grade.
CFS-108-001	11/14/2002	2	249	233	Surveyed depth below grade 8.8 ft.
CFS-108-002	11/14/2002	2.7	185	152	Surveyed depth below grade 14.3 ft.
CFS-108-003	11/14/2002	3.4	12.5	15	Surveyed depth below grade 11.0 ft.
CFS-108-004	11/14/2002	2.9	225	219	Surveyed depth below grade 11.3 ft.
CFS-108-005	11/14/2002	9.3	7910	8020	USACE QA Split Sample. NYSDEC QA Split Sample. Surveyed depth below grade 17.0 ft.

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-108-006	11/14/2002	2.8	219	174	Surveyed depth below grade 12.4 ft.
CFS-108-007	11/14/2002	1.6	13.7	6	CFS-108-Duplicate. Surveyed depth below grade 6.5 ft.
CFS-108-008	11/14/2002	1.8	236	191	NYSDEC QA Split Sample. Surveyed depth below grade 4.8 ft.
CFS-108-009	11/14/2002	2	34.4	25.6	Surveyed depth below grade 9.3 ft
CFS-108-010	11/14/2002	1.9	31.6	17.1	Surveyed depth below grade 3.6 ft.
CFS-109-001	8/13/2003	1.4	93.7	69.6	Elev.~220.6; Depth = 6.3'
CFS-109-002	8/13/2003	1.2	8.2	3.6	Elev.~220.4; Depth = 5.6'
CFS-109-003	8/13/2003	3.5	356	264	Elev.~217.5; Depth = 8.6' USACE Split
CFS-109-004	8/13/2003	3.4	319	254	Elev.~212.4; Depth = 16.3' NYSDEC Split
CFS-109-005	8/13/2003	2.4	34.3	20.7	Elev.~213.0; Depth = 14.8'
CFS-109-006	8/13/2003	7.3	23,400	23,000	Elev.~212.4'; Depth = 14.2'
CFS-109-007R	8/20/2003	4.1	43.8	40.7	Elev.~216.2'; Depth = 13.7'
CFS-109-008	8/13/2003	2.1	163	87.8	Elev.~218.3; Depth = 8.3'USACE Split
CFS-109-009	8/13/2003	10.5	895	630	Elev.~221.0'; Depth = 2.4' NYSDEC Split
CFS-109-010	8/13/2003	2.6	125	83.8	Elev.~215.3; Depth =8.2'
CFS-110-001	4/23/2003	1.1	5.9	16	Sample depth = 4.7'
CFS-110-002	4/23/2003	0.8	353	287	USACE and NYSDEC Split Sample depth = 5.0'
CFS-110-003	4/23/2003	1.6	23.8	38.5	Sample depth = 4.6'
CFS-110-004	4/23/2003	2.1	583	511	Ave. of CFS-110-004,-007 and -003 is 218 mg/kg; Sample depth = 4.2'

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-110-005	4/23/2003	0.71	3.8	14.7	Sample depth = 5.7'
CFS-110-006	4/23/2003	1.2	242	239	Sample depth = 3.9'
CFS-110-007	4/23/2003	2	90.8	104	USACE Split, Sample depth = 4.5'
CFS-110-008	4/23/2003	5.7	421	392	Duplicate data point (CFS-110-DUP); Sample depth = 1.4'
CFS-110-009	4/23/2003	2.6	32.2	49.6	NYSDEC Split, Sample depth = 1.3'
CFS-110-010	4/23/2003	5.5	90.3	138	Sample depth = 1.6'
CFS-110-011	4/23/2003	1.1	5.6	15.6	Sample depth = 4.3'
CFS-111-001	7/17/2003	2.4	9.7	5.3	
CFS-111-002	7/17/2003	3.3	80.8	62.9	
CFS-111-003	7/17/2003	4.7	496	369	
CFS-111-004	7/17/2003	2.2	9.1	7.1	USACE split
CFS-111-005	7/17/2003	1.4	4.9	7.4	
CFS-111-006	7/17/2003	2.5	6.7	2.7	
CFS-111-007	7/17/2003	2	6	4.5	NYSDEC split
CFS-111-008	7/17/2003	2	6	5.3	USACE split
CFS-111-009	7/17/2003	1.3	5.6	2.6	NYSDEC split
CFS-111-010	7/17/2003	1.8	10.4	3.3	
CFS-111-011	7/17/2003	1.7	42.4	34.9	
CFS-111-012	7/17/2003	1.4	9.3	4.1	

