RECORD OF DECISION

Wolff-Alport Chemical Company Superfund Site
Ridgewood, Queens County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 2017

528285

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Wolff-Alport Chemical Company Superfund Site
Ridgewood, Queens County, New York

Superfund Site Identification Number: NYC200400810
Operable Unit: 01

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of a remedy for the Wolff-Alport Chemical Company (WACC) Superfund Site (Site), chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting a remedy to address the source areas at the Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 U.S.C. § 9621(f), and it concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy, which addresses contaminant source areas, includes the following components:

- All tenants of the buildings on the former WACC property will be permanently relocated.
- All of the buildings on the former WACC property will be demolished.
- Following the demolition of the buildings, all soils exceeding the Remediation Goals (RGs) on the former WACC property, the 308 Cooper Street and 350 Moffat

Street properties, as well as beneath the roadway and sidewalks along Irving Avenue and Moffat Street, will be excavated.

- The clay pipe sewer line beginning at the manhole located on Irving Avenue southwest of the former WACC property and extending to the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue will be excavated and replaced (approximately 120 feet of pipe).
- After the removal of the sewer line, bedding material samples will be collected from the open excavation to determine if the bedding material is contaminated. Any bedding material that exceeds the RGs will also be removed and backfilled with clean fill.
- The remaining portion of the sewer line down to the intersection of Wyckoff Avenue and Halsey Street (approximately 2,150 feet) will undergo jet cleaning using high-pressure water nozzles to flush out dirt, sediments/sludge, and any other matter from the sewer pipeline. The jetting will be performed in combination with vacuuming to collect the jetted waste.
- Following completion of sewer jet cleaning, a gamma survey will be performed within the flushed sewer to determine if high gamma counts are still present. Any portions of the sewer line with elevated gamma counts will undergo further investigation, including the sewer material and bedding, to determine the source of the radiological contamination. Those portions of the sewer line, along with any bedding material that exceed the RGs will be removed and replaced.
- Site restoration will include backfilling the areas of excavation with clean fill followed by resurfacing of roadways and sidewalks impacted by the construction.
- The excavated contaminated soil, sewer sediment, and debris will be disposed of either in a non-hazardous waste landfill or in a landfill permitted to accept radioactive waste, based upon the level of radioactivity in the materials.

No data were collected at the following three nearby properties: 282 Moffat Street; 323 Moffat Street; and the parking lot of 335 Moffat Street. Additionally, only minimal data was collected at the non-parking lot portion of 335 Moffat Street, 338-350 Moffat Street, and the area adjacent to the nearby active rail lines. During the design of the selected remedy, an investigation will be conducted at these adjacent properties which may have been impacted by site-related activities. Any contaminated soils in these areas will be addressed as part of the remedy.

During the design, a Phase 1A Cultural Resources Survey[1] will be performed to document the Site's historic resources.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation

---

[1] A Phase I cultural resources survey is designed to determine the presence or absence of cultural resources in the project's potential impact area. The Phase I survey is divided into two progressive units of study--Phase IA, a literature search and sensitivity study and, if necessary, based upon Phase 1A survey, a Phase IB field investigation to search for resources.

Policy[2]. This will include consideration of green remediation technologies and practices. The selected remedy will address source materials constituting principal threats by excavating and removing the radiologically contaminated soil, sediments, and building materials.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. § 9621, because it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants, or contaminants that at least attain the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The selected remedy will not meet the statutory preference for the use of treatment as a principal element of the remedial action because no proven and cost-effective treatment technology is currently available to treat radioactive wastes.

Because this alternative will not result in contaminants remaining on-site above levels that would otherwise require use restrictions or limits on exposures, five-year reviews will not be necessary. If the remedy requires five or more years to complete, five-year reviews will be performed until the remedial action is completed.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this remedy.

- Contaminants of concern and their respective concentrations (see ROD, pages 4-9 and Appendix II, Tables 1-14);
- Baseline risk represented by the contaminants of concern (see ROD, pages 11-23 and Appendix II, Tables 15-22);
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, page 24, and Appendix II, Table 23);
- Manner of addressing source materials constituting principal threats (see ROD, page iii and page 36);
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, page 10);
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 39);
- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are

[2] See http://epa.gov/region2/superfund/green_remediation, https://semspub.epa.gov/work/HQ/100000160.pdf, and http://www.dec.ny.gov/docs/re-mediation_hudson_pdf/der31.pdf.

projected (see ROD, page 35 and Appendix II, Table 24); and

- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, pages 30-42).

AUTHORIZING SIGNATURE

Angela Carpenter, Acting Director
Emergency and Remedial Response Division

9.26.17
Date

RECORD OF DECISION FACT SHEET
EPA REGION 2

Site

Site name:	Wolff-Alport Chemical Company Site
Site location:	Ridgewood, Queens County, New York
HRS score:	50.00
Listed on the NPL:	May 12, 2014

Record of Decision

Date signed:	September 26, 2017
Selected remedy:	Permanent relocation of current on-Site commercial and residential tenants, demolition of all contaminated buildings at the Site, excavation of soils beneath those buildings, as necessary, cleaning and/or replacing contaminated sewers, excavation, and off-site disposal of contaminated soil, debris, and sewer sediment.
Capital cost:	$39.9 million
Annual operation, maintenance, and monitoring cost:	$0
Present-worth cost:	$39.9 million

Lead	EPA
Primary Contact:	Thomas Mongelli, Remedial Project Manager, (212) 637-4256
Secondary Contact:	Joel Singerman, Chief, Central New York Remediation Section, (212) 637-4258

Waste

Waste type:	Thorium-232, Radium-226, Radon-222, Radon-220, PCBs, and Benzo(a)pyrene
Waste origin:	Waste disposal activities related to the processing of monazite sands
Contaminated media:	Soil, building material, sewer sediment, and indoor air

DECISION SUMMARY

Wolff-Alport Chemical Company Superfund Site
Ridgewood, Queens County, New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2017

TABLE OF CONTENTS

	PAGE
SITE NAME, LOCATION, AND DESCRIPTION	1
SITE HISTORY AND ENFORCEMENT ACTIVITIES	1
HIGHLIGHTS OF COMMUNITY PARTICIPATION	3
SCOPE AND ROLE OF OPERABLE UNIT	4
SUMMARY OF SITE CHARACTERISTICS	4
CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES	10
SUMMARY OF SITE RISKS	11
REMEDIAL ACTION OBJECTIVES	24
SUMMARY OF REMEDIAL ALTERNATIVES	25
COMPARATIVE ANALYSIS OF ALTERNATIVES	30
PRINCIPAL THREAT WASTE	36
SELECTED REMEDY	36
STATUTORY DETERMINATIONS	39
DOCUMENTATION OF SIGNIFICANT CHANGES	41

ATTACHMENTS

APPENDIX I: FIGURES
APPENDIX II: TABLES
APPENDIX III: ADMINISTRATIVE RECORD INDEX
APPENDIX IV: STATE LETTER OF CONCURRENCE
APPENDIX V: RESPONSIVENESS SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

The Wolff-Alport Chemical Company (WACC) site (Site) comprises an area of radiological contamination at 1127 Irving Avenue in Ridgewood, Queens, New York on the border of Bushwick, Brooklyn. The Site includes the former WACC property, a roughly triangular area of approximately 0.75 acres that is now subdivided into several commercial properties, as well as adjacent areas including streets, sidewalks, commercial and residential properties, and the sewer system where contaminants have migrated or have the potential to migrate in the future. A Site location map is provided as Figure 1. Figure 2 shows the general area of the Site.

The former WACC property is bound by Irving Avenue to the southwest, Cooper Avenue to the northwest, and a commercial property to the east. At present, the property is covered with contiguous structures, except along its eastern edge in an area which was formerly used as a rail spur. The neighborhoods surrounding the former WACC property contain light industry, commercial businesses, residences, a school, and a daycare center. An active rail line passes within 125 feet to the southeast of the property.

The former WACC property consists of several parcels on Block 3725 which, as shown on the tax map of Queens County, include the above-mentioned gravel-covered former rail spur used to store automobiles (Lot 31), a one-story dilapidated warehouse, which is currently unoccupied (Lot 33), a subdivided one-story building primarily used for storage and occupied by a construction company and an auto body shop with an adjoining office (Lot 42), a one-story building housing a motorcycle repair business (Lot 44), a two-story building housing a delicatessen, office space, and three residential apartments, as well as an attached one-story building housing a tire shop (Lot 46), and a one-story building housing an auto repair shop and office space (Lot 48).

SITE HISTORY AND ENFORCEMENT ACTIVITIES

WACC operated at the property from the 1920s until 1954, importing monazite sand via rail and extracting rare earth metals from the material. Monazite sand contains approximately 6-8 percent or more of thorium and 0.1-0.3 percent of uranium. The acid treatment process used by WACC converted the phosphate and metal component of the monazite to aqueous species, rendering the rare earth materials extractable while dissolving the thorium and uranium in an acid, such as sulfuric and nitric acid, generating waste process liquors and tailings. This process concentrated thorium-232 (Th-232) and uranium-238 (U-238), both of which are radioactive, in the process liquors.

During its operation, WACC occupied three structures that currently comprise Lots 42 and 44. WACC's operation included two yard areas--one between the buildings on Lot 42 and the other on the eastern end of the property at the northern end of Moffat Street. These areas were reportedly used as staging areas for monazite sands or waste tailings containing Th-232 and U-238. The waste tailings were likely spread or buried on the property. WACC likely disposed of the liquid process wastes into the sewer. According to the U.S. Department of Energy, the Atomic Energy Commission (AEC) ordered WACC to halt sewer disposal of thorium waste in the fall of 1947. Thereafter, thorium was precipitated as thorium oxalate sludge and later sold to the AEC.

Scoping-level radiological surveys performed by NYSDEC, New York City Department of Health and Mental Hygiene (NYCDOHMH), and EPA in 2007 found radiological impacts throughout the WACC property and the nearby sewer. Follow-up investigations by the New York City Department of Design and Construction (NYCDDC) in 2009-2010 found waste tailings consisting of black or gray ash-like material containing elevated Th-232 concentrations beneath the WACC property buildings, adjacent sidewalks, and asphalt surfaces of Irving Avenue and Moffat Street, and in the surface soils of the former rail spur. During the NYCDDC investigation, elevated levels of thoron and radon gas were detected in the deli basement.

In 2010, radon testing was conducted in the basement of a nearby public school by NYCDOHMH and overseen by EPA staff. All results were found to be within the normal background range of 0.0 and 1.9 picocuries per liter (pCi/L) with the exception of a single location in a basement crawl space where radon and thoron concentrations were found to be approximately 17.9 pCi/L and 24.4 pCi/L, respectively. The radon and thoron gas was determined to be emanating from a hole in the concrete floor of the crawl space. The hole was sealed with a concrete plug, and subsequent testing found radon and thoron concentrations had dropped to within normal background ranges.

In February 2012, the Agency for Toxic Substances and Disease Registry (ATSDR) issued a Health Consultation that noted that exposure to the residual radioactive contamination at the Site may pose a health threat under certain long-term exposure scenarios. Based on the ATSDR document, EPA prepared a Removal Site Evaluation for the Site in August 2012 to determine whether an immediate response action (*i.e.,* a removal action) was necessary. In September 2012, EPA collected gamma radiation exposure rate measurements and thoron and radon concentration measurements on and around the perimeter of the suspected source area and at background locations. The gamma radiation exposure rate measurements identified hot spots inside the on-Site buildings, along the former rail spur, and along the sidewalks and streets adjacent to the former facility and elevated radon concentrations in two of the former WACC property businesses.

Based upon this evaluation, EPA conducted a removal action between October 2012 and April 2014 which consisted of a gamma radiation[1] assessment and radon sampling at the Site, the installation of a radon mitigation system in one former WACC property building where radon concentrations exceeded EPA's guidance level of 4 pCi/L, and the

[1] Gamma radiation arises from the radioactive decay of atomic nuclei.

installation of lead, steel, and concrete shielding in certain areas of the Site, based on recommendations collaboratively developed by EPA and NYCDOHMH. Gamma exposure rates in areas where shielding was placed were reduced between 60-95 percent based on a comparison of pre-shielding and post-shielding gamma radiation surveys.

In July 2013, EPA, New York State Department of Health (NYSDOH), and NYCDOHMH conducted a radiological assessment of the neighborhood within a half-mile radius of the Site. The data collected during this assessment indicated that there is no unacceptable exposure to the surrounding community from radiological contaminants located at the Site.

The Site was included on the National Priorities List on May 12, 2014.

EPA conducted field investigations from September 2015 to March 2017, and completed the remedial investigation and feasibility study (RI/FS)[2] reports in July 2017.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI and FS reports and a Proposed Plan[3] were released to the public for comment on July 27, 2017. These documents were also made available to the public at information repositories maintained at the Washington Irving Library located at 360 Irving Avenue (at Woodbine St.) Brooklyn, New York, and the EPA Region 2 Office in New York City. Notices of availability for the above-referenced documents were published in the July 27, 2017 edition of the *Ridgewood Times* and the July 28, 2017 edition of *El Correo*. The public comment period ran from July 28, 2017 to August 28, 2017. On August 16, 2017, EPA conducted a public meeting at the Audrey Johnson Day Care Center, located at 272 Moffat Street, Brooklyn, New York, to inform local officials and interested citizens about the Superfund process, to explain the Proposed Plan for the Site, including the preferred remedy and to respond to questions and comments from the approximately 50 attendees. Public comment was primarily related to relocation of the on-Site businesses, the availability of funds to implement the remedy, impacts on the surrounding community from the proposed response activities, and redevelopment of the Site following the completion of the remedial action. Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

---

[2] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks and an FS identifies and evaluates remedial alternatives to address the contamination.

[3] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for that preference.

While the current land use of the site property is mostly industrial, the predominant land use in the surrounding area is residential (characterized by attached houses and apartment buildings), and the neighborhood is near areas of Brooklyn and Queens that have been under intense redevelopment pressure (primarily residential) over the past 10 years. Because the area is served by municipal water and the aquifer is already designated as a drinking water source (although it is not likely that the groundwater underlying the former facility property will be used for potable purposes in the foreseeable future), the public's views on potential future beneficial groundwater uses were not solicited.

SCOPE AND ROLE OF OPERABLE UNIT

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at 40 CFR Section 300.5, defines an operable unit as a discrete action that comprises an incremental step toward comprehensively addressing site problems. A discrete portion of a remedial response eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the Site.

This response action applies a comprehensive approach to all identified Site problems; therefore, only one operable unit is required to remediate the Site. The primary objectives of this action are to address the soil, sewer, air, and building material contamination, and minimize the migration of contaminants through surface runoff, dust migration, emanation of radon and thoron gases, and sewer discharge.

SUMMARY OF SITE CHARACTERISTICS

Environmental media investigated during the RI included soil, sediment, groundwater, air, and building/sewer materials. Samples were primarily collected to delineate the extent of media contaminated by radioactive waste; however, samples were also analyzed to determine the presence of non-radiological contamination. Specifically, the investigation included building material gamma surveys, building material sampling, wipe sampling, a hazardous material building survey, soil investigations,[4] including gamma walkover surveys and soil sampling, groundwater sampling, water level measurements, hydraulic conductivity assessments, sewer investigations, including fiberscope mapping with in-sewer gamma count and gamma exposure rate surveys, sewer material sampling, soil borings in the vicinity of the sewer, sediment sampling in Newtown Creek where the combined sewer overflow (CSO) discharges,[5] gamma exposure rate

---

[4] Soil samples were collected at three intervals—surficial (0-2 feet); shallow (2-10 feet); and deep (>10 feet).

