

THE COLONIE FUSRAP SITE: CY2002 SITUATION REPORT

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ABSTRACT

This paper presents a summary of accomplishments at the Colonie FUSRAP Site in Fiscal Year 2002. During this period several significant milestones were achieved and have set the stage for the project to be completed in a more comprehensive manner, ahead of schedule and at a lower cost than the original Remedial Plan inherited from the Dept of Energy in 1997. Discussion of the DOE and subsequent USACE remedial plans is included along with summary level discussions of the key site infrastructure and remedial elements.

INTRODUCTION

The Colonie FUSRAP (or Colonie Interim Storage Site as the project was known under DOE) is one of the most unique and complex FUSRAP sites currently undergoing active remediation. The Site was formerly operated by National Lead Industries and was an active metals foundry/mill works long before the introduction of radiological materials (Depleted Uranium and Thorium 232) into the manufacturing process. While the purpose of this presentation is to update the status of current work, it is important to touch on the past non-radiological work onsite due to the fact that the wastes associated with those processes are one of the factors that complicate clean-up and closure of the site.

The New York State Department of Environmental Conservation's (NYSDEC) Inactive Hazardous Waste Registry lists the Colonie FUSRAP Site as a Class 2 hazardous waste site with a unlined, uncapped industrial landfill located within a former lake located onsite. The site is less than 12 acres in size and is directly bordered by occupied residences and commercial establishments including two active restaurants. A state highway (NYS Route 5) and the main CSXt/Amtrak rail lines abut the property to the north and south, respectively. The site is bisected by a major stormwater drainage consisting of a combination of open channel flow and buried 5' culvert.

The site is home to two sets of High Voltage power lines that feed the main Town of Colonie Substation (45KVA lines). Both the culvert/channel and the power poles were installed within the areas of the site with the deepest and most contaminated materials and presented significant engineering and safety challenges, as do the perimeter residences/business and active/shared rail line. Any one of these factors would have been challenging enough for a straight RCRA or Radiological site but in combination these features make the Colonie FUSRAP a truly unique FUSRAP project. The current success is a testimony to solid management and teamwork by all participants with lessons to be shared. Use of both field X-ray fluorescence (Niton 733), and FIDLER to guide excavations in association with on-site gamma spectrometry high purity germanium Detector (HPGe), Global Positioning System (GPS) linked cross-walks have been essentials to dealing with the mixed RCRA/Rad materials.

USACE assumed responsibility for the Colonie site in 1997 and mobilized to start DOE's selected Remedial Alternative in April 1998. On December 21, 2001, USACE executed a revised Action Memorandum that fundamentally alters the remedial selection to one that is more comprehensive, better for the community and far more cost effective. USACE is expected to complete this comprehensive program well ahead of DOE projected completion date for the limited excavation and on-site consolidation remedial plan selected under the former Action memorandum.

KEY METRICS

Key metrics completed through 30 September 2002 at the Colonie FUSRAP Site Soil Remediation include:

Excavation Volume	Approximately 60,600 loose cubic yards of mixed RCRA/Rad Soils and debris/materials FY02 Excavation Volume totals 16,400 lcyds
RCRA Soil Stabilization Volume	Approximately 76,700 tons of RCRA Characteristic materials treated on-site FY02 Stabilization Volume totals 20,500 tons
Water Treatment Volume	Approximately 17,500,000 gallons treated on-site FY02 totals 5,225,000 gallons treated
T&D Volume:	Approximately 61,300 lcyds shipped FY02 totals 22,800 lcyds shipped
FSS Units/Backfill Volumes	6 complete units and 33,700 lcyds backfill placed FY02 totals 6 complete units and 25,500 lcyds

As of 28 September 2002, the site crews had achieved 769 consecutive days without a lost work time injury. A total of over 280,000 work-hours have been expended. FY02 totaled approximately 64,500 work hours for the prime contractor (51,500 hrs.) and on-site subcontractors (13,000 hrs.).

USACE'S REMEDIAL ACTION PLAN

The U.S. Army Corps of Engineers (USACE) is designated to remediate the former Colonie Interim Storage Site (CISS) and three adjacent vicinity properties (VPs), hereafter referred to as the Colonie FUSRAP Site. The Colonie FUSRAP Site is located in the Town of Colonie, Albany County, New York State. This remedial effort falls under the USACE's Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to identify, investigate, and clean up or control sites previously used by the Atomic Energy Commission (AEC) and its predecessor, the Manhattan Engineer District. Shaw Environmental, under various USACE Total Environmental Restoration Contract (TERC) and Primary Remedial Action Contract (PRAC) is the Remedial Action Contractor for the Colonie Site.