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-112-001	9/16/2003	0.41	9.7	4.6	
CFS-112-002	9/16/2003	1.3	13.6	10.6	
CFS-112-003	9/16/2003	1.2	227	177	USACE split
CFS-112-004	9/16/2003	1.3	20.7	15.4	
CFS-112-005	9/16/2003	1.7	2.8	3.3	NYSDEC split
CFS-112-006	9/16/2003	1.5	9.3	5.3	USACE split
CFS-112-007	9/16/2003	1.1	25.7	13.8	NYSDEC split
CFS-112-008	9/16/2003	1.5	37	18.4	
CFS-112-009	9/16/2003	1.4	361	241	
CFS-112-DUP	9/16/2003	0.89	28.2	27.9	Duplicate of CFS-112-007
CFS-113-001	10/23/2003	2	32.1	36.6	
CFS-113-002	10/23/2003	2.5	233	156	NYSDEC split
CFS-113-003	10/23/2003	2.6	161	216	
CFS-113-004	10/23/2003	3.2	65.5	67	USACE split
CFS-113-005	10/23/2003	1.7	1.3	4.5	
CFS-113-006	10/23/2003	5.2	85.1	76.4	
CFS-113-007	10/23/2003	4.4	12.3	16.1	USACE split
CFS-113-008	10/23/2003	3.1	108	181	
CFS-113-009	10/23/2003	2.3	16.2	12.3	

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-113-010	10/23/2003	1.3	5.8	9.9	NYSDEC split
CFS-114-001	6/15/2004	1.5	5.7	2.4	
CFS-114-002	6/15/2004	1.3	12.1	4.6	
CFS-114-003	6/15/2004	3.8	20.4	6.5	NYSDEC split
CFS-114-004	6/15/2004	3.4	44.8	29.9	
CFS-114-005	6/15/2004	1.2	5	2.3	
CFS-114-006	6/15/2004	1.2	6.2	2.1	
CFS-114-007	6/15/2004	1.6	16.5	13.5	USACE split
CFS-114-008	6/15/2004	1.6	4.4	3.1	
CFS-114-009	6/15/2004	1.4	5.5	4.1	NYSDEC split
CFS-115-001	8/4/2004	1.7	12	7.4	NYSDEC Split
CFS-115-002	8/4/2004	1.3	7.7	2.4	
CFS-115-003	8/4/2004	1.2	9.9	2.6	
CFS-115-004	8/4/2004	1.9	7.3	2.5	
CFS-115-005	8/4/2004	1.8	8.5	3.4	USACE Split
CFS-115-006	8/4/2004	1.6	9.5	2.8	
CFS-115-007	8/4/2004	1.3	11.4	5.7	
CFS-115-008	8/4/2004	1.6	6.4	2	Duplicate
CFS-115-009	8/4/2004	2.1	7.7	2.5	