[5] Combined sewers receive both sewage and stormwater flows and discharge to surface water when the sewer system's capacity is exceeded, *i.e.,* in significant storm events.

confirmation surveys, and school/daycare investigations, including soil sampling, gamma exposure rate surveys, and radon and thoron evaluations. The results of the RI are summarized below.

The primary contaminants of concern at the Site are the radioactive isotopes Th-232, U-238, and radium-226 (Ra-226).[6] Th-232 in combination with Ra-226 were used to determine the nature and extent of contamination associated with the Site. For risk analysis and screening purposes, the U-238 concentrations are assumed to be that of its Ra-226 progeny. This is a conservative assumption in that the acid used as the agent for solubilizing the monazite ores in the rare-earth extraction process will preferentially concentrate the Ra-226 in the waste sludge.

Site Hydrogeology

The Site is at an elevation of approximately 70 feet above mean sea level (msl), and the ground surface in the area generally slopes gently to the southwest. The eastern edge of the Site is adjacent to an elevated rail line that runs parallel to Moffat Street. The ground surface rises sharply toward the rail line and continues to rise to a cemetery, east of the Site, to elevations as high as 160 feet above msl.

While drilling borings and wells at the Site, EPA encountered two types of unconsolidated material--fill and Upper Glacial Aquifer deposits (till and outwash). Fill near the former WACC property is typically 5-15 feet thick and is generally characterized by the presence of man-made materials (bricks, coal, various building materials) intermixed with silt, sands, and gravels. Much of the upper layers of the fill in borings at the former WACC property, as well as some borings to the south on Moffat Street, consisted of a black, gray, and/or white cinder or ash-like material. This material, which is likely waste tailings, was found between 0-4 feet below ground surface (bgs) near the former WACC property and between 0-6 feet bgs along Moffat Street.

Upper Glacial Aquifer deposits were encountered from the bottom of fill (0-15 feet bgs) to the base of the borings installed at the Site (75 feet bgs). The upper portion of the glacial deposits (down to approximately 25-37 feet bgs) is made up of glacial till, which is yellowish brown dense silty sand and gravel. The material underlying the glacial till is glacial outwash, slightly more uniform and coarse in texture than the till, and it extends from the bottom of the till to at least 75 feet bgs (*i.e.,* the total depth of investigation at the Site).

Depth to groundwater at the Site is about 60 feet bgs, and the direction of groundwater flow is generally to the south. Based on the available geologic literature, the base of the

[6] Because the minimum detectable activity using gamma spectroscopy for U-238 is high, gamma spectroscopy results are not used as a first line indicator for U-238. Therefore, Ra-226, the decay progeny of U-238, is used to indicate U-238 levels.

Upper Glacial Aquifer in this area is assumed to be the Gardiners Clay, which is present at an elevation of 100 feet below msl at the Site, or about 170 feet bgs.

Groundwater

Four rounds of groundwater sampling were conducted as part of the RI. While Th-232 concentrations slightly exceeded the screening criterion in one groundwater sample collected during the second sampling event, subsequent sample results indicated that radionuclide concentrations in the groundwater are all below the screening criteria. (see Appendix II, Table 1)

Volatile organic compounds (VOCs) exceeded the standards in the former WACC property groundwater. There were, however, no known VOC uses at the WACC facility, VOCs were not detected in on-property soil samples, and an upgradient groundwater sample showed elevated VOC concentrations. Therefore, it was concluded that the on-Site VOC concentrations were due to a non-site-related upgradient source.

Building Materials

Radiological contamination remains in the building structures at the former WACC property, primarily, in the buildings that previously contained the kiln/vat in which monazite sands processing took place (Lots 42 and 44), in the basement of the deli (Lot 46), and, to a lesser extent, in the warehouse on Lot 33 constructed above the former yard area. Contaminants are primarily embedded in the building structures with the highest concentration of Th-232 at 415.2 picocuries per gram (pCi/g)[7] and Ra-226 at 44.2 pCi/g from a sample of brick from Lot 44. The Th-232 and Ra-226 RI screening criteria (determined from background[8] levels) for the building materials are 1.2 pCi/g and 0.9 pCi/g, respectively. (see Appendix II, Tables 2 and 3)

Asbestos-containing material, lead-based paint, and other hazardous materials were found in the WACC building structures, which is not unusual for industrial buildings of this age.

Air

Previous investigations found concentrations of radon and thoron above the screening criteria and EPA's guidance level of 4 pCi/L in indoor air at multiple locations at the former WACC property. Air sampling conducted prior to radiation mitigation activities in 2013 found the highest levels of air contamination in the buildings on Lots 42 and 44 (where

---

[7] The term provides an expression of how many radioactive decays are occurring per unit of time. Soils in New York State have background concentrations of Th-232 that range from 0.5 to 2 pCi/g.

[8] Background refers to substances or locations that are not influenced by the releases from a site and, therefore, can be used as a point of comparison.

the majority of WACC processing activities took place) as well as Lot 46. Following the mitigation activities in the building on Lot 42, the radon levels in that building, as measured when the mitigation system was turned on, dropped to below EPA's guidance level.

Soils

Under the former WACC buildings, the highest concentrations of radiological contamination were encountered with a maximum concentration of 760 pCi/g found in a sample 10 to 12 feet bgs. Contamination extends to a depth of 28 feet bgs under the building on Lot 44, the former kiln/vat building, with a Th-232 concentration of 4.3 pCi/g[9] from 26 to 28 feet bgs; and to 24 feet bgs under Lot 42, the former yard where the monazite sands were loaded into the kiln/vat building for processing, with a Th-232 concentration of 2.6 pCi/g from 22 to 24 feet bgs. The Th-232 and Ra-226 RI screening criteria for soil are 1.2 pCi/g and 0.9 pCi/g, respectively. (see Appendix II, Tables 4 and 5)

Surficial contamination was detected in the following locations: the former rail spur area, along the slope of adjacent active rail lines, at the intersection of Irving Avenue and Moffat Street, the northern portion of Moffat Street, the eastern portion of Irving Avenue, and in the southeastern corner of Lot 31/northern part of 350 Moffat (area adjacent to the Moffat Street/Irving Avenue intersection). The surficial contamination appears to have been, primarily, because of filling in the area with process tailings, as observed in soil borings. Other surficial contamination was likely caused by stockpiling of the monazite sands and tailings in the former storage yards, allowing rainwater to transport contamination to lower topographic areas. This also would have allowed wind to transport the particulate matter through the air, likely depositing near the former WACC property.

Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) were detected at the former WACC property as deep as 7 feet bgs; they may be related to former underground storage tanks (USTs). Elevated concentrations of PAHs found throughout the surficial soils at the former WACC property may be attributable to the handling of the contents of on-property USTs and/or the current use of the area to store demolished cars. A 2010 report by the NYCDDC identified two on-property USTs with unidentified contents. The same report indicates that a filling station with gasoline USTs previously operated at the property. Similar PAH concentrations were also found at nearby 308 Cooper Street.

Elevated concentrations of polychlorinated biphenyls (PCBs) were found in three surficial soil locations, with a maximum concentration of 100 milligrams per kilogram (mg/kg). PCBs in the shallow soils may be related to the USTs or a sump located below the

[9] Background Th-232 concentrations ranged from 0.487 pCi/g to 1.132 pCi/g.

building on Lot 33. While arsenic and iron concentrations exceeding the screening criteria were found in all samples at all depths, because these contaminants were also found at similar concentrations off Site, it is likely that they are associated with urban fill (see Appendix II, Table 6).

Soils Underlying Streets

Soil samples collected from a soil boring advanced in the middle of the intersection of Irving Avenue and Moffat Street revealed 209.93 pCi/g of Th-232 and 38.65 pCi/g of Ra-226 in the top foot of soil. Contaminant concentration in soils under Moffat Street generally decreased moving south away from the WACC property, with elevated concentrations of Th-232 and Ra-226 observed in mostly surficial samples. Two soil borings located in gamma reading hotspots had elevated surficial Th-232 at 28.55 pCi/g and 59.35 pCi/g and Ra-226 at 5.55 pCi/g and 11.13 pCi/g, respectively. Visual observations of the soils at these locations indicated potential waste tailings in the top foot of soil. Approximately 40 feet south from the hotspot on Moffat Street, gamma readings dropped to levels just above or within background levels. (see Appendix II, Tables 4 and 5)

Sewers and Associated Soils

The sewer investigation found significant radionuclide contamination present in the sewer system originating at the former WACC property. Gamma count measurements were significantly elevated in the manholes south of the former WACC buildings on Irving Avenue where process liquors containing thorium were likely discharged. The elevated gamma counts (>20 times background) continue in the sewer line and manholes on Irving Avenue for approximately two blocks. Radionuclide contamination within the pipes and manholes is present in sediments and structural materials of the sewer manholes near the former WACC property.

The maximum radionuclide concentrations in sewer structural materials were found in the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue, with Th-232 at 2,536.2 pCi/g and Ra-226 at 163.1 pCi/g. The maximum Th-232 concentration in sewer sediments was observed in the manhole located south of the former WACC property on Irving Avenue, with Th-232 at 1,218.1 pCi/g and Ra-226 at 45.9 pCi/g (see Appendix II, Table 2).

Irving Avenue, west of the Irving Avenue/Moffat Street intersection, likely contains deep contamination associated with disposal of contaminated process liquors in the sewer line that may have leaked to the surrounding soils. One soil sample collected during the RI had a Th-232 concentration of 5 pCi/g and a Ra-226 concentration of 1.15 pCi/g. Contamination down to 8 feet bgs was observed at the intersection and the northern portion of Moffat Street at a concentration of 3.31 pCi/g of Th-232 and 2.31 pCi/g of Ra-226 (see Appendix II, Tables 4 and 5).

The Irving Avenue/Moffat Street intersection had the highest gamma scan readings outside of the WACC property. Gamma scan levels generally dropped to four times background at the intersection of Irving Avenue and Schaeffer Street and dropped to background levels at the intersection of Irving Avenue and Eldert Street, with sporadic occurrences of gamma levels above four times background continuing in the sewer along Halsey Street to Wyckoff Avenue (see Appendix II, Tables 7 and 8).

While soil borings collected adjacent to the sewer lines found only limited radionuclide contamination, a fiberscope survey identified breaks in the pipeline along Irving Avenue in the vicinity of Cooper Street. Therefore, it is likely that the bedding material below the sewer in this area is contaminated.

Elevated Th-232 concentrations were detected in sediments in Newtown Creek in the area immediately adjacent to the sewer outfall leading from the Irving Avenue sewer line. The maximum Th-232 concentration in these sediments was 70.2 pCi/g from 5 to 6 feet below the sediment surface (see Appendix II, Table 9).

Gamma Exposure Rate Confirmation Surveys

Gamma exposure rate surveys confirmed the results from the previous gamma exposure rate surveys conducted within the former WACC buildings and on sidewalks and streets near the former WACC property. Exposure rates remain above background levels throughout each of these areas, but they were within the background range a few blocks from the former WACC property. The maximum gamma exposure rates observed were collected on Irving Avenue south of the former WACC property at 220 microRoentgens per hour (μR/hr)[10] near the sidewalk curb and 338 μR/hr in the middle of the street. These readings were taken at waist height or approximately three feet above the ground surface (see Appendix II, Table 10).

School/Daycare Center Investigation

Soil samples collected from around the nearby school only slightly exceeded the screening criteria. Soil samples collected from beneath the school and from around and beneath the nearby daycare center did not contain radiological contamination (see Appendix II, Tables 4 and 5). Short-term radon levels collected in the daycare center and school and long-term radon and thoron levels collected in the school were below or equal to the screening criteria for indoor air, ranging from 0.1 pCi/L to 1.4 pCi/L. Gamma exposure rates collected from within the school and daycare center were all within or below the background observed for the neighborhood (see Appendix II, Tables 10 through 14).

[10] μR/hr is a measurement of energy produced by radiation in a cubic centimeter of air.

Contamination Fate and Transport

The primary source of radionuclides at the Site was the processing of imported monazite sands for rare earth elements extraction which resulted in process liquor and tailing byproducts. The acid treatment process used by WACC converted the phosphate and metal component of the monazite to aqueous species, rendering the rare earth materials extractable while dissolving the thorium and uranium in an acid, generating waste process-liquors and tailings.

In the process liquors, Th-232 and U-238 were mobile and able to migrate as the process liquors were continually discharged to the leaky sewer pipes under the building. These radionuclides migrated to the subsurface soils. However, as the acid became diluted in the soil, the radionuclides came out of solution, forming insoluble and immobile compounds, preventing the thorium from extending deeper in the soils. In the presence of process liquors, Ra-226 is immobile in particulate form and will not migrate to the subsurface soils. The radionuclides also migrated through the sewers, with Th-232 and U-238 falling out of solution as the acid was diluted by the CSO water, and a portion of Ra-226 going into solution as the pH increased, and particulate forms sorbed to the sewer structure and sediment in the sewer. The process tailings were stored in the former storage yards uncovered, subjecting them to wind and surface water in which they traveled in particulate form. The process tailings were also disposed of by filling/spreading at the WACC property and the adjacent areas.

The radioactive half-lives of Ra-226, U-238, and Th-232 are 1,600 years, 4.5 billion years, and 14 billion years, respectively.

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

While the Site is located in a mixed industrial/commercial area, there are residences located on the former WACC property and within a few hundred feet of the former WACC property. The predominant land use in the area surrounding the former WACC facility is residential (characterized by attached houses and apartment buildings), and the neighborhood is near areas of Brooklyn that have been under intense redevelopment pressure (primarily residential) over the past 10 years.

Groundwater Use

Because the area is served by municipal water, it is unlikely that the groundwater underlying the Site will be used for potable purposes in the foreseeable future. Regional groundwater is, however, designated as a drinking water source by NYSDEC.

SUMMARY OF SITE RISKS

A baseline risk assessment is an analysis of the potential adverse human health effects caused by the release of hazardous substances from a site in the absence of any actions to control or mitigate these under current and anticipated future land uses. EPA's baseline risk assessment for this Site, which is part of the RI/FS report, focused on contaminants in the soil, sediments, and groundwater that were likely to pose significant risks to human health and the environment. Potential indoor air vapor intrusion concerns were evaluated and found to not warrant further assessment. The risk assessment for this Site (see *Final Human Health Risk Assessment Report*, CDM Smith, June 13, 2017) is available in the Administrative Record.

The Site is in a mixed industrial/commercial area with no environmentally-sensitive areas and limited habitat for ecological receptors. Therefore, a focused screening level ecological risk assessment (SLERA) was conducted in lieu of a full SLERA to assess the risk posed to ecological receptors based on sewer discharges into Newtown Creek (see *Final Ecological Screening Evaluation Technical Memorandum, Revision 1,* CDM Smith, June 19, 2017).

Human Health Risk Assessment

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance exposure from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the Chemicals of Concern (COCs) and Radionuclides of Concern (ROCs) at the Site in various media (*i.e.*, soil, groundwater, surface water, sediment, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of, inhalation of, and chemical dermal or external radiation contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations to which people may be exposed and the potential frequency and duration of exposure. Using these factors, a reasonable maximum exposure scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with contaminant exposures and the relationship between the magnitude of exposure and the severity of adverse health effects are determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the liver or kidney). Some contaminants are capable of causing both cancer and noncancer health effects.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 1×10^{-4} cancer risk means a one-in-ten-thousand excess cancer risk; or, stated another way, one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime site-related excess cancer risk in the range of 1×10^{-4} to 1×10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 1×10^{-6} being the point of departure. For noncancer health effects, a hazard index (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a noncancer HI is that a threshold level (measured as an HI of less than or equal to 1) exists below which noncancer health effects are not expected to occur.