The goal of this remedial effort is to efficiently achieve the remedial objectives as described in the December 2001 Action Memorandum (2) and in accordance with the June 2001 supporting Technical Memorandum for the Colonie Site (3)

The soil removal effort includes:

- The excavation and off-site disposal of site material(s) with Uranium-238 (U-238) levels greater than or equal to 35 picoCuries/gram (pCi/g), regardless of the depth at which these materials are encountered.
- The excavation and off-site disposal of site material(s) with Thorium-232 (Th-232) levels greater than or equal to 2.8 pCi/g, regardless of the depth at which these materials are encountered.
- The excavation and off-site disposal of site material(s) with total Lead levels greater than or equal to 450 mg/kg **AND** encountered at depths of nine (9) feet or less below original grade.
- The excavation and off-site disposal of site material with total Copper greater than or equal to 1,912 mg/kg **AND** encountered at depths of nine (9) feet or less below original grade.
- The excavation and off-site disposal of site material with total Arsenic levels greater than or equal to 7.4 mg/kg **AND** encountered at depths of nine (9) feet or less below original grade.
- The excavation of a minimum of six inches of material from the entire site, fenceline to fenceline, prior to the execution of Final Status Survey(s) over the entire site.
- The placement of a minimum of six inches and an average of two (2) feet of clean backfill soil over the site.

The estimated total volume of soil to be removed under the above program is estimated to be approximately 96,000 loose cubic yards and equates to the large scale excavation and off-site disposal alternative in the Dept. of Energy's 1995 Soil EE/CA. DOE's selected remedy (alternative 3B in the 1995 EE/CA) of moderate excavation and on-site disposal would have resulted in off-site disposal of less than 6,000 lcyds with reburial of approximately 37,000 cubic yards of mixed waste materials containing up to 100 pCi/gm of depleted uranium and characteristic RCRA wastes in an on-site disposal area.

USACE staff revisited the DOE's EE/CA and selected remedy in light of significant technical and administrative challenges to the execution of the moderate excavation and reburial of material on-site. The engineering challenges associated with reburial of radioactive wastes in an urban environment with a high groundwater table, bisecting stormwater drainage channels, high voltage power lines and inadequate zoning were significant. The costs of the large-scale

excavation were dramatically reduced in January 2000 when the NRC issued USACE a ruling indicating the wastes at Colonie were not regulated under the NRC and did not arbitrarily require disposal at radioactive licensed disposal sites. Background work with various disposal sites immediately bore the fruit of approved Waste Disposal Profiles with both a RCRA site and with Envirocare to handle the waste materials being generated. Off-site waste shipments began 14 February 2000 less than 6 weeks after receipt of the NRC letter.

With appropriate approvals of off-site waste profiles, cost effective disposal was available and USACE completed a new Technical Memorandum (June 2001) and subsequent Action Memorandum (December 2001) that selected the large scale excavation alternative with one modification. USACE's risk assessment indicated the lack of complete exposure pathways for metals contaminated soils at depths below nine feet. As such the soil removal for metals only contaminated soils stops at the nine foot depth. This resulted in a decrease in anticipated soil volumes under the large scale excavation alternative of an estimated 14,000 cubic yards.

PROJECT TEAM

The Colonie project team is lead by USACE's North Atlantic Division and includes a wide variety of Corps districts, A/E firms, Contractors and vendors. The key organizations and their responsibilities include:

- USACE's West Point Area Office for Construction Management Services
- USACE's New York District for Project Management Services
- USACE's Baltimore District for Technical Direction and Contract Administration services
- USACE's Kansas City District For disposal contract services
- Shaw Environmental, Inc, prime Contractor and Engineering
- Environmental Dimensions Inc for on-site radiological controls
- Environmental Rail Solutions, Inc for waste transportation via rail
- Disposal services at US Ecology's Idaho and Envirocare's Utah landfills via the Kansas City Multiple Award Remediation Contract (MARC) contract vehicle
- Argonne National Laboratory for technical support and website services

SITE DESCRIPTION & BACKGROUND

Industrial operations on-site began in approximately 1923 when the Embossing Company purchased a portion of the present day site to construct a facility to manufacture wood products and toys. In 1927, Magnus Metal Company, Inc. purchased the property and converted the facility to a brass foundry for manufacturing railroad components. Magnus Metal Company, Inc. cast the brass components in sand molds and manufactured brass bearing housings with surfaces of babbitt metal (an alloy of lead, copper and antimony).

In 1937, National Lead Industries (NL) purchased the facility and continued the brass foundry operations initiated by Magnus Metal Company, Inc. At some point before 1941, NL purchased an adjacent lot that contained a portion of Patroon Lake and began filling Patroon Lake with used casting sand. In 1958, the nuclear division of NL began producing items manufactured from uranium and thorium under a license issued by the AEC. From 1958 through 1984, NL carried out a number of processes using radioactive materials consisting primarily of depleted uranium

but also of thorium and enriched uranium. The plant handled enriched uranium from approximately 1960 to 1972. From 1966 to 1972, NL held several contracts to manufacture fuel from enriched uranium for experimental nuclear reactors. Operations were conducted at the plant to reduce depleted uranium-tetrafluoride to depleted uranium metal, which was then fabricated into shielding components, ballast weights, and projectiles.