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-115-010	8/4/2004	1.2	7.5	2.3	
CFS-115-011	8/4/2004	1.6	8.3	2.5	NYSDEC Split
CFS-115-012	8/4/2004	1.9	138	95.2	
CFS-116-001	11/9/2004	1.6	20.3	14.6	
CFS-116-002	11/9/2004	1.4	6.3	2.9	NYSDEC Split Sample
CFS-116-003	11/9/2004	1.2	21.8	9.8	USACE Split Sample
CFS-116-004	11/9/2004	1.8	5.9	2.6	
CFS-116-005	11/9/2004	2.5	6.7	2.4	
CFS-116-006	11/9/2004	1.4	5.8	2.2	
CFS-116-007	11/9/2004	1.7	11.7	6.1	NYSDEC Split Sample
CFS-116-008	11/9/2004	2.1	18	14.5	
CFS-116-009	11/9/2004	2.2	5.9	2.6	
CFS-117-001	11/21/2005	1.5	49.4	34.4	
CFS-117-002	11/21/2005	2.3	6.6	2.9	NYSDEC Split Sample
CFS-117-003	11/21/2005	1.7	196	240	
CFS-117-004	11/21/2005	1.3	152	142	
CFS-117-005	11/21/2005	0.8	2.8	3.5	
CFS-117-006	11/21/2005	0.9	8.2	7.5	USACE Split Sample
CFS-117-007	11/21/2005	0.9	4.3	4.9	NYSDEC Split Sample

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-117-008	11/21/2005	1.6	11.9	9.4	USACE Split Sample
CFS-117-009	11/21/2005	2.1	183	104	
CFS-118-001	3/21/2006	1.8	5.6	3.8	
CFS-118-002	3/21/2006	1.5	7.3	4.1	
CFS-118-003	3/21/2006	1.5	20.9	20.7	NYSDEC Split Sample
CFS-118-004	3/21/2006	1.7	6.6	5.3	USACE Split Sample
CFS-118-005	3/21/2006	1.6	6.3	2.5	NYSDEC Split Sample
CFS-118-006	3/21/2006	1.8	17.4	10.6	
CFS-118-007	3/21/2006	1.2	4.8	3.3	
CFS-118-008	3/21/2006	2	7.9	3.4	
CFS-118-009	3/21/2006	1.3	8.3	3.8	NYSDEC Split Sample
CFS-118-010	3/21/2006	1	15.5	11	
CFS-118-011	3/21/2006	1.4	5.5	2.6	
CFS-119-001	6/14/2006	2.1	9.1	4.8	NYSDEC Split Sample
CFS-119-002	6/14/2006	1.2	10.4	7.6	
CFS-119-003	6/14/2006	1.3	31.2	20	
CFS-119-004	6/14/2006	4.3	1040	615	
CFS-119-005	6/14/2006	3.4	18.2	7.7	
CFS-119-006	6/14/2006	1.8	24	10.9	

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-119-007	6/14/2006	3.9	13.5	6.5	
CFS-119-008	6/14/2006	0.62	11.3	2.8	USACE Split Sample
CFS-119-009	6/14/2006	0.62	61.4	56.3	NYSDEC Split Sample
CFS-120-001	7/7/2006	1.7	12.9	10.5	NYSDEC Split Sample
CFS-120-002	7/7/2006	1.4	27.4	15.8	USACE Split Sample
CFS-120-003	7/7/2006	2.7	33.1	28.4	
CFS-120-004	7/7/2006	1.4	7.4	3.9	
CFS-120-005	7/7/2006	1.6	14.7	5.1	NYSDEC Split Sample
CFS-120-006	7/7/2006	0.7	8	2.9	NYSDEC Split Sample
CFS-120-007	7/7/2006	1.6	34.5	27.2	
CFS-120-008	7/7/2006	2.3	14	8.2	
CFS-120-009	7/7/2006	1.2	8.6	6.8	
CFS-121-001	7/20/2006	2.4	21.4	13.2	
CFS-121-002	7/20/2006	0.68	12.9	8.3	NYSDEC Split Sample
CFS-121-003	7/20/2006	4.4	142	115	NYSDEC Split Sample
CFS-121-004	7/20/2006	1.6	19.1	11.6	
CFS-121-005	7/20/2006	2.7	13.6	3.6	NYSDEC Split Sample
CFS-121-006	7/20/2006	1	11.9	7.7	
CFS-121-007	7/20/2006	0.24	8.5	5.6	USACE Split Sample