The excess lifetime cancer risk and non-cancer health hazard estimates in the human health risk assessment (HHRA) are based on current and future reasonable maximum exposure scenarios and were developed by taking into account various health protective estimates about the frequency and duration of an individual's exposure to chemicals selected as COCs and ROCs, as well as the toxicity of these contaminants.

Because of the developed nature of the Site, direct exposure to COCs in the soil (*i.e.,* direct contact with contaminated soil, as opposed to exposure to radiation emanating from the soil, which is discussed under complete exposure pathways, below) is limited for current receptors. In addition, groundwater is not currently used for any purpose at or near the Site; therefore, direct exposure to contaminants in groundwater was not evaluated for current receptors.

While it is expected that the future land and groundwater use in this area will remain the same, a change in land use to residential was considered in the risk assessment, as is discussed in more detail below.

COCs and ROCs were selected primarily through comparison to risk-based screening levels. COCs were identified for surface and subsurface soil and groundwater by comparison of maximum detected concentrations in Site media to EPA regional screening levels for residential soil and tap water. Maximum detections of radionuclides in Site media were compared to EPA preliminary remediation goals for residential soil and tap water to select ROCs.

Health effects that could result from external radiation exposure from surface and subsurface soils and outdoor and interior surfaces were evaluated in the HHRA, as was direct contact (*i.e.,* ingestion and inhalation) with radionuclides and other chemicals in surface soils, subsurface soils, and sewer sediments, inhalation of radon and thoron in indoor air, direct contact with chemicals in the groundwater, and inhalation of vapors from groundwater.

Based on the current use and anticipated future use, the HHRA focused on a variety of possible receptors, including on-Site workers, public users of the former WACC property and surrounding areas, on-Site residents, construction/utility workers, trespassers, and school children.

Non-radiological excess cancer risk exceeds EPA's target threshold for future residents and is at the upper end of EPA's target range for industrial workers. The primary COC cancer risk drivers are PCB Aroclors and the PAH benzo(a)pyrene present in surface soil. Hot spots for these COCs are present on the former WACC property. Noncancer health hazards associated with exposure to surface soil for future residents exceed the target threshold because of exposure to PCBs and selenium. Noncancer health hazards associated with exposure to surface soil for future industrial workers also exceed the target threshold because of exposure to PCBs. Excess cancer risk for future construction/utility workers exposed to COCs in surface/subsurface soil is within EPA's target range. Noncancer health hazards associated with exposure to surface/subsurface soil for future construction/utility workers exceed the target threshold established for exposure to PCBs.

Complete exposure pathways for current, commercial receptors to radionuclides of potential concern include external gamma radiation from soil, external gamma radiation from outdoor and indoor surfaces and inhalation of radon and thoron in indoor air.

Excess cancer risks were estimated for radiological/non-radiological cancer risks, and then the radiological cancer risks were estimated for non-radon-related cancer risks and radon-related cancer risks.[11] Non-radon-related excess cancer risk for current, commercial indoor workers (1 x 10^{-3}) and industrial workers (3 x 10^{-3}) exceed EPA's target cancer risk range primarily (*i.e*., over 90 percent) related to external gamma

[11] Cancer slope factors provided in the RESidual RADioactivity, Department of Energy computer model (RESRAD) Onsite Version 7.2 model and in the online EPA PRG Calculator for Radionuclides were used by EPA's contractor, CDM Smith, for radionuclides. CDM Smith also completed a risk and dose assessment using the Preliminary Remediation Goal (PRG) calculator and RESRAD 7.2. Both methods were used to estimate cancer risk from radionuclides and the results from both methods support the need to take action under CERCLA.

radiation exposure from Th-232 and its associated decay products, with the majority of the remaining fraction associated with Ra-226. Inhalation of dust particles and soil ingestion pathways make negligible contribution to risk. Cancer risk related to exposure to radon gas, produced by the decay of radioactive on-property material, was estimated to be significantly higher than exposure to external gamma radiation. The excess cancer risk from radon was 2×10^{-3} for the current and future commercial indoor worker, as well as the future industrial worker (or double the Th-232 risk). The excess radiological cancer risk was estimated at 3×10^{-3} for both radon and non-radon risk for the future industrial worker.

As noted above, as part of a 2013 removal action which was intended to reduce potential radiation exposure to workers over the short term, EPA installed shielding in most of the work areas and a radon mitigation system in some areas on the former WACC property. Shielding was shown to be effective in reducing annual exposure to current workers to levels below public dose limits.

Total radiological excess cancer risk for future on-property residents, excluding radon, is approximately 5×10^{-3}. For residential consumption of home grown produce, the risk was 1×10^{-2}. Radiological excess cancer risk was dominated by external exposure, which accounts for 80 to 90 percent of estimated risk. Th-232 and its associated decay products were responsible for most (i.e. greater than 90 percent) of the risk due to external exposure. The total radiological excess cancer risk estimate, including radon but excluding produce, is 8×10^{-3}. The total radiological excess cancer risk estimate for all exposure pathways is 2×10^{-2}.

Radiological risks for both future indoor and industrial workers are anticipated to be much the same as risks for current workers. While any future commercial or industrial construction is likely to have a substantial on-slab foundation, which should provide much the same shielding as the shielding previously put in place, the total cancer risk for future workers even assuming shielding from a foundation and, excluding radon, remains 2×10^{-3} and if risk from radon is included, it is 3×10^{-3}. Excess cancer risks for future workers assuming no cover or remediation of the contaminated zone range as high as 4×10^{-3}. For future industrial workers with shielding and excluding radon, the cancer risk is 3×10^{-3} and if risk from radon is included, it is 5×10^{-3}. With no shielding cover, the cancer risk is 5×10^{-3}.

Future development of the Site will require construction workers to be on-Site without the benefit of shielding for up 100 work days. Excess cancer risk for construction workers will be about 5×10^{-5}. For utility workers exposed to sewer sediment, excess cancer risk will be about 2×10^{-4}, which is at the upper end of the acceptable risk range. Future risks for the general public are assumed to be similar to current risks for these receptors. High risk estimates (above 1×10^{-4}) for workers suggest some potential for the general public to experience exposure above regulatory thresholds.

Groundwater is not currently used as drinking water, and it is unlikely to be used as such in the foreseeable future; however, drinking water scenarios were evaluated for future residents and future commercial indoor workers. Chemical risk drivers in groundwater at the Site include tetrachloroethylene (PCE), trichloroethylene (TCE), and hexavalent chromium. PCE and TCE contaminant plumes appear to originate from upgradient sources and are not deemed to be Site-related. The risk associated with exposure to hexavalent chromium in groundwater is most likely overestimated in the HHRA because EPA has concluded that hexavalent chromium is present as a fraction of the total chromium concentration.

The total HI under the reasonable maximum exposure scenario (exposure above about the 90th percentile of the population distribution) for future residents exposed to COCs in surface soil is 55. The majority risk reflected in the HI is attributable to ingestion of PCBs.

Appendix II, Tables 15 through 21 summarize the human health risk data.

Screening Level Ecological Risk Assessment Summary

Because of the extremely limited habitat, a full SLERA was not conducted; instead a focused screening evaluation was conducted. The purpose of the focused SLERA was to describe the likelihood, nature, and extent of adverse effects in ecological receptors exposed to Site-related radionuclides as a result of releases to the environment from past processing activities at the Site. Because the CSO discharges may contain thorium waste from monazite sand processing, this evaluation focused on risks to ecological receptors exposed to the Site-related CSO discharges in Newtown Creek (approximately 1.9 miles to the northwest). Newtown Creek is a tidal arm of the New York-New Jersey Harbor Estuary.

Maximum and mean radionuclide concentrations measured in sediment were compared to biota concentration guides (BCGs) for riparian animals in the aquatic ecosystem. The results of the screening evaluation verify that radionuclide concentrations in sediment in the East Branch of Newtown Creek are significantly less than BCGs and that the dose to receptors is below biota dose limits. The bulk of measured radioactivity in sediment is likely due to natural background of radionuclides except for the thorium isotopes (*i.e.,* Th-228, Th-230, and Th-232) and their progeny. Observations that the Site and nearby areas provide only limited ecological habitat further support the conclusion of low or insignificant risk to ecological receptors.

Appendix II, Table 22 summarizes the ecological risk data.

Uncertainties

As in any risk assessment, the estimates of health threats (cancer risks and noncancer health hazards) have numerous associated uncertainties. To compensate for uncertainty surrounding input variables, assumptions are made that tend to result in protective estimates of risk rather than under-estimated risk. In cases where data are limited, assumptions may be based on professional judgment or subjective estimates that may under or over-estimate risks. The primary areas of uncertainty and limitations are qualitatively discussed here. The main areas of uncertainty in the HHRA include environmental data, exposure parameter assumptions, toxicological data, and risk characterization.

Environmental Data

Uncertainty is always involved in the estimation of chemical concentrations. Errors in the analytical data may stem from errors inherent in sampling and/or laboratory procedures. One of the most effective methods to minimize procedural or systematic error is to subject the data to a strict quality control (QC) review. The QC review procedure helps to eliminate many laboratory errors. However, even with all data rigorously validated, it must be realized that error is inherent in all laboratory procedures. The data validation resulted in the qualification of some analytical results as estimated and usable and a very few analytical results as rejected. Therefore, the uncertainty associated with data quality is not considered significant.

Uncertainties Associated with Identification of COCs

Samples were collected from known and suspected areas of contamination (i.e. biased sampling) and areas representative of background to delineate the nature and extent of contamination. This sampling methodology provides data that are considered to accurately represent the current level of overall contamination at the former WACC property. For areas that are anticipated to have a greater probability of having been impacted by historical operations, larger data sets exist. For a few exposure areas, data are limited, which increases the uncertainty of the adequacy of data representativeness. For example, for Lot 48, the K&M auto repair shop and office space at 1514 Cooper Avenue, no radionuclide analytical laboratory results are available.

The COC screening process was conducted to limit the number of contaminants included in quantitative risk assessment while also assuring that all significant contaminants are addressed. COCs were selected based on toxicity, nutritional essentiality, and frequency of detection. The selection of COCs was conducted by comparing maximum detected chemical concentrations to EPA's Regional Screening Levels (RSLs). Use of maximum concentrations is likely to result in the selection of chemicals with an overall low likelihood of posing unacceptable risk rather than elimination of chemicals that could pose significant risk.

Essential nutrients (*i.e.,* calcium, magnesium, potassium, and sodium) were eliminated as COCs, although they may be associated with adverse health effects if they are present at high concentrations. There are no criteria that could be used to evaluate inorganic chemicals recognized as essential nutrients; quantitative risk assessment is therefore not possible for these chemicals. However, for this Site, where comparatively high concentrations of relatively toxic chemicals are present (*e.g.,* PCBs, and PAHs), it is considered unlikely the essential nutrients would contribute significantly to overall risk.

Chemicals were also eliminated based on their frequency of detection. If a chemical was detected in five percent or less of the samples in a data set having at least 20 samples, then the chemical was only considered a COC if it is a Group A carcinogen. Very few chemicals were eliminated based on this criterion. Chemicals eliminated because they were infrequently detected in the surface/subsurface soil dataset include several VOCs that were detected in only one sample out of 30, four SVOCs, and three pesticides. Elimination of these chemicals is unlikely to have a significant impact on the risk characterization. No chemicals were eliminated as COCs in the groundwater dataset based on frequency of detection.

COCs were not selected based on comparison to background. Because COCs include inorganic chemicals that occur naturally in the environment, it is likely that some of the COCs selected for evaluation are not elevated above natural background. This results in an overestimation of Site risks. Chromium VI was selected as a COC based on the assumption that it contributes a fraction of the total chromium results. This assumption may overestimate risks associated with chromium.

Non-Detected Chemicals

A few chemicals were not detected in any samples, but their reporting limits exceeded screening levels in many sample results. When a chemical is not detected and the reporting limit exceeds the screening levels, some degree of uncertainty exists regarding the presence or absence of the chemical. The uncertainty associated with chemicals that were not detected for which the reporting limit is above the screening level in some samples is not expected to significantly affect results of the HHRA. The rationale for this conclusion is that these chemicals are not expected to be site-related based on historical site operations.

Screening Levels

The screening levels used in the risk assessment are based on the May 2016 RSLs developed by EPA. Risk-based RSLs are not available for many chemicals. Based on similarities in chemical structure and physiological activities, surrogate screening levels are used for several pesticides and PAHs. These surrogate values may result in over- or underestimating risks.

Uncertainties Associated with Exposure Assessment

Exposure pathways were identified based on current and anticipated future land use. If Site conditions change significantly in the future, exposure pathways and assumptions may require further evaluation. However, a residential scenario is considered the most conservative, and this future use was assumed while evaluating the exposed population in the future. There are two major areas of uncertainty associated with exposure parameter estimation. The first relates to the estimation of exposure point concentrations (EPCs). The second relates to parameter values used to estimate chemical intake (*e.g.*, ingestion rate, exposure frequency).

Exposure Point Concentrations

A baseline risk assessment evaluates mean concentrations over an exposure unit, considering all exposures within that area as equally possible. Risks associated with exposures are then assessed by evaluating those average or mean concentrations with exposure factors and appropriate exposure/toxicity assumptions. In all exposure calculations, the desired input parameter is the true mean concentration of a contaminant within a medium, averaged over the area where random exposure occurs. However, because the true mean cannot be calculated based on a limited set of measurements, EPA recommends the exposure estimate be based on the 95th upper confidence limit (UCL) of the mean. When data are plentiful and inter-sample variability is not large, the EPC may be only slightly higher than the mean of the data. However, when data are sparse or are highly variable, the EPC may be far greater than the mean of the available data, resulting in substantial uncertainty and a likely overestimation of risk. At this Site, the EPC was the 95th UCL or the maximum concentration. The 95th UCL was calculated for a COC when four or more sample results were detected above the detection limit in the dataset; typically, in cases where the chemical was detected infrequently (*i.e.,* in less than four samples), the maximum detected concentration was used as the EPC.

Concentrations of a COC within an exposure area were generally variable. Hot spots were identified in the Site soil data sets, and even when these hot spots were removed from the dataset, high variability remained. Overall, uncertainties in exposure point concentrations are more likely to overestimate than underestimate risks. Additionally, when calculating EPCs from sampling data, any approach dealing with chemicals that were not detected is associated with some degree of uncertainty. This is because the non-detected result does not indicate whether the chemical is absent from the medium, present at a concentration just above zero, or present at a concentration just below the reporting limit. For chemicals that are infrequently detected, many of the values used to estimate the EPCs are based on reporting limits. Elevated reporting limits for non-detected levels can lead to overestimation of risk if the actual concentrations are well below the reporting limit. However, reporting limits for Site COCs were generally toward the lower end of the detected concentrations, so the 95 percent or higher UCLs on the mean were minimally influenced by the reporting limits.

Exposure Point Concentrations for Air

Measured concentrations of soil COCs were used to estimate COC concentrations in air. Soil concentrations were multiplied by a conservative site-specific particulate emission factor (PEF) to estimate a concentration of respirable particles in air related to fugitive dust emissions from contaminated soils. The PEF is estimated based on the size of the source, the fraction of vegetative cover, and mean annual wind speed. For this analysis, the fraction of vegetative cover was assumed to be 50 percent, which likely is an overestimate for this developed area. The contribution of the inhalation of particulates pathway to total risks was not significant in comparison to the incidental ingestion and the dermal contact pathway; therefore, the conservative estimated PEF used would not likely alter the conclusions of the risk assessment.