Other processes conducted at the plant included an electroplating operation for plating uranium with nickel and cadmium. Chemicals used in the plating operation included nickel sulfamate, sodium cyanide, ferric chloride, nitric acid, silicate phosphate, iridite (chromium brightener), cadmium metal, nickel metal, boric acid, and tetrachloroethene (also known as perchloroethene, or PCE). How or where most of these materials were disposed is unknown; very few disposal records have been located. NL letters indicate that under an AEC license, approximately 42 cubic meters (cm) of graphite, slag, refractory, uranium oxide, insoluble oil, metal scrap, and combustible trash were buried in the Patroon Lake area in 1961. Chemical wastes and packaged chemicals used at the site have included acids, bases, degreasing agents, carbon tetrachloride, benzene, polychlorinated biphenyls (PCBs), cyanide, and asbestos. The chemicals present on the Resource Conservation and Recovery Act (RCRA) Part A application permit were removed from the Colonie Site as part of this facility's closure as a designated "interim RCRA storage facility." This closure was documented in the 1995 RCRA Closure Report certified by both the DOE and an independent New York State Professional Engineer.

New York State officials closed NL in 1984 at which time Congress authorized the DOE to remediate the property. In February 1984, the Secretary of Energy accepted an offer from NL to donate the land, buildings, and equipment to the DOE in order to help expedite the cleanup. The USACE accepted the property on behalf of the DOE on February 29, 1984 and transferred the title to DOE. In 1985 the DOE acquired a portion of the Niagara Mohawk (NiMo) property bordering the Colonie Site (existing power pole alignment and the "Keyhole" portion of the site) and subsequently designated it as part of the Colonie Site. From 1984 to 1988, remedial efforts were completed by the DOE for 53 of the 56 VPs. From 1992 to 1996, the remaining NL Site buildings were demolished by DOE. Various debris, waste materials and machinery associated with demolition of the main building were left on-site at the time USACE and their contractors initiated remedial efforts.

ON-SITE PROCESSES & INFRASTRUCTURE

In order to execute the Action Memorandum criteria numerous infrastructure changes were required at the project site. The principal on-site processes and infrastructure changes are discussed below.

Due to the shallow water table and depth of the buried wastes on-site, a groundwater dewatering system was designed and installed. Due to past issues with respect to discharges from the National Lead plant to the County Sanitary sewers, connection of the dewatering system to the sewers was denied. Accordingly an on-site water treatment system was designed and constructed. A NYSDEC State Pollution Discharge Elimination System (SPDES) permitted discharge to the on-site stormwater drainage channel feeding Patroon Creek was secured to support the on-site treatment system.

A waste treatment feasibility study was initiated early on in the project due to the fact that the primary waste stream was a mixed waste, containing both RCRA characteristic wastes (principally D-008 for lead) as well as the depleted uranium and limited amounts of Thorium 232. Under subcontract with ICFKaiser (the original USACE contracting entity at the site), Kiber Environmental conducted a bench scale study of the Colonie waste materials and recommended the use of phosphoric acid as the single stabilization agent. IT Corporation (who assumed ICFKaiser's contracts on or about April 1999) requested and the Army approved self-performance of the on-site stabilization system. NYSDEC bulk storage permits for on-site storage of up to 7,500 gallon of technical grade phosphoric acid were received in support of the stabilization system.

The presence of waste materials containing radioactive, RCRA or mixed Radiological waste; the specifications of the original DOE remedial plan; and a strong desire to manage the generation of mixed wastes, necessitated the excavation process to be guided by two types of field instruments. A field instrument for detection of low energy radiation or FIDLER is used to survey grids to locate and mark areas of radiological contamination. These soils are removed and the radiological survey repeated within the grid until surveys of the remaining surface indicates radiological contamination levels below the radiological criteria. A Niton Model 733 Field X-ray Fluorescence (XRF) device is used to survey the grid area for total lead and total copper levels. Excavation proceeds in controlled lifts until surveys using both instruments (the FIDLER and the XRF) indicate the soil surface readings meets the clean-up criteria. There is one exception to the above process in that the metals levels of the action memorandum only apply within the upper nine feet of the original ground surface. In other words, a third element of control is required to manage the depth of the excavation whenever a grid achieves radiological criteria before reaching depths of nine feet.