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-121-008	7/20/2006	0.92	18.3	14	
CFS-121-009	7/20/2006	1.3	450	173	
CFS-121-010	7/20/2006	1.2	37.7	23.2	
CFS-122-001	8/2/2006	0.93	6.5	5.3	
CFS-122-002	8/2/2006	2	1.9	2.9	USACE Split
CFS-122-003	8/2/2006	1.2	1.3	2.3	NYSDEC Split
CFS-122-004	8/2/2006	2.3	9.3	5.3	
CFS-122-005	8/2/2006	0.84	3.7	2.1	NYSDEC Split
CFS-122-006	8/2/2006	1.7	67.9	48.2	
CFS-122-007	8/2/2006	4.5	27.6	17.9	
CFS-122-008	8/2/2006	4.9	22.9	12.3	
CFS-122-009	8/2/2006	6.4	23.3	12.8	NYSDEC Split
CFS-123-001	9/20/2006	2.2	299	231	
CFS-123-002	9/20/2006	5.5	490	133	
CFS-123-003	9/20/2006	4.6	509	451	NYSDEC Split Sample
CFS-123-004	9/20/2006	6.2	26	11.3	
CFS-123-005	9/20/2006	5.7	161	116	NYSDEC Split Sample
CFS-123-006	9/20/2006	2.5	21.4	12.9	
CFS-123-007	9/20/2006	5	29.7	15.4	

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-123-008	9/20/2006	1.4	5.5	4.7	NYSDEC Split Sample
CFS-123-009	9/20/2006	4.1	442	261	USACE Split Sample
CFS-124-001	9/20/2006	3.9	95.4	73.7	
CFS-124-002	9/20/2006	5.7	26.3	12.6	NYSDEC Split Sample
CFS-124-003	9/20/2006	4.8	171	119	
CFS-124-004	9/20/2006	5.4	23.5	12.1	
CFS-124-005	9/20/2006	6.1	23.4	12.8	NYSDEC Split Sample
CFS-124-006	9/20/2006	4.3	100	75.3	
CFS-124-007	9/20/2006	6.4	25.3	12	USACE Split Sample
CFS-124-008	9/20/2006	5	33.9	19.4	NYSDEC Split Sample
CFS-124-009	9/20/2006	6.6	54.4	27.6	
CFS-124-010	9/20/2006	6.8	435	127	
CFS-124-011R	9/27/2006	3.1	2450	734	
Culvert Station +75	8/8/2001	3.3	109	67.2	Covers stations 0+51 thru 1+00. Final depth of 13 feet below grade.
Culvert 1+25	8/9/2001	10.2	564	618	Covers stations 1+01 thru 1+50. Sample replaced with Culvert 1+25R.
Culvert 1+25R	9/13/2001	5.5	612	357	Location re-excavated and resampled. Final depth of 12.25 feet below grade.
Culvert 1+75R	9/21/2001	1.5	1.9	3.6	Location re-excavated and resampled. Final depth of 13 feet below grade.
Culvert 2+25	9/19/2001	6	18.1	6.1	Covers stations 2+01 thru 2+50.Final Depth of 15 feet below grade