EPCs Based on Current Conditions Used to Estimate Future Exposures

Another assumption made in this assessment is that exposure to COCs in various media remains constant over time. Thus, the assessment assumes contaminant concentrations will neither increase nor decrease over time. In reality, COC concentrations in dynamic systems change over time. Some processes, such as erosion and leaching, may lead to decreasing or increasing concentrations. COC concentrations in soil may not be subject to as much uncertainty in the future because many COCs are relatively stable in soil. In general, the magnitude of uncertainties associated with estimation of future EPCs cannot be ascertained with available data and analysis.

Exposure Parameters

Accurate calculation of risk values requires accurate estimates of the level of human exposure that is occurring. However, many required exposure parameters are not known with certainty and must be estimated from limited data or knowledge. Exposure parameters are selected using a combination of available guidance, professional judgment, and site-specific conditions. These sources of information include considerable uncertainty. Exposure assumptions used in the HHRA at this Site generally are conservative and chosen to assure human health is adequately protected. For example, assumptions made for exposure time, frequency, and duration of chemical exposures, as well as for the quantity of material ingested, inhaled, or absorbed, are all on the high end of those possible. Their combination in calculations of exposure is expected to provide an estimate of exposure well above the average.

Toxicological Data

Toxicity information for many chemicals is often limited. Consequently, there are varying degrees of uncertainty associated with toxicity values (*i.e.*, cancer slope factors, reference doses). For example, uncertainties can arise from extrapolation from animal studies to humans, high dose as opposed to low dose, and continuous exposure as opposed to intermittent exposure. In addition, in some cases, only a few studies are available to characterize the toxicity of a chemical, and uncertainties exist not only in the dose response curve but also in the nature and severity of the adverse effects the chemical may cause. EPA typically deals with this uncertainty by applying an uncertainty factor (10 to 100) to account for limitations in the database. In general, uncertainty in toxicity factors is one of the largest sources of uncertainty in risk estimates at a site. Because of the conservative methods EPA uses in dealing with the uncertainties, it is much more likely the uncertainty will result in an overestimation rather than an underestimation of risk.

Furthermore, toxicity values are often based on observed dose-response relationships such as when the chemical is dissolved in water or is in some other readily soluble form. However, chemicals in soil may exist in forms that are not readily absorbed.

The use of surrogate toxicity values could either over-estimate or under-estimate potential risks. For example, the oral reference dose for Aroclor 1254 was used to evaluate non-cancer exposures to Aroclor 1260, which is the driver for chemical non-cancer health effects. Although toxic effects vary depending on the specific PCB congener, the use of the Aroclor 1254 is expected to be conservative. Use of the EPA toxicity criteria could either over-estimate or under-estimate potential risks, but it is difficult to determine either the direction or magnitude of any such errors. In general, however, it is likely that the criteria err on the side of protectiveness for most chemicals.

Risk Characterization

There is also uncertainty in assessing the risks associated with a mixture of chemicals. In this assessment, the effects of exposure to each contaminant present have initially been considered separately. However, these substances occur together at the Site, and individuals may be exposed to mixtures of the chemicals. Prediction of how these mixtures of chemicals will interact synergistically must be based on an understanding of the mechanisms of such interactions. Individual chemicals may interact chemically in the body, yielding a new toxic component or causing different effects at different target organs. Suitable data are not currently available to rigorously characterize the effects of chemical mixtures. Consequently, chemicals present at the Site are assumed to act additively, and health risks are evaluated by summing excess lifetime cancer risks and calculating HIs for noncancer health effects.

This approach to assessing risk associated with mixtures of chemicals assumes that there are no synergistic or antagonistic interactions among the chemicals and that all chemicals have the same toxic endpoint and mechanisms of action. To the extent that these assumptions are incorrect, the actual risks could be underestimated or overestimated. Because of the uncertainties described above, this risk assessment should not be construed as presenting absolute risks or hazards. Rather, the risk assessment is designed to present a conservative analysis that allows for interpretation of site-related risks under a standard set of guidelines, defined target risks, and federal policy.

Building Materials Sampling

The hazardous building materials survey found asbestos-containing materials (ACM), assumed asbestos-containing paint (ACP), lead-based paint (LBP), and assumed LBP components, and suspect hazardous materials throughout the building structures. ACM tar was used in the construction of the buildings and found in wire insulation and electrical panels, roofing materials, window caulking, and interior construction materials. LBP was found in the TerraNova, Primo Auto Body, Flat Fix, Jarabacoa Deli locations, in the second-floor apartment, and the exterior of K&M Auto. Mercury was assumed to be present in all fluorescent lightbulbs and wall thermostats throughout. These hazardous materials likely represent a health risk that was not quantified in this HHRA.

Gamma Radiation Assessment

In 2013, a removal action[12] was implemented to limit worker and public exposure to radiologically-contaminated soils beneath the former WACC property buildings and the adjacent Irving Avenue street and sidewalk. The removal action involved installation of concrete, steel, and lead shielding to limit exposure rates in the work and public areas. EPA developed a dose assessment for the Site under pre-shield and post shield conditions. Gamma measurements were recorded in µR/hr at specific intervals using a pressurized-ionization chamber Model 451P, a type of radiation survey meter. Two measurements were recorded at each interval, one at ground level (contact) and the second at waist height (three feet above ground). For each property that was surveyed, specific areas of concern were identified, and an occupancy factor was determined. The occupancy factor was determined through Site observations of the percentage of time an individual would spend in each area of concern. To calculate an annual dose accumulation, an average was calculated for all for contact and waist results within an area of concern. The average was then multiplied by the estimated annual hours worked and the specific occupancy factor for the area of concern. The number of hours worked per year used was 2,200 hours, based on data from the U.S. Bureau of Labor Statistics.

Shielding significantly reduced exposure rates for workers, ranging from a 62 percent to a 94 percent reduction. An assessment was conducted using the dose assessment described above to calculate associated risk levels. Risk factors provided in the ASTDR Health Consultation were used to convert dose to risk for each of the work areas. This work is viewed as supplemental information, not as a replacement for the risk assessment conducted for this Site. EPA guidance generally does not base a CERCLA risk assessment on conversions from dose estimates but rather on slope factors in models such as the Preliminary Remediation Goal (PRG) calculator The values from

[12] Removal actions are immediate, short-term responses intended to protect people from immediate threats posed by hazardous substances at sites.

these reports were used to maintain consistency among the dose and risk evaluations that have been promulgated during the years that the Site has been studied. The minimum average value and the maximum value for each work area was selected to provide a range of doses and risks associated with activities at the Site. These doses were then converted to risk values by assuming a Cancer Mortality Risk Conversion factor of 5.8 x 10^{-4} per rem and a Cancer Incidence Risk Conversion Factor of 1.16 x 10^{-3} per rem. Because the listed doses are in millirem per year, the converted risk values were multiplied by 25 years, the assumed worker exposure duration in the EPA PRG calculator, to obtain a lifetime risk value for each work area.

It was assumed that the pre-shielding levels would be applicable for future worker doses and the current shielded dose rates would apply in calculating present worker risks.

Radon and Thoron Cancer Risk Estimates

Significant uncertainty surrounds evaluation of thoron/radon intrusion into buildings. Several factors that influence radon (and chemical vapor) migration (*e.g.,* preferential subsurface flow conduits, foundation integrity, seasonal variances, structural air spaces, air turn- over rates and others) are beyond RESRAD programing. As is the case with vapor intrusion, RESRAD estimates of intrusion of thoron and radon into indoor spaces should be considered screening level only. RESRAD predicts cancer risk above 1×10^{-3} for all receptors exposed to radon and risk in the 1×10^{-5} range for exposure to thoron. Radon air samples collected in on-Site, former WACC buildings prior to the installation of lead shielding and a radon mitigation system were as high as 4.6 pCi/L in Lot 42. The EPA PRG Calculator estimates a cancer risk of 3.3×10^{-2} for an indoor worker based on that maximum air concentration.

Consumption of Homegrown Produce

A number of factors contribute to significant uncertainties associated with the estimated risks associated with the consumption of homegrown produce by future residents. First, the HHRA did not seek a Site-specific estimate for consumption of homegrown produce; instead default consumption rates were used for a number of fruits and vegetables that are considered in the PRG calculator. Ingestion rates for fruits and vegetables and leafy vegetables were adjusted in RESRAD to correspond to those in the PRG Calculator. Secondly, the fraction of contaminated produce ingested was set at the default of 1, meaning that all of the specified fruits and vegetables ingested were assumed to be grown in the contaminated zone. Thirdly, plants were assumed to be irrigated with on-Site groundwater. Finally, the assumption that residents may grow a significant portion of their fruits and vegetables in a densely populated urban environment likely overestimates risks. Cancer risks associated with consumption of homegrown produce are above EPA's upper risk range because of exposure to Th-232 and its progeny even when the fraction of contaminated produce consumed is reduced to 10 percent. Cancer risks for the produce consumption pathway estimated in RESRAD and the PRG calculator are similar, but both results likely overestimate exposure that might occur on the Site in the future

<u>Noncancer Effects from Exposure to Uranium</u>

Samples collected during the RI were analyzed for uranium isotopes but not for total uranium; therefore, non-cancer health effects associated with exposure to uranium were not estimated. However, a projected amount of uranium mass from isotopes was estimated to perform a screening level noncancer hazard calculation for residents. Uranium mass was estimated assuming that U-238 makes up about 99 percent of natural uranium, while U-235 makes up only about 0.72 percent of natural uranium and, therefore, can be ignored for screening. Based on a maximum activity for U-238 of 20.87 pCi/g, the total mass for uranium was estimated to be 60 mg/kg. The current residential RSL for uranium (soluble salts) is 230 mg/kg, implying an HI of 0.3.

EPA recently issued a new risk assessment document regarding a non-cancer oral reference dose (RfD) for uranium. This document recommends the use of the ATSDR minimal risk level of 0.0002 mg/kg-day for soluble uranium instead of the RfD of 0.003 mg/kg-day currently used. Using this more conservative RfD would increase the HI estimate by a factor of 15, resulting in an HI of 4 for the maximum uranium concentration.

However, the value of 20.87 pCi/g is an outlier. The EPC, based on the data set that does not include this value, is 2 pCi/g, resulting in an HI of 0.4. Exposure to uranium in soil could make a small contribution to total HI for chemicals, but inclusion of uranium in the quantitative analysis for chemicals would not change results. The HI for future residents is 55, which is more than two orders of magnitude greater than anticipated for uranium alone.

Summary of Human Health Risks

The results of the HHRA indicate that radiation from surface and subsurface soils, the inhalation of radon in indoor air, and incidental ingestion of PCBs and benzo(a)pyrene in surface soil present unacceptable exposure risks (see Appendix II, Table 15).

Basis for Action

Based upon the quantitative human-health risk assessment and ecological evaluation, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the response action selected in this ROD, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels.

The following RAOs have been established for the Site:

- Reduce or eliminate human exposure via inhalation of radon and thoron, incidental ingestion, dermal adsorption, and external exposure to radiological contamination (Ra-226 and Th-232) that may be present within the former WACC property buildings to levels protective of current and anticipated future use by preventing exposure to contaminant levels above remediation goals (RGs);[13]
- Reduce or eliminate the human exposure threat via inhalation, incidental ingestion, dermal adsorption, and external exposure to contaminated Site soils and solids (*i.e.,* sewer pipe and sediments/sludge in sewers) to levels protective of current and anticipated future land use by preventing exposure to benzo(a)pyrene, Aroclor-1260, Ra-226, and Th-232 concentrations above RGs; and
- Prevent/minimize the migration of Site contaminants off Site through surface runoff, dust particulate migration, and CSO discharge.

In achieving the RAOs for the Site, EPA will also rely on an "As Low As Reasonably Achievable" (ALARA) (10 CFR 20.1003) principle. ALARA, which has been used at other radiologically-contaminated sites in EPA Region 2, means taking additional measures during implementation of the remedial action beyond those required to meet a specified cleanup goal to assure protectiveness. An ALARA approach will be used because of the long-lived nature of radionuclides, the difficulty in eliminating routes of exposure, and limitations of current analytical equipment to detect radionuclides at levels approaching natural background levels. Applying RGs with ALARA principles at other EPA Region 2 sites has resulted in exposure levels that are lower than the levels that result from using the RGs alone.

Remediation Goals

The RGs for this Site are summarized in Appendix II, Table 23.

---

[13] Because there are no promulgated standards or criteria that apply to radiological-contaminated soils and building material, RGs were developed. RGs are used to define the extent of cleanup needed to achieve the RAOs.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ, as a principal element, treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, that at least attain ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives considered for addressing the contaminated building material, sewer pipe and manholes, and surface and subsurface soil contamination can be found in the *Final Feasibility Study Report* for the Site.

The time required to construct or implement the remedy under each alternative is estimated based on construction activity production rates. Actual durations may be longer. The estimates do not include the time required to design the alternative, negotiate the performance of the alternative with any potentially responsible parties, or procure contracts for design and construction. The remedial alternatives are:

Alternative 1: No Further Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund regulations require that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any remedial measures that address the contamination at the Site.

Because this alternative would result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. Although this five-year review is a requirement independent of this remedy, if justified by such a review, future remedial actions may be necessary and required to be implemented to remove, treat, or contain the contaminated materials.

Alternative 2: Temporary Relocation of Tenants, Targeted Building Demolition, Installation of Additional Shielding, Shallow Soil Excavation, Soil Cover Over Remaining Contamination, Sewer Removal/Cleaning, Off-Site Disposal, and Institutional Controls

Capital Cost:	$35,500,000
Annual O&M Cost:	$109,000
Present-Worth Cost:	$36,900,000
Construction Time:	1 year 3 months

Under this alternative, the tenants of the buildings on Lots 42, 44, 46, and 48 would be temporarily relocated while response activities on the former WACC property occur. The construction would begin with the demolition of the currently unoccupied warehouse located on Lot 33.

After the building demolition is completed, contaminated soil would be excavated to a maximum depth of approximately four feet bgs on the portions of the Site where no buildings are present and beneath the roadway and sidewalks along Irving Avenue and Moffat Street and on the 308 Cooper Street and 350 Moffat Street properties.

In accordance with ALARA principles, the clay pipe sewer line beginning at the manhole located on Irving Avenue southwest of the former WACC property and extending northwest to the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue would be excavated and replaced (approximately 150 feet of pipe). After the removal of the sewer line, bedding material samples would be collected from the open excavation to determine if the bedding material is contaminated. Any bedding material that exceeds the RGs would also be removed and replaced.

The remaining portion of the sewer line down to the intersection of Wyckoff Avenue and Halsey Street (approximately 1,950 feet) and a portion of the pipe line on Cooper Avenue branching with the Irving Avenue sewer line approximately 200 feet northeast of the Cooper Avenue and Irving Avenue intersections (approximately 200 feet) would undergo jet cleaning using high-pressure water nozzles to flush out dirt, sediments/sludge, and any other matter from the sewer pipeline. The jetting would be performed in combination with vacuuming to collect the jetted waste for off-site disposal. Following completion of sewer jet cleaning, a gamma survey would be performed within the flushed sewer to determine if high gamma counts are still present. Any portions of the sewer line with elevated gamma counts would undergo further investigation, including the sewer material and bedding, to determine the source of the radiological contamination. Those portions of the sewer line, along with any bedding material that exceeds RGs, would be removed and replaced with uncontaminated material.