Given the site's history of inorganic contamination in the years prior to introduction of radiological contamination, the excavation process is always driven by the radiological instrument first and then by the XRF. The one exception to that is for the work associated with replacement of the stormwater culvert that bisected the main landfill area. It appears as though this culvert was not the original culvert and was installed sometime in the mid 1970's. During the process of installation of the new 1970's culvert, the depth profile of radiological, mixed and then inorganic materials was disrupted and mixed wastes were encountered at depths greater than anticipated. For all other portions of the site the radiological/mixed and then organic profile is maintained.

The soils excavated are staged in roughly 250 loose cubic yard piles based on the expected waste profiles and the field screening levels (XRF and FIDLER). Soils excavated for inorganic content are not commingled with soils excavated for radiological content. All soil piles are labeled and sampled using a five grab composite for off-site laboratory analysis via the Toxic Characteristic Leaching Procedures (TCLP) lead analysis. All soil pile samples are oven dried and analyzed in the on-site High Purity Germanium detector for radiological contaminants of concern as well for metal content via XRF.

Based on the results of these analyses, soils are classified as RCRA or Non-RCRA contaminated. To date over 85% of the excavated soils have been RCRA characteristic hazardous waste and

have been stabilized using the on-site soil stabilization system prior to shipment for off-site disposal.

Final Status Surveys

As excavation progresses to the point where field instruments indicate compliance with clean up goals, a final status survey (FSS) process is utilized to document compliance with the Action Memorandum criteria. The FSS process is based on the 1997 Multi-agency site survey and investigation manual (MARSSIMS). Colonie's FSS units are deemed class 2 units due to documented contamination levels and as such are limited to a maximum 2,000 sq. meters in area. Based on discussions with NYSDEC and due to the criteria that radiological contaminate clean-up goals are set as levels "in addition to background levels", it was determined that a background FSS unit was established to provide information on background levels. For the six survey units completed through the end of FY02 the application of this allowable subtraction of background levels has not been required.

Two principal additional measures are required due to the unique nature of the wastes at Colonie. The first is associated with inclusion of metals clean-up goals. The final status survey sampling includes analysis for Target Analyte Metals list compounds. The second evolution in the FSS is associated with the AM's depth limitation on applicability of metals criteria. Each survey unit is subject to civil surveying to verify the depth of the final grades. For those locations documented to be below the nine-foot limit level, metals clean-up goals are not applicable.

Perimeter Air monitoring protocols

The Colonie site is a relatively small site located in an area of mixed residential and light commercial enterprises. Occupied homes exist immediately west and south of the property and active restaurants are located on the north property lines. Given these conditions and the fact that large-scale excavation and on-site soil stabilization activities would occur, the DOE's perimeter air program was deemed to require modifications. Each of the DOE's six air sampling pumps were supplemented with a particulate monitor connected to a continuous data logger. This modification provides positive documentation as to the dust levels at the perimeter air stations and can be utilized to defend any claims of release to offsite locations.

A second measure was added to allow proactive responses in those instances where dust reaches the perimeter. Each MEI Model 100-AN Personnel Data Ram was connected to a high visibility strobe light. The alarm function of the PDR was adjusted to alarm at 80% of the OSHA nuisance dust criteria of 150 ug/cubic meter. With this equipment set, dust at levels below the OSHA trigger will activate the strobe lights. Once a light is activated, all equipment processes are suspended and measures are taken to locate and eliminate the source of the dust. Various engineering controls used to combat dust include aggressive deployment of a 2,500 gallon water truck, additives to enhance the effectiveness of the water sprays (non-ionic wetting agent/block polymers), biodegradable soil encapsulants and rigorous application of soil erosion and sedimentation controls

SUMMARY AND CLOSURE

As of the end of FY2002, the project schedule indicates completion of soil excavation work by late CY2003. Complete demobilization of equipment and support facilities/infrastructure is

scheduled for no later than June 2004. At Colonie, USACE will complete a more comprehensive remedy of large scale excavation and off-site disposal in less time and at a substantial cost savings than the proposed DOE remedy. USACE estimates cost at completion to be \$53,000,000 compared to DOE's estimated cost at completion of \$94,073,000 thus resulting in a savings of approximately \$40,000,000.

Fiscal Year 2002 was a success largely through the determined team work displayed by the various project entities and individuals. In FY002, the FUSRAP team demonstrated cost effective and timely remediation at Colonie and set the stage for completion ahead of programmed timeframes and at a lower cost than originally estimated while the program was under the DOE. For more details on the Colonie FUSRAP project, readers are encouraged to visit the project's public website @ <http://web.ead.anl.gov/corps/colonie>.

REFERENCES:

1. Final Engineering Evaluation and Cost Analysis (EE/CA) for the Colonie Site, DOE/OR/21950-1008, September 1995
2. Action Memorandum, 10 Oct 2001, USACE
3. Final Technical Memorandum in Support of a Proposed Action Memorandum, 01 June 2001, USACE
4. Final Multi-Agency Radiation Survey & Site Investigation Manual, NUREG-1575/EPA 402-R-97-016, December 1997