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
Culvert 2+75	9/19/2001	33.4	10.2	6	Covers stations 2+51 thru structure 1. Final depth of 16 feet below grade.
NHW-01A	8/16/2001	2.4	226	159	Resample collected after pumping out water and re-establishing grade. Final depth 13 feet below grade
NHW-02A	8/16/2001	2.2	313	207	Resample collected after pumping out water and re-establishing grade. Final depth 13 feet below grade
NHW-03A	8/16/2001	1.6	144	67.5	Resample collected after pumping out water and re-establishing grade. Final depth 13 feet below grade
NHW-04A	8/16/2001	2.5	68.7	53	Resample collected after pumping out water and re-establishing grade. Final depth 13 feet below grade
NHW-05A	8/16/2001	3.4	655	430	Resample collected after pumping out water and re-establishing grade. Final depth 13 feet below grade
Channel -1-25	9/27/2001	5.5	166	200	Covers stations -1-01 thru -1-50. Depth 4.0 ft. below grade.
CFS-SWK-01	7/23/2001	6.1	378	305	Southwest Keyhole Area. Depth 1.0 ft. below grade.
CFS-SWK-02A	8/2/2001	4	17.8	47.5	Resample collected after re-excavation of SWK-02
CFS-SWK-03	7/23/2001	5.8	45.8	73.9	Southwest Keyhole Area. Depth 5.9 ft. below grade.
CFS-SWK-04A	8/2/2001	3.8	21.1	28.1	Resample collected after re-excavation of SWK-04
CFS-SWK-05	7/23/2001	3.7	96.6	105	Southwest Keyhole Area. Depth 3.0 ft. below grade.
CKS-1	9/7/2001	3.7	235	231	Center South Keyhole Area. NYSDEC split sample collected. Duplicate collected at this location. Depth 8.0 ft. below grade.
CKS-2	9/7/2001	6.5	1730	1300	Center South Keyhole Area. NYSDEC split sample collected. Data excluded due to channel excavation. Final Depth 8.0 ft. below grade.
Channel 0-75	9/27/2001	2.4	7.3	5.4	Covers stations -0-50 thru -1-00. Replaces Sample CKS-2 Depth 5.0 ft. below grade.

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CKS-3	9/7/2001	0.38	4690	783	Center South Keyhole Area. NYSDEC split sample collected. Data excluded due to channel excavation. Final Depth 12 ft. below grade.
Channel 0-25	9/27/2001	0.47	1.7	1.3	Covers stations 0+00 thru -0-50. Replaces Sample CKS-3. Depth 12 ft. below grade.
CKS-4	9/7/2001	14.1	195	136	Center South Keyhole Area. NYSDEC split sample collected. Depth 1.0 ft. below grade. Average value from CKS-04, -05 and -06 for Arsenic is 6.11 mg/kg
CKS-5	9/7/2001	0.63	16.6	5.7	Center South Keyhole Area. NYSDEC split sample collected. Depth 1.0 ft. below grade.
CKS-6	9/7/2001	3.6	440	415	Center South Keyhole Area. NYSDEC split sample collected. Depth 10.5 ft. below grade.
CFS-NLF-001	5/16/2005	8	11.8	26.2	
CFS-NLF-002	5/16/2005	1.2	2.4	6.7	USACE Split Sample
CFS-NLF-003	5/16/2005	2.6	606	361	
CFS-NLF-004	5/16/2005	2.6	183	149	
CFS-NLF-005	5/16/2005	3.3	14.3	23.8	
CFS-NLF-006	5/16/2005	3.1	26.1	20.8	NYSDEC Split Sample
CFS-NLF-007	3/17/2005	3.5	115	101	
CFS-NLF-008	3/17/2005	2.8	23.4	42.8	
CFS-NLF-009	3/17/2005	3.6	288	228	NYSDEC Split Sample
CFS-NLF-010	4/13/005	2.1	134	94	
CFS-NLF-011	4/13/005	1.6	9.7	8.9	NYSDEC Split Sample

Sample ID	Date Collected	Off-site TAL Metals			Notes
		Arsenic (ppm)	Copper (ppm)	Lead (ppm)	
CFS-NLF-012	5/16/2005	7.3	4340	3370	
CFS-NLF-013	5/16/2005	2.1	8.4	4.6	NYSDEC Split Sample
CFS-NLF-014	4/13/005	2.3	6	3.4	USACE Split Sample
CFS-NLF-015	4/13/005	1.8	41	57.3	NYSDEC Split Sample
CFS-NLF-016	4/13/005	2	73.6	57.3	
CFS-NLF-017	4/13/005	2.1	35.3	30.6	
CFS-NLF-018	4/13/005	2.4	17.7	25.5	