In order to maintain uninterrupted sewer service during the sewer line replacement, upgradient sewage flow would need to bypass the portion of sewer line under construction temporarily to connect the flow to the downgradient sewer line. To do this, a temporary bypass system with the design flow capacity of the upgradient sewer line would be installed in the upgradient manhole to the downgradient manhole. Temporary plugs would be set in place between these points to allow the sewer pipe to be removed.

Final status surveys (gamma scan and post-excavation sampling) would be performed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)[14] to ensure that the RGs are met prior to Site restoration. In areas where contaminated soil is determined to be present greater than 4 feet bgs, the excavation would only be increased horizontally based on sidewall sampling results in excess of RGs. The Site restoration would include backfill of excavated areas with clean fill, placement of a geofabric layer to delineate clean fill from contaminated soil, and replacement of portions of the sidewalk and roadway that were removed during excavation.

Additional radiation shielding would be installed on top of the existing shielding in the buildings on Lots 42 and 44 and the basement side wall on Lot 46 along its boundary with Lot 44.

Under this alternative, it is estimated that 18,800 cubic yards (cy) of contaminated soil, sewer sediment, and debris would be excavated and disposed of off-site. The materials would be disposed of as Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)[15] waste in a permitted landfill. It is estimated that 5,900 cy of building debris would be disposed of off-site in a non-hazardous waste landfill.

It is anticipated that an environmental easement would be recorded for Lots 42, 44, 46, areas of Irving Avenue and Moffat Street where contamination would be left in place, and the 350 Moffat Street property, which would restrict intrusive activity and allow access for monitoring. The easement would also require the installation of a radon mitigation system prior to or during any future construction in these areas.

A long-term monitoring plan would be put in place to monitor radon and thoron levels in the buildings that would remain at the former WACC property. Maintenance of the existing radon system would continue, annual inspections of the soil cover will be

[14] This document provides guidance on how to demonstrate that a site is in compliance with a radiation dose- or related risk-based regulation.

[15] These are naturally occurring radioactive materials that have been concentrated or exposed to the accessible environment as a result of human activities, such as manufacturing, mineral extraction, or water processing.

performed to monitor erosion and ensure continued protection of human health, and maintenance would be conducted as necessary, and groundwater samples would be collected periodically to monitor if contaminants are leaching from the soil over time.

While a remediation time frame of 30 years is used for estimating the costs associated with the operation and maintenance (O&M) activities, because of the extremely long half-life of the radioactive isotopes that are present at the Site, it is understood that under this alternative, O&M would continue in perpetuity.

Annual inspections of the soil cover would be performed to monitor erosion and ensure continued protection of human health, and maintenance would be conducted as necessary. Groundwater samples would be collected periodically to monitor if contaminants are leaching from the soil over time.

Because this alternative would result in contaminants remaining on Site above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the remedy be reviewed at least once every five years.

Alternative 3: Permanent Relocation of Tenants, Demolition of WACC Buildings, Shallow Soil Excavation, Soil Cover of Remaining Contamination, Sewer Removal/Cleaning, Off-Site Disposal, and Institutional Controls

Capital Cost:	$33,900,000
Annual O&M Cost:	$60,000
Present-Worth Cost:	$34,600,000
Construction Time:	1 year 4 months

Under this alternative, the tenants of the buildings on Lots 42, 44, 46, and 48 would be permanently relocated. Subsequently, all of the former WACC property buildings would be demolished.

Following the demolition of the buildings, soil excavation would extend to a maximum depth of approximately four feet bgs over the entire former WACC property,[16] as well as beneath the roadway and sidewalks along Irving Avenue and Moffat Street and on the 308 Cooper Street and 350 Moffat Street properties.

The contaminated sewer would be addressed as described in Alternative 2.

---

[16] Contaminated soil beneath Lots 42 and 44 extends to a depth of approximately 28 feet bgs Risk calculations indicate that if a building is constructed at the property in the future, the four-foot clean soil cover and installation of a radon mitigation system would reduce the risk to within EPA's acceptable risk range.

Final status survey and Site restoration would be addressed as described in Alternative 2.

Under this alternative, an estimated 19,400 cy of contaminated soil, sewer sediment, and debris would be excavated and disposed of off-site as TENORM waste in a permitted landfill. Approximately 6,400 cy of building debris would be disposed of off-site in a non-hazardous waste landfill.

To limit intrusive activity and allow access for monitoring, an environmental easement would be recorded for the portions of the former WACC property and Irving Avenue and Moffat Street, and the 350 Moffat Street property where contamination would remain at depth. The easement would also require the installation of a radon mitigation system for future construction.

Annual inspections of the soil cover would be performed to monitor erosion and ensure continued protection of human health, and maintenance would be conducted as necessary. Groundwater samples would be collected periodically to monitor if contaminants are leaching from the soil over time.

Because this alternative would result in contaminants remaining on-Site above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that a review be conducted at the Site at least once every five years.

Alternative 4: Permanent Relocation of Tenants, Demolition of WACC Buildings, Soil Excavation, Sewer Removal/Cleaning, and Off-Site Disposal

Capital Cost:	$39,900,000
Annual O&M Cost:	$0
Present-Worth Cost:	$39,900,000
Construction Time:	1 year 5 months

Under this remedial alternative, as in Alternative 3, the tenants of the buildings on Lots 42, 44, 46, and 48 would be permanently relocated, and all of the former WACC property buildings would be subsequently demolished.

Following the demolition of the buildings, all soils exceeding the RGs would be excavated from the former WACC property, including those highly contaminated soils that extend down to approximately 28 feet bgs beneath Lots 42 and 44, as well as those beneath the roadway and sidewalks along Irving Avenue and Moffat Street and on the 308 Cooper Street and 350 Moffat Street properties.

The contaminated sewer line would be addressed as described in Alternative 2.

Final status surveys would be performed to ensure that RGs are met prior to Site restoration in accordance with MARSSIM.

Site restoration would include backfilling areas of the excavated areas with clean fill followed by resurfacing of roadways and sidewalks impacted by the construction. The top layer of the clean fill would consist of soil suitable to support vegetation.

Under this alternative, an estimated 24,300 cy of contaminated soil, sewer sediment, and debris would be excavated and disposed of off-site as TENORM waste in a permitted landfill. Approximately 6,400 cy of building debris would be disposed of in a non-hazardous waste landfill.

Because this alternative would not result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, five-year reviews would not be necessary.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, EPA considers the factors set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, and conducts a detailed analysis of the viable remedial alternatives in accordance with the NCP, 40 C.F.R Section 300.430(e)(9), the EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies*, OSWER Directive 9355.3-01, and the EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives set forth in the FS against each of the nine evaluation criteria set forth at Section 300.430(e)(9)(iii) of the NCP and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

Those criteria are overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance.

The evaluation criteria are described below.

- *Overall protection of human health and the environment* addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- *Compliance with ARARs* addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.
- *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ.
- *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- *Cost* includes estimated capital and O&M costs, and net present-worth costs.
- *State acceptance* indicates if, based on its review of the RI and FS reports and the Proposed Plan, the State concurs with the selected remedy at the present time.
- *Community acceptance* refers to the public's general response to the alternatives described in the FS report and Proposed Plan.

The following is a comparative analysis of these alternatives based upon the evaluation criteria noted above.

Overall Protection of Human Health and the Environment

Alternative 1 would not be protective of human health and the environment, because it would not actively address the contaminated soil, building materials, and sewer line.

Alternative 2 would achieve the RAOs and protection of human health through the installation of additional shielding, excavation and off-Site disposal of contaminated surface soil and backfilling with clean fill, and sewer removal/cleaning, in combination with a requirement that a radon mitigation system be installed in any future construction, long-term management, and institutional controls. The protectiveness of this alternative would be dependent on the adherence to institutional controls and the O&M of the implemented remedy, in perpetuity.

Alternative 3 would achieve RAOs and protection to human health by excavation and off-Site disposal of contaminated surface soil and backfilling with clean fill, sewer removal/cleaning, long-term management, installation of a radon mitigation system for future construction, and institutional controls. The protectiveness of this alternative is dependent on adherence to institutional controls and O&M of the implemented remedy in perpetuity.

Alternative 4 would achieve RAOs and protection of human health and the environment by sewer removal/cleaning and excavating contaminated soil and building materials above the PRGs from the Site. The residual risks would be within EPA's acceptable risk range and, therefore, institutional controls would not be required.

Compliance with Applicable or Relevant and Appropriate Requirements

Because there are no federal or state promulgated standards or criteria that apply to radiological-contaminated soils and building material, RGs were developed to define the extent of the cleanup needed to achieve the RAOs.

Because the contaminated soils, building material, and sewer would not be addressed under Alternative 1, this alternative would not achieve the cleanup objectives.

Alternative 2 would meet the RGs through the installation of additional shielding, the excavation and off-Site disposal of contaminated surface soil and backfilling with clean fill, sewer removal/cleaning, and the installation of radon mitigation systems in future construction.

Alternative 3 would meet the RGs through a combination of excavation and off-Site disposal of contaminated surface soil and backfill with clean fill, and sewer removal/cleaning.

Alternative 4 would meet the RGs through sewer removal/cleaning and removing contaminated soil and building materials.

Alternatives 2, 3, and 4 would be conducted while adhering to all appropriate transportation and disposal requirements, as well as Federal relocation requirements.

Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants.

The additional shielding, excavation, and off-Site disposal of contaminated surface soil and backfilling with clean fill, and sewer removal/cleaning under Alternative 2 would provide long-term effectiveness and permanence for the buildings that would remain in place. Long-term effectiveness and permanence would rely on the maintenance of the soil covering the contamination left in place, future monitoring, and implementation of institutional controls to require the installation of a radon mitigation system if buildings are constructed on the former WACC property in the future.

Alternative 3 would provide a slightly greater degree of long-term effectiveness and permanence than Alternative 2 in that it would leave no WACC buildings in place and would employ shallow excavation and backfilling with clean fill in the excavation areas; however, it would still require institutional controls to limit intrusive activity and allow access for monitoring and require the installation of a radon mitigation system if buildings are constructed on the former WACC property in the future.

As a result of the extremely long half-life of the radioactive isotopes present at the Site, under Alternatives 2 and 3, O&M would be necessary in perpetuity.

Alternative 4 would provide the highest degree of long-term protectiveness and permanence by sewer removal/cleaning and removing contaminated soil and building materials above the RGs from the Site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 1 would provide no reduction in toxicity, mobility or volume.

Alternatives 2, 3 and 4 would reduce the mobility of contaminants to varying extents by removing varying amounts of contaminated soil and debris from the Site. As Alternative 4 would remove the greatest amount of contaminated soil and debris, it would result in the greatest reduction in the mobility of contaminants, followed by Alternative 3 and the Alternative 2.

Alternatives 2 through 4 would not reduce the toxicity or volume of contaminants and would not meet the statutory preference for treatment as a principal element of the remedial action. However, no proven and cost-effective treatment technology is currently available to treat radioactive wastes.

Short-Term Effectiveness

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to remediation workers or the community as a result of its implementation.

Alternatives 2-4 involve the same extent of sewer removal and cleaning, and therefore they would equally adversely impact local traffic through street closures during sewer work.

Under Alternative 2, only the warehouse on Lot 33 would be demolished and would only involve shallow soil excavation; therefore, of the action alternatives, this alternative would present the least impact to the community and workers as a result of the demolition and excavation work.

Alternative 3 would present a slightly greater impact to the community and workers than Alternative 2 because of demolition of all of the buildings and the excavation of a greater volume of soil, which will result in a longer duration of work and more truck traffic.

Because Alternative 4 would involve the greatest amount of soil excavation, it would cause the greatest level of short-term impacts to the community and potential impact to workers as a result of the need to safely manage and conduct these operations in limited space and constrained areas. These impacts could, however, be mitigated as discussed below.

For Alternatives 2-4, there is a potential for increased stormwater runoff and erosion during construction and excavation activities that would have to be properly managed to prevent or minimize any adverse impacts. For these alternatives, appropriate measures would have to be taken during the building demolition and excavation activities to prevent the transport of fugitive dust and exposure of workers and the community.

Alternatives 2-4 might present some limited risk to remediation workers through exposure to radiologically-contaminated materials through the building demolition and soil excavation activities. The risks to on-Site workers could, however, be minimized by utilizing proper protective equipment.

Noise from the demolition and excavation work associated with Alternatives 2-4 could present some limited adverse impacts to remediation workers and nearby residents. Following appropriate health and safety protocols and exercising sound engineering practices would protect the remediation workers and community.

Alternatives 2-4 would require the off-site transport of contaminated soil and material (ranging from approximately 920 truckloads for Alternative 2 to 1,240 truckloads for Alternative 4), which would potentially adversely affect local traffic. Additional trucks would be needed to bring clean backfill material to the Site. However, a traffic control plan would be developed to mitigate adverse impacts to traffic.

The temporary relocation of the commercial tenants under Alternative 2 would physically disrupt the businesses twice. Permanently relocating the businesses under Alternatives 3 and 4 would, on the other hand, cause less physical disruption in that the tenants would only have to move once. Depending upon the location to which the tenants are relocated, both temporary and permanent relocation could cause the loss of customers.

Because no actions would be performed under Alternative 1, there would be no implementation time. It is estimated that Alternatives 2-4 would require one year five months, one year six months, and one year seven months, respectively, to implement.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake.

Although the total volume of material to be excavated under Alternative 2 is less than the other alternatives, the targeted demolition of the warehouse and excavation of the soils on Lot 33, coupled with the placement of shielding in the other former WACC property buildings, would likely make Alternative 2 more difficult to implement. This is due to the structural condition of the buildings on the lots adjacent to Lot 33 and the physical constraints present in the area. The demolition of all of the former WACC buildings that would occur under Alternatives 3 and 4 would make the demolition and excavation components of those alternatives easier to implement than the demolition component of Alternative 2.

Alternatives 2-4 would employ technologies known to be reliable and that can be readily implemented. Equipment, services, and materials needed for these alternatives are readily available, and the actions would be administratively feasible. Sufficient facilities are available for the disposal of the excavated soils and demolition debris.

While the installation of additional shielding under Alternative 2 is technically feasible, the additional shielding would limit the ability of one of the tenants, an auto body shop, from conducting its current business, as there would not be sufficient vertical space to lift automobiles for repairs.

The implementation of the intended institutional controls under Alternatives 2 and 3 would be moderately difficult to implement and potentially difficult to maintain.

Cost

The estimated capital, O&M, and present-worth cost are discussed in detail in EPA's *Final Feasibility Study Report*. For estimating costs and for planning purposes, a 30-year time frame was used for O&M under Alternatives 2, 3, and 4. The costs estimates are based on the best available information. The highest present-worth cost is Alternative 4 at $39.9 million. See Appendix II, Table 24 for a more detailed summary of the estimated costs for Alternative 4.

Alternative	Capital Cost	Annual O&M Cost	Present Worth
1	$0	$0	$0
2	$35,500,000	$109,000	$36,900,000
3	$33,900,000	$60,000	$34,600,000
4	$39,900,000	$0	$39,900,000

State/Support Agency Acceptance

NYSDEC concurs with the selected remedial alternative.

Community Acceptance

Although concerns were expressed by the public during the public comment period regarding (a) EPA's future ability to fund the preferred alternative, (b) impacts to the on-Site businesses because of their proposed relocation, (c) impacts to the community during construction, and (d) redevelopment of the Site following the end of construction, the public generally supports the selected remedy. These comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or will present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy-selection criteria that are described above. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

EPA considers former process tailing residues remaining on the Site to be principal threat wastes because this material has the potential to act as a source for further off-site contamination if uncovered. As discussed previously, no proven and cost-effective treatment technology is currently available to treat radioactive wastes. The selected remedy will address source materials constituting principal threats by excavating and removing it for proper off-site disposal.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has determined that Alternative 4, permanent relocation of the tenants, demolition of the buildings on the former WACC property, contaminated soil excavation, contaminated sewer removal/cleaning, and off-site disposal of the contaminated soils and debris, best satisfy the requirements of CERCLA Section 121, 42 U.S.C. § 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR § 300.430(e)(9).

While Alternative 2 is approximately $3 million less costly than Alternative 4, the latter being the costliest alternative, it requires the disruption of the six commercial tenants twice (temporary relocation) and leaves significant levels of radiological contamination in-place in both the structures and underlying soil (which would also continue to produce radon/thoron gas) that would necessitate institutional controls, maintenance, and perpetual long-term monitoring to be protective. Furthermore, the additional shielding required by Alternative 2 would limit the ability of one of the tenants, an auto body shop, from conducting business, as there would not be sufficient vertical space to lift automobiles for repairs. In addition, the ability to ensure that the institutional controls remain in place in such a setting as the WACC buildings would be difficult.

While Alternative 3 is the least costly action alternative and removes the radiologically-contaminated building materials and much of the contaminated soils, because some contaminated soil would remain, institutional controls would be necessary to restrict the future use of the property. Ensuring such controls remain effectively in place can be difficult. Since the radioactive half-life of Th-232 is 14 billion years, institutional controls, maintenance, and long-term monitoring would need to be managed in perpetuity. For a relatively small increase in costs, Alternative 4 avoids the long term Site management issues associated with Alternatives 2 and 3, because it permanently relocates the tenants and removes the radiologically-contaminated building materials and underlying contaminated soils, thereby allowing unlimited future use of the property.

Description of the Selected Remedy

The selected remedy to address the source areas includes the following components:[17]

- All tenants of the buildings on the former WACC property will be permanently relocated.
- All of the buildings on the former WACC property will be demolished.
- Following the demolition of the buildings, all soils exceeding the RGs on the former WACC property, the 308 Cooper Street and 350 Moffat Street properties, as well as beneath the roadway and sidewalks along Irving Avenue and Moffat Street, will be excavated.

[17] See Figures 6 and 7 for illustrations of the selected remedy.

- The clay pipe sewer line beginning at the manhole located on Irving Avenue southwest of the former WACC property and extending northwest to the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue will be excavated and replaced (approximately 120 feet of pipe).
- After the removal of the sewer line, bedding material samples will be collected from the open excavation to determine if the bedding material is contaminated. Any bedding material that exceeds the RGs will also be removed and backfilled with clean fill.
- The remaining portion of the sewer line down to the intersection of Wyckoff Avenue and Halsey Street (approximately 2,150 feet) will undergo jet cleaning using high-pressure water nozzles to flush out dirt, sediments/sludge, and any other matter from the sewer pipeline. The jetting will be performed in combination with vacuuming to collect the jetted waste.
- Following completion of sewer jet cleaning, a gamma survey will be performed within the flushed sewer to determine if high gamma counts are still present. Any portions of the sewer line with elevated gamma counts will undergo further investigation, including the sewer material and bedding, to determine the source of the radiological contamination. Those portions of the sewer line, along with any bedding material that exceed the RGs, will be removed and replaced.
- Site restoration will include backfilling the areas of excavation with clean fill followed by resurfacing of roadways and sidewalks impacted by the construction.
- The excavated contaminated soil, sewer sediment, and debris will be disposed of either in a non-hazardous waste landfill or in a landfill permitted to accept radioactive waste, based upon the level of radioactivity in the materials.

No data were collected at the following three nearby properties: 282 Moffat Street; 323 Moffat Street; and the parking lot of 335 Moffat Street. Additionally, only minimal data was collected at the non-parking lot portion of 335 Moffat Street, 338-350 Moffat Street, and the area adjacent to the nearby active rail lines. During the design of the selected remedy, an investigation will be conducted at these adjacent properties which may have been impacted by site-related activities. Any contaminated soils in these areas will be addressed as part of the remedy.

During the design, a Phase 1A Cultural Resources Survey will be performed to document the Site's historic resources.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy. This will include consideration of green remediation technologies and practices.

Summary of the Estimated Remedy Costs

The estimated capital and total present-worth cost of the selected remedy is $39.9 million. There are no anticipated annual O&M costs associated with the selected remedy because all material with contamination above their RGs will be removed, therefore the absence of monitoring causes the capital cost and present worth cost for the selected remedy to be identical.

It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy. For example, a sensitivity analysis conducted for Alternative 4 found that a 20 percent decrease in the volume of radiological waste, would result in a decrease in the total capital cost of $3.6 million or 9 percent. A decrease in production rate of 20 percent would result in an increase of the total capital cost of $2.7 million or 7 percent, and if all wastes were found to be radioactive waste, the result would be an increase of $1 million or 3 percent to the total capital cost.

Expected Outcomes of the Selected Remedy

Under Alternative 4, all material, including soil, building materials, and sewer sediments with contamination above their RGs will be removed and disposed of off-site, eliminating unacceptable human health risks to all potential present and future receptors. It is anticipated that the Site property will be available for unrestricted use and unlimited exposure following the completion of the remedy implementation. The estimated time to implement the remedy is 17 months. Groundwater at the Site will not be available because of contamination from upgradient sources; the remedy is expected to fully address the Site as a potential source of groundwater contamination. See Appendix II, Table 23 for a list of the RGs for the Site.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, EPA has either determined that the selected remedy meets these statutory requirements or has provided a justification as to why the selected remedy will not meet the requirement.

Protection of Human Health and the Environment

Alternative 4 will provide protection to human health and the environment and meet the RAOs for soils and sediments, as well as future inhabitants of buildings that might be constructed on the Site. The human health risks associated with direct contact with contaminated soils or the combined sewer system will be eliminated by a combination of removal of soils, including all principal threat waste soils and materials exceeding the RGs, cleaning of the sewers, and placement of clean fill in excavated areas, thereby allowing unrestricted use and unlimited exposure following the completion of the remedy implementation.

Compliance with ARARs and Other Environmental Criteria

This alternative will be designed and implemented in compliance with chemical-, location- and action-specific ARAs identified in Appendix II, Table 25, which also summarizes other criteria, advisories, or TBCs that EPA will consider during implementation of the selected remedy.

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of those alternatives with O&M. The total estimated present worth cost for implementing the selected remedy is $39.9 million.

Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective (NCP Section 300.430(f)(1)(ii)(D)) in that it represents reasonable value for the money to be spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy has been determined to be proportional to the costs, and the selected remedy therefore represents reasonable value for the money to be spent.

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

No proven and cost-effective treatment technology is currently available to treat radioactive wastes; the selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

Preference for Treatment as a Principal Element

The selected remedy will not meet the statutory preference for the use of treatment as a principal element of the remedial action because no proven and cost-effective treatment technology is currently available to treat radioactive wastes

Five-Year Review Requirements

Because this alternative will not result in contaminants remaining on-Site above levels that would otherwise necessitate restrictions on use and limited exposure, five-year reviews will not be necessary. If the remedy requires five or more years to complete, five-year reviews will be performed until the remedial action is completed.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on July 27, 2017, identified Alternative 4, permanent relocation of tenants, demolition of WACC buildings, soil excavation, sewer removal/cleaning, and off-site disposal of the soils, materials, and sewer sediments, as the preferred remedy. EPA considered all comments during the public comment period to determine if any significant changes to the remedy, as originally identified in the Proposed Plan, were necessary. During the public meeting, EPA was made aware of one additional commercial tenant and three residential tenants located on Lot 46. The total number of tenants who would be permanently relocated now includes six commercial tenants and three residential tenants resulting in an increase to the total estimated cost of the remedy to $39,900,000.

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX I

FIGURES

SUMMARY OF FIGURES

Figure 1: Site Location

Figure 2: Site Map

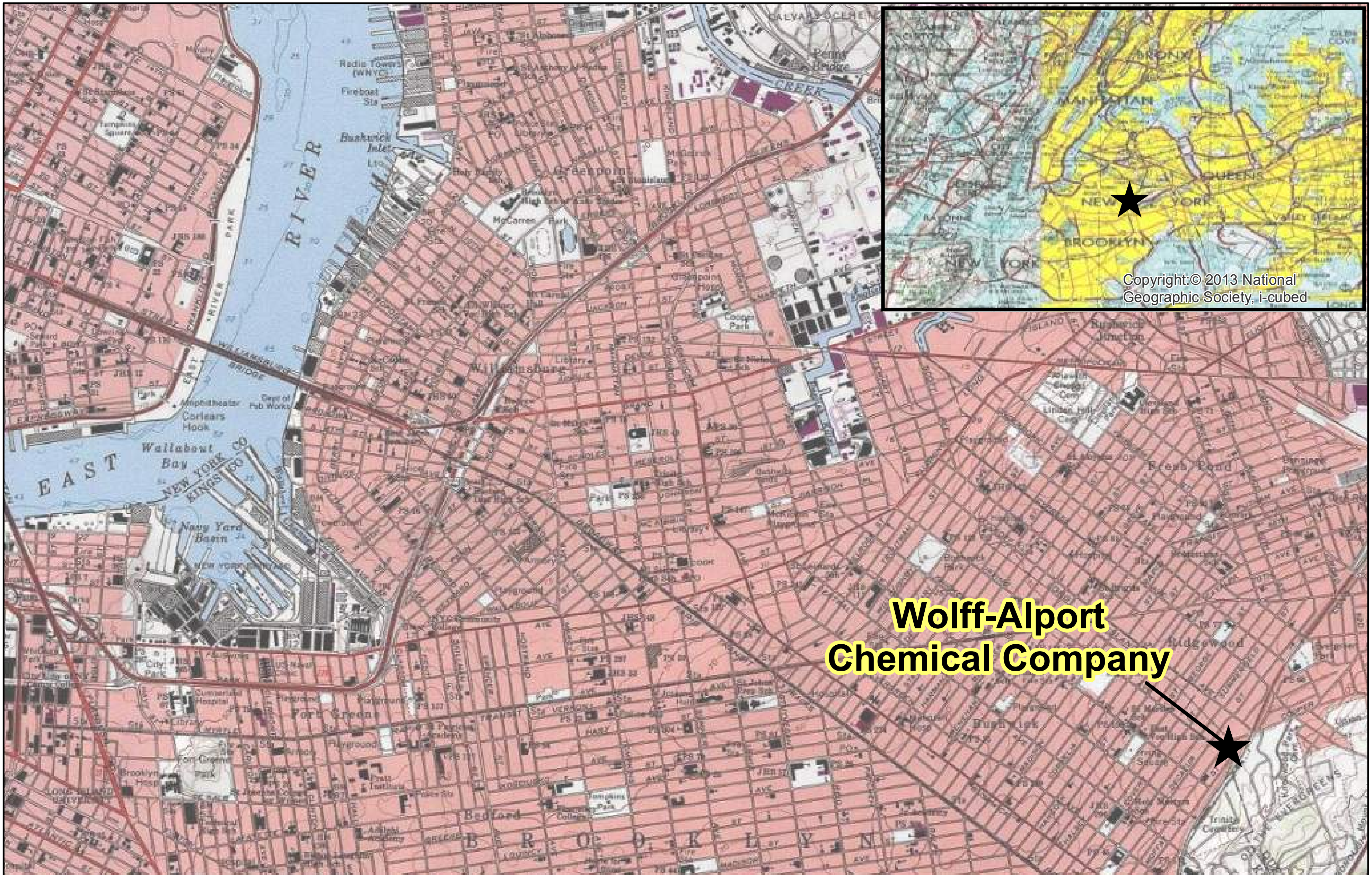
Figure 3: Conceptual Site Model

Figure 4: Extent of Contamination in Soils

Figure 5: Extent of Contamination in Sewers

Figure 6: Alternative 4 Soil Excavation Plan

Figure 7: Alternative 4 Sewer Remediation Plan



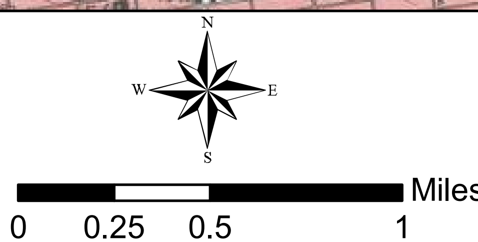
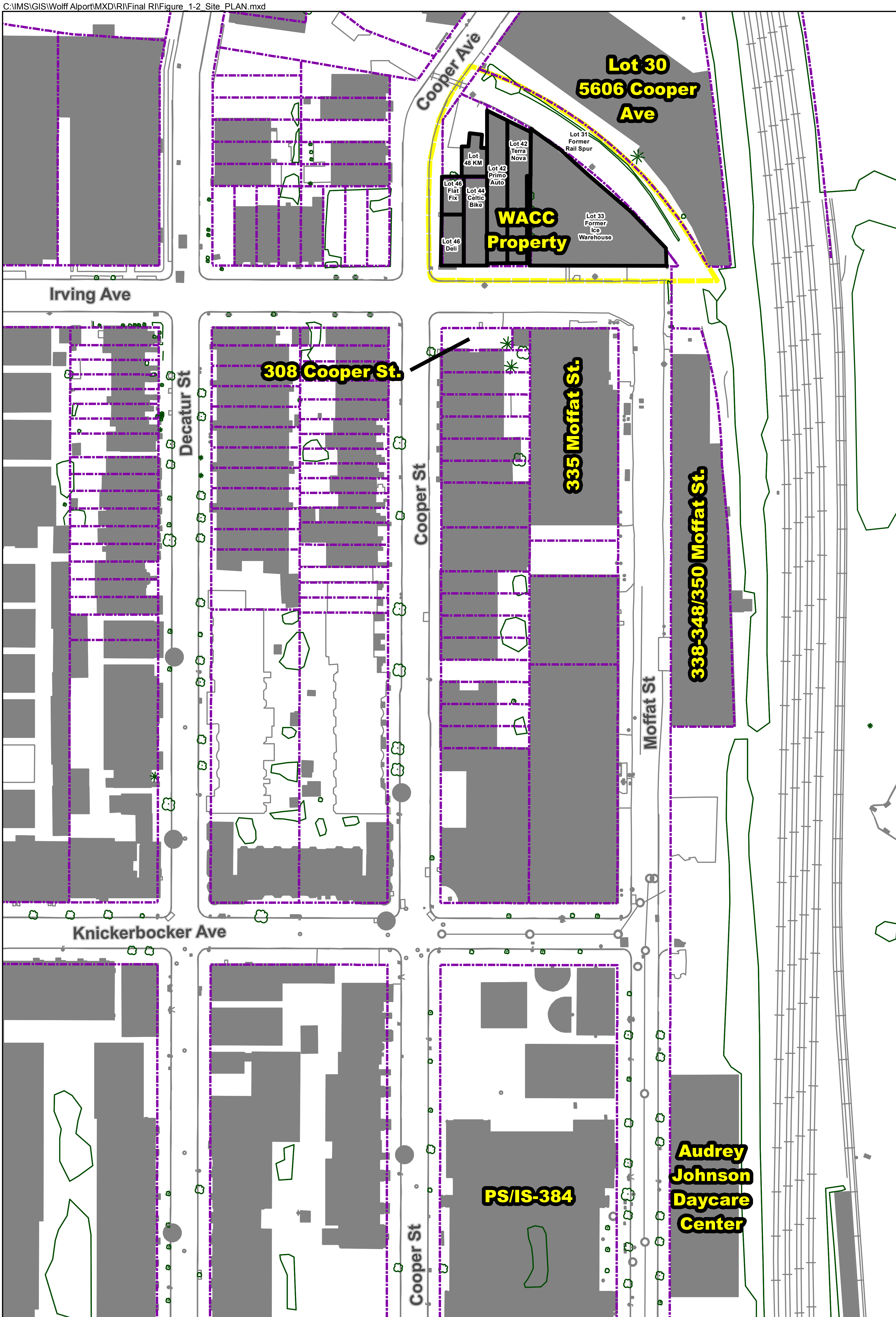


Figure 1
Site Location
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

CDM Smith

C:\IMS\GIS\Wolff Alport\MXD\RI\Final RI\Figure_1-2_Site_PLAN.mxd



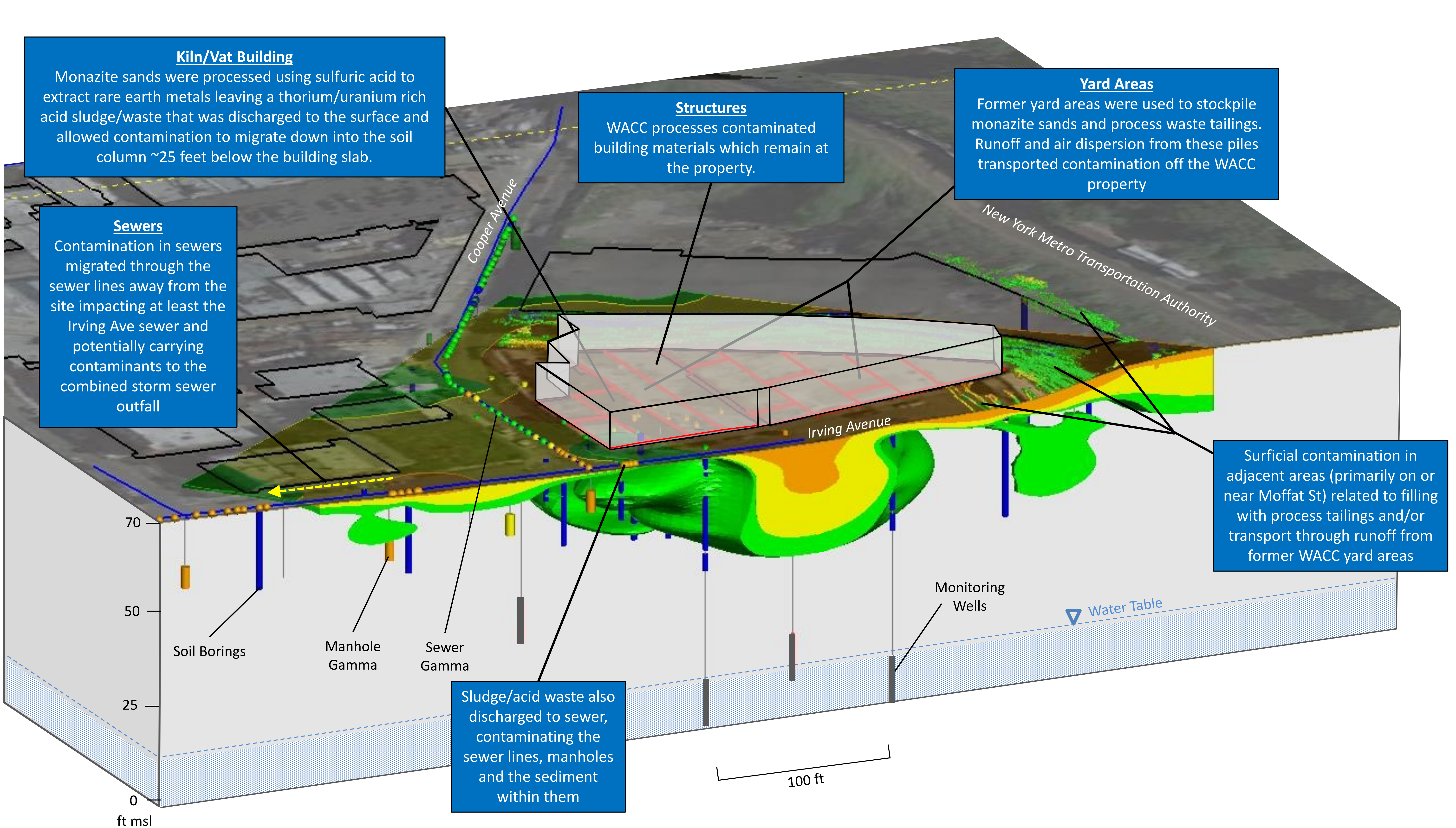
WACC Property
WACC Lot Boundaries
Vegetation
Property Lines
Buildings

Acronyms
PS/IS - Public School/ Intermediate School
WACC - Wolff-Alport Chemical Company

Feet
0 50 100 200

Figure 2
Site Map
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

CDM Smith



Notes

CPM – represents range of gamma activity in counts per minute

WACC – Wolff-Alport Chemical Company

Radiological contamination in the Conceptual Site Model is represented as colors grading from green (less-contaminated) to orange (more-contaminated),

CDM Smith

Figure 3
Conceptual Site Model
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

CONTAMINANTS OF CONCERN	PRELIMINARY REMEDIATION GOAL
AROCLOR 1260	1 mg/kg
BENZO(A)PYRENE	1 mg/kg
THORIUM–232	5.22 pCi/g
RADIUM–226	1.92 pCi/g

LEGENDS

- 2015 RI BORINGS
- 2013 BVNA BORINGS
- 2010 BERGER BORINGS
- RI MONITORING WELLS
- RESULT EXCEEDS PRELIMINARY REMEDIATION GOALS
- NOT ANALYZED
- RESULT BELOW PRELIMINARY REMEDIATION GOALS
- EXTENT OF CONTAMINATION

CDM Smith

NOTES:

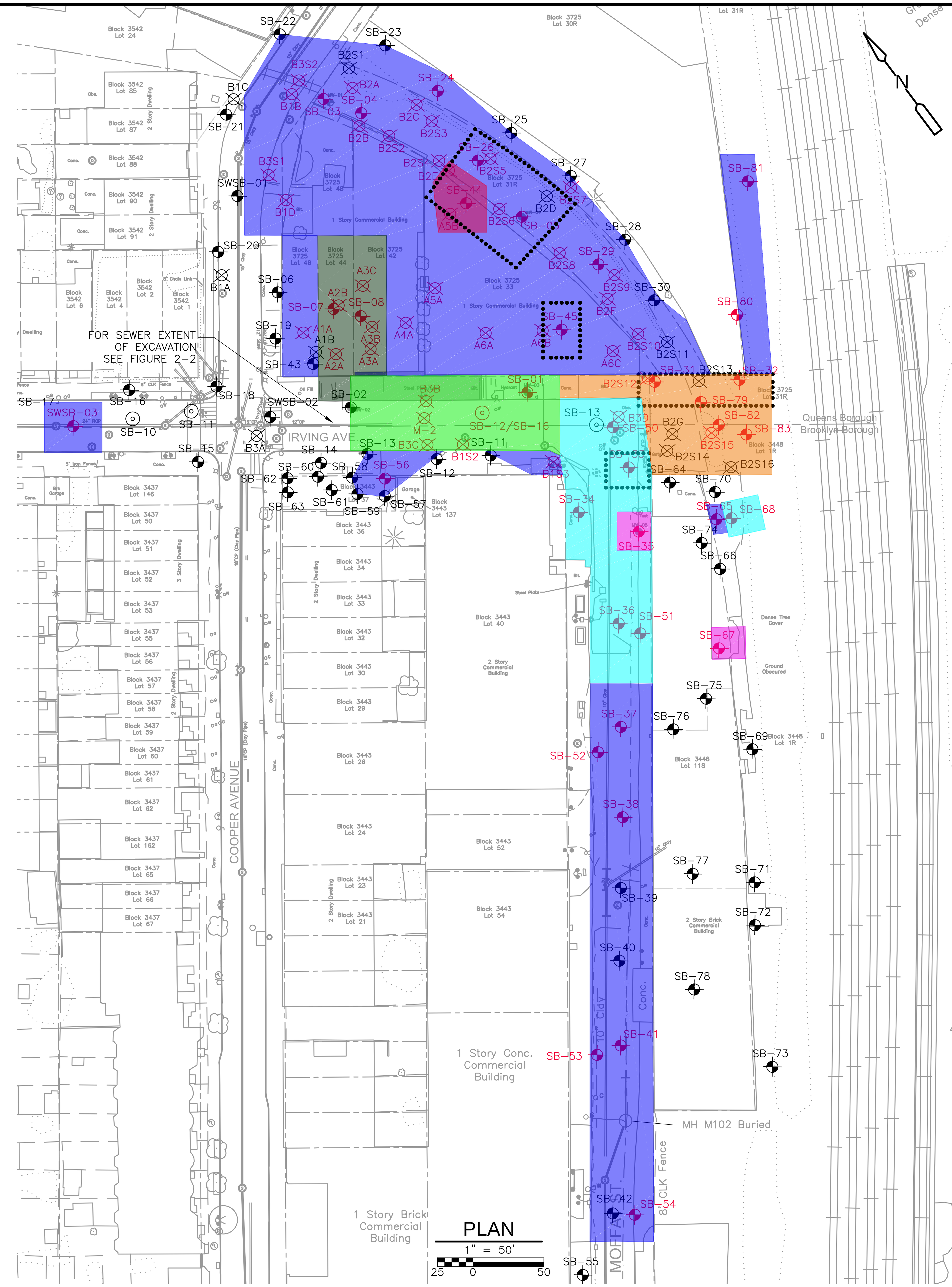
1. BORING SYMBOLS SHOWN IN RED INDICATES RESULT EXCEEDS PRELIMINARY REMEDIATION GOALS AT THAT LOCATION.
2. AN EXCEEDANCE MARKED IN THE "RAD" COLUMN INDICATES AN EXCEEDANCE OF THE THORIUM–232 CRITERIA AND/OR THE RADIUM–226 CRITERIA.
3. HOTSPOTS ARE DEFINED AS THOSE AREAS CONTAINING SAMPLES WITH COMBINED TH–232 AND RA–226 CONCENTRATIONS GREATER THAN 50 pCi/g.

ACRONYMS:

RAD – THORIUM–232 AND RADIUM–226
PCBs – POLYCHLORINATED BIPHENYLS
BAP – BENZO(A)PYRENE
mg/kg – MILLIGRAMS PER KILOGRAM
pCi/g – PICOCURIES PER GRAM

Figure 4
Extent of Contamination in Soils
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

Figure 5
Extent of Elevated Gamma Counts in Sewers
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York



LEGENDS

- 2015 RI BORINGS
- 2013 BVNA BORINGS
- 2010 BERGER BORINGS
- RI MONITORING WELLS
- EXTENT OF PCB AND/OR PAH CONTAMINATION

- 2 FT DEPTH OF EXCAVATION
- 3 FT DEPTH OF EXCAVATION
- 4 FT DEPTH OF EXCAVATION
- 6 FT DEPTH OF EXCAVATION
- 8 FT DEPTH OF EXCAVATION
- 20 FT DEPTH OF EXCAVATION
- 30 FT DEPTH OF EXCAVATION

NOTES:

1. BORING SYMBOLS SHOWN IN RED INDICATES RESULT EXCEEDS PRELIMINARY REMEDIATION GOALS AT THAT LOCATION.
2. EXTENT OF EXCAVATION IS DELINEATED USING THE NEAREST CLEAN SAMPLE IN THE OUTWARD DIRECTION FROM THE WOLFF-ALPORT CHEMICAL COMPANY PROPERTY. IF SUCH A SAMPLE DOES NOT EXIST, THE EXTENT IS ESTIMATED AS 20 FEET AWAY FROM THE FURTHEST SAMPLE RESULT ABOVE PRELIMINARY REMEDIATION GOALS OR TO THE NEXT PHYSICAL BARRIER (E.G., BUILDING).

CDM Smith

Figure 6
Alternative 4 Excavation Plan
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

MANHOLE ID	DEPTH (FEET BELOW GROUND SURFACE)
C-1	9.7
I-2	10
I-3	10
I-4	13.8
I-5	13.1
I-6	14.5
I-7	15.5
I-8	17.5
I-9	16.5
I-10	16.3
I-11	16
I-12	16
I-13	17
H-1	16.7
H-2	18.3
H-3	18
W-1	18

LEGENDS

- 2015 RI BORINGS
- 2013 BVNA BORINGS
- 2010 BERGER BORINGS
- EXTENT OF SEWER REQUIRING REMOVAL
- EXTENT OF SEWER REQUIRING SEWER JET CLEANING AND INVESTIGATION

CDM Smith

NOTES:

1. EXTENT OF SEWER CONTAMINATION IS DELINEATED USING GAMMA MEASUREMENTS WITH A CRITERIA OF 10,000 COUNTS PER MINUTE.
2. IT IS ASSUMED THAT SOILS ABOVE THE SEWER PIPELINE ARE NOT CONTAMINATED EXCEPT FOR THOSE SOILS FROM 0-2 FEET AT SWSB-03.
3. IT IS ASSUMED THAT SOILS AROUND SEWER PIPELINE AND 6 INCHES BELOW PIPELINE ARE CONTAMINATED.
4. I-1 WAS UNABLE TO BE LOCATED DURING THE 2015 REMEDIAL INVESTIGATION. HOWEVER, AN INVESTIGATION CONDUCTED IN 2009 (LOUIS BERGER & ASSOCIATES 2010) FOUND THE MANHOLE UNDER A 6-FOOT BY 6-FOOT SECTION OF ASPHALT WHICH WAS OPENED TO COMPLETE THE INVESTIGATION.
5. THE SEWER PIPE FROM MANHOLE C-1 TO MANHOLE I-3 AND FROM MANHOLE I-4 TO W-1 WOULD BE REMEDIATED THROUGH THE FOLLOWING STEPS:
   - A. DECONTAMINATE THE SEWER PIPE USING JET WASHING.
   - B. PERFORM A GAMMA SURVEY.
   - C. FOR AREAS WITH GAMMA MEASUREMENTS EXCEEDING 10,000 COUNTS PER MINUTE, ADDITIONAL INVESTIGATION WOULD BE PERFORMED TO DETERMINE THE EXTENT AND LEVEL OF CONTAMINATION.
   - D. THE SEWER PIPE AND BEDDING MATERIALS EXCEEDING THE PRGS WOULD BE EXCAVATED AND DISPOSED OFF SITE.
6. DUE TO HIGH CONTAMINANT CONCENTRATIONS, THE SEWER PIPE AND BEDDING MATERIALS EXCEEDING THE PRGS WITHIN THIS AREA WOULD BE EXCAVATED AND DISPOSED OFF SITE.

Figure 7
Sewer Remediation Plan
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX II

TABLES

Summary of Tables

Table 1: Groundwater Radiological Gamma Spectroscopy Results
Table 2: Building and Sewer Materials Radiological Gamma Spectroscopy
Table 3: Building Material Scan Data
Table 4: ISOCS Radiological Results
Table 5: Soil Radiological Gamma Spectroscopy Results
Table 6: Soil Chemical Analytical Results
Table 7: Sewer Line Gamma Data Summary
Table 8: Sewer Manhole Data Summary
Table 9: Sediment Radiological Gamma Spectroscopy Results
Table 10: Gamma Exposure Rate Locations and Results Summary
Table 11: Short-Term Radon Sample Location and Results Summary
Table 12: Six Month Radon and Thoron Results
Table 13: One Year Radon and Thoron Results
Table 14: Radon and Thoron Measurements – 2017
Table 15: Summary of Cancer Risk and Non-Cancer Health Hazards
Table 16: Summary of Chemicals of Concern and Radionuclides of Concern and Medium-Specific Exposure Point Concentrations
Table 17: Selection of Exposure Pathways
Table 18: Non-Cancer Toxicity Data Summary
Table 19: Cancer Toxicity Data Summary
Table 20: Risk Characterization Summary – Non-Carcinogens
Table 21: Risk Characterization Summary – Carcinogens
Table 22: Comparison of Sediment Results to Biota Concentration Guidelines
Table 23: Remediation Goals
Table 24: Cost Estimate for Alternative 4
Table 25: ARARs and Other Environmental Criteria

Table 1
Groundwater Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample ID	Sample Date	Start Depth (feet)	End Depth (feet)	Depth Unit	Matrix	Sample Type	Parent Sample*	Potassium-40				Radium-226				Thorium-232			
									Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Groundwater Screening Criteria													5.0				5.0			
Groundwater Round 1																				
MW-01	MW-01-R1	12/10/2015	65	75	ft	WG	N		-37.608	1504.3	32.4	UJ	-12.207	46.562	55.9	UJ	1.342	5.562	10.1	UJ
MW-02	MW-02-R1	12/9/2015	65	75	ft	WG	N		-5.308	20.632	31.6	UJ	-11.472	34.599	57	UJ	1.761	5.963	10.7	UJ
MW-03	MW-03-R1	12/9/2015	65	75	ft	WG	N		10.342	21.476	29.2	UJ	-5.928	35.328	51.1	UJ	4.4	5.468	9.73	UJ
MW-03	MW-903-R1	12/9/2015	65	75	ft	WG	FD	MW-03-R1	35.406	22.922	28.9	J	-5.511	42.71	56.1	UJ	-0.195	5.768	10.2	UJ
MW-04	MW-04-R1	12/9/2015	65	75	ft	WG	N		33.66	21.462	27.1	J	17.369	44.788	57.2	UJ	-5.18	16.37	10.7	UJ
MW-05	MW-05-R1	12/9/2015	65	75	ft	WG	N		-28.385	36.131	41.3	UJ	-9.085	28.978	44.9	UJ	-0.518	5.582	7.95	UJ
Groundwater Round 2																				
MW-01	MW-01-R2	4/21/2016	65	75	ft	WG	N		28.61	19.215	25.8	J	0.652	33.436	51.1	UJ	-3.835	12.053	10.6	UJ
MW-02	MW-02-R2	4/21/2016	65	75	ft	WG	N		-13.788	37.2	34.8	UJ	1.405	41.491	56.6	UJ	5.947	4.48	10.7	UJ
MW-03	MW-03-R2	4/20/2016	65	75	ft	WG	N		-33.658	35.2	40.9	UJ	16.514	34.309	45.2	UJ	0.636	4.301	7.64	UJ
MW-04	MW-04-R2	4/21/2016	65	75	ft	WG	N		9.194	27.734	38.4	UJ	-17.007	43.694	43.8	UJ	3.554	7.63	8.71	UJ
MW-04	MW-904-R2	4/21/2016	65	75	ft	WG	FD	MW-04-R2	-58.72	46.367	41.2	UJ	3.266	24.9	45.3	UJ	0.739	4.639	8.17	UJ
MW-05	MW-05-R2	4/20/2016	65	75	ft	WG	N		10.705	19.5	28.4	UJ	-31.416	49.318	52.8	UJ	**10.988**	5.263	8.09	J
Groundwater Round 3																				
MW-01	MW-01-R3	11/17/2016	65	75	ft		N						0.053	0.148	0.283	U	2.544	0.989	1.12	
MW-02	MW-02-R3	11/17/2016	65	75	ft		N						0.269	0.191	0.244	J	-0.336	0.29	0.841	UJ
MW-02	MW-902-R3	11/17/2016	65	75	ft		FD	MW-02-R3					0.371	0.256	0.337	J	0.281	0.32	0.478	U
MW-03	MW-03-R3	11/17/2016	65	75	ft		N						0.297	0.204	0.248	J	-0.158	0.623	1.267	UJ
MW-05	MW-05-R3	11/17/2016	65	75	ft		N						0.115	0.194	0.338	U	-0.119	0.275	0.7	U
Groundwater Round 4																				
MW-01	MW-01-R4	4/13/2017	65	75	ft		N						0.313	0.156	0.154		-0.359	0.445	1.025	UJ
MW-02	MW-02-R4	4/12/2017	65	75	ft		N						0.235	0.136	0.15		-0.457	0.499	1.163	UJ
MW-02	MW-902-R4	4/12/2017	65	75	ft		FD	MW-02-R4					0.26	0.147	0.163		-0.392	0.363	0.951	UJ
MW-03	MW-03-R4	4/12/2017	65	75	ft		N						0.198	0.127	0.151		-0.192	0.219	0.689	U
MW-04	MW-04-R4	4/13/2017	65	75	ft		N						0.16	0.124	0.175	U	-0.035	0.068	0.384	U
MW-05	MW-05-R4	4/13/2017	65	75	ft		N						0.248	0.16	0.206		0.301	0.419	0.706	U
MW-06	MW-06-R4	4/13/2017	65	75	ft		N						0.274	0.152	0.18		0	0.197	0.488	U

Notes:

All units in picoCurie per gram (pCi/g).

CSU (+/- s) = combined standard uncertainty (2 sigma)

MDA - minimum detectable activity

Q - qualifier

U - not detected

J - estimated value

* Parent sample ID listed for duplicate samples.

Highlighted cell and bold format indicates that concentration exceeded screening criteria.

Table 2
Building and Sewer Materials Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Parent Sample*	Potassium-40				Radium-226				Thorium-232			
			Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Solids Screening Criteria							0.919				1.220			
Building Materials														
LOT33	12/17/2015		23.743	3.068	0.976		**3.86**	1.593	1.67	J	**1.754**	0.384	0.183	
LOT33	12/17/2015	BRICK-02-LOT33	22.182	3.137	0.874		**3.85**	2.149	2.46	J	**1.76**	0.35	0.352	
LOT33	12/17/2015		2.18	1.14	1.79	J	**2.726**	1.59	1.86	J	0.579	0.215	0.372	J
LOT42	12/18/2015		33.469	6.481	4.41	J	**21.09**	10.986	13.5	J	**152.66**	9.698	1.6	
LOT42	12/17/2015		12.978	2.782	2.18	J	**8.217**	6.701	8.15	J	**57.643**	4.018	0.758	
LOT42	12/18/2015		3.917	0.608	0.191		0.349	0.602	0.705	UJ	0.45	0.115	0.077	
LOT44	12/17/2015		32.95	6.769	9.2	J	**44.219**	16.906	21.1	J	**415.17**	25.721	2.73	
LOT46	12/17/2015		9.781	1.986	1.93	J	**6.619**	2.855	3.73	J	**7.784**	0.813	0.332	J
LOT46	12/17/2015		0.479	0.302	0.469		0.413	0.498	0.723	UJ	0.099	0.075	0.125	U
LOT46	12/17/2015		2.85	0.975	0.613	R	0.147	0.987	1.15	R	0.505	0.178	0.216	R
Sewer Materials														
I-2	11/18/2015		184.87	20.203	22.6	R	**76.423**	38.146	44.9	J	**2206.4**	136.66	8.11	
I-4	11/18/2015		215.93	24.123	26.9	R	**163.12**	51.598	57.8	J	**2536.2**	155.41	10.2	
I-4	11/18/2015		6.553	1.662	1.58		2.106	1.877	3.11	UJ	**4.423**	0.624	0.185	
I-5	11/18/2015		6.876	1.31	0.396		1.117	2.253	2.63	UJ	**4.67**	0.494	0.208	
I-6	11/18/2015		16.45	2.735	0.956		**2.686**	2.131	2.59	J	1.044	0.289	0.314	
I-6	11/18/2015		6	1.397	1.09		0.347	1.113	2.02	UJ	0.698	0.213	0.366	
I-6	11/18/2015	CONC-I6	8.959	1.766	0.764		0.803	1.05	1.88	UJ	0.785	0.245	0.378	
I-7	11/18/2015		7.137	1.363	1.06		1.003	1.317	2.23	UJ	**2.275**	0.345	0.197	
I-8	11/18/2015		8.33	1.493	0.417		1.31	1.305	1.5	UJ	0.922	0.252	0.397	
Sewer Sediments														
I-2	11/18/2015		72.749	15.332	20.7	J	**69.801**	6.939	4.254	J	**1079.9**	73.029	7.8	J
I-2	11/18/2015		90.381	11.434	13.6	J	**45.938**	4.762	3.809	J	**1218.1**	76.238	4.69	J
I-7	11/18/2015		21.624	4.044	2.99	J	**6.153**	0.837	0.892		**116.72**	7.319	1.25	J

Notes:

All units in picoCurie per gram (pCi/g).
CSU (+/- s) = combined standard uncertainty (2 sigma)
MDA - minimum detectable activity
Q - qualifier
U - not detected
J - estimated value
R - rejected
* Parent sample ID listed for duplicate samples.
Highlighted cell and bold format indicates that concentration exceeded screening criteria.

Table 3
Building Material Scan Data
Wolff-Alport Chemical Company Site
Ridgewood, NY

Sample ID	Comments/Location Description	Pre-Sampling Total	Removable (Wipe Samples)
		Alpha (dpm/100cm^2)	
CIND-01-LOT33	Cinder block from Lot 33	63	0
BRICK-02-LOT33	Brick from Lot 33	131	0
CONC-07-LOT42	In Primo Auto Body main shop (Lot 42)	575	2
CONC-08-LOT42	Concrete collected in Primo Auto main shop (Lot 42)	724	2
BRICK-09-LOT42	Brick collected in Primo Auto main shop (Lot 42) but underneath the overlying concrete	2,363	0
BRICK-06-LOT44	In Primo Auto Body auxillary shop (Lot 44). Brick from short brick wall in front of one of the arches	27,365	0
BRICK-03-LOT46	Brick In basement of deli (Lot 46)	10,376	0
WOOD-04-LOT46	Wood from basement of deli (Lot 46)	63	0
IBEAM-05-LOT46	Rusted steel from I-beam in basement of Jarabacoa Deli	59	0

Notes:

ID - identification

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232				Uranium-238			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria										0.919				1.220				1.061		
Soil Borings																				
SB-01	10/30/2015	0	2		14.038	1.370	3.160		0.784	0.067	0.235		**2.578**	0.275	0.135	J	1.360		1.360	U
SB-01	10/30/2015	2	4		11.385	1.244	3.040		0.494	0.057	0.231		1.031	0.197	0.162	J	0.969		0.969	U
SB-01	10/30/2015	4	6		14.659	1.377	3.110		0.451	0.060	0.261		0.806	0.186	0.159	J	1.040		1.040	U
SB-01	10/30/2015	6	8		13.251	1.440	3.550		0.573	0.066	0.283		0.838	0.838	0.187	J	1.170		1.170	U
SB-01	10/30/2015	8	9		16.264	1.425	3.040		0.650	0.063	0.264		1.040	0.198	0.114	J	1.000		1.000	U
SB-01	10/30/2015	10	12		11.748	1.353	3.390		**1.152**	0.087	0.313		**5.008**	0.384	0.168		1.480		1.480	U
SB-01	10/30/2015	12	14		15.523	1.388	3.040		0.679	0.062	0.204		0.977	0.213	0.190		1.070		1.070	U
SB-01	10/30/2015	14	16		13.679	1.378	3.300		0.657	0.063	0.234		0.759	0.184	0.121		0.992		0.992	U
SB-01	10/30/2015	16	18		15.052	1.381	3.080		0.593	0.058	0.212		0.694	0.170	0.159		1.010		1.010	U
SB-01	10/30/2015	20	22		13.284	1.277	2.950		0.662	0.057	0.211		0.888	0.174	0.121		0.863		0.863	U
SB-01	10/30/2015	22	24		13.558	1.329	3.110		0.510	0.051	0.185		0.778	0.198	0.192		0.984		0.984	U
SB-01	10/30/2015	25	27		14.577	1.366	3.110		0.622	0.060	0.219		0.860	0.198	0.167		0.993		0.993	U
SB-01	10/30/2015	27	29		12.805	1.296	3.100		0.640	0.059	0.199		0.891	0.182	0.097		1.030		1.030	U
SB-02	11/6/2015	0	2		11.164	1.351	3.420		0.907	0.076	0.294		**3.151**	0.316	0.255		1.430		1.430	U
SB-02	11/6/2015	2	4		9.694	1.330	3.570		0.489	0.067	0.264		1.092	0.199	0.204		1.010		1.010	U
SB-02	11/6/2015	4	6		10.303	1.304	3.400		0.365	0.058	0.240		1.070	0.206	0.171		1.090		1.090	U
SB-02	11/6/2015	6	8		11.810	1.225	2.930		0.306	0.048	0.199		0.355	0.185	0.153		0.839		0.839	U
SB-02	11/6/2015	8	10		15.257	1.433	3.260		0.675	0.064	0.209		0.720	0.202	0.167		1.140		1.140	U
SB-02	11/6/2015	10	12		14.782	1.415	3.260		0.703	0.066	0.213		**1.960**	0.257	0.223		1.230		1.230	U
SB-02	11/6/2015	12	14		12.737	1.261	2.930		0.580	0.059	0.235		1.003	0.195	0.105		0.992		0.992	U
SB-02	11/6/2015	14	16		11.580	1.206	2.900		0.717	0.059	0.194		0.578	0.170	0.154		1.080		1.080	U
SB-02	11/6/2015	16	18		15.076	1.317	2.850		0.623	0.057	0.222		0.597	0.172	0.161		0.994		0.994	U
SB-02	11/6/2015	18	20		13.014	1.344	3.230		0.549	0.058	0.229		0.837	0.193	0.176		1.080		1.080	U
SB-02	11/6/2015	20	25		12.122	1.295	3.140		0.671	0.063	0.239		0.304	0.169	0.189		0.991		0.991	U
SB-02	11/6/2015	26	28		13.453	1.329	3.120		0.518	0.056	0.211		0.501	0.182	0.151		1.040		1.040	U
SB-02	11/6/2015	28	30		12.840	1.319	3.160		0.494	0.057	0.212		0.510	0.187	0.163		1.090		1.090	U
SB-03	10/21/2015	0	2		7.487	1.503	4.390		**2.152**	0.130	0.381		**7.522**	0.565	0.201		2.050		2.050	U
SB-03	10/21/2015	2	4		10.764	1.193	2.930		0.704	0.061	0.203		0.832	0.176	0.181		0.994		0.994	U
SB-03	10/21/2015	4	6		11.777	1.297	3.190		0.520	0.057	0.204		0.693	0.203	0.182		1.140		1.140	U
SB-03	10/21/2015	6	8		12.088	1.274	3.080		0.558	0.060	0.207		0.972	0.182	0.148		1.070		1.070	U
SB-03	10/21/2015	8	10		12.302	1.245	2.940		0.581	0.061	0.220		0.835	0.174	0.169		0.988		0.988	U
SB-03	10/21/2015	10	12		13.142	1.272	2.960		0.459	0.053	0.214		0.893	0.191	0.160		0.975		0.975	U
SB-03	10/21/2015	12	14		15.163	1.322	2.850		0.624	0.057	0.227		0.846	0.193	0.118		1.510		1.510	U
SB-03	10/21/2015	12	14	SB-03-12-14	14.143	1.366	3.150		0.455	0.059	0.232		1.079	0.203	0.185		0.990		0.990	U
SB-03	10/21/2015	14	16		13.418	1.336	3.150		0.475	0.055	0.230		0.674	0.180	0.175		1.010		1.010	U
SB-03	10/21/2015	16	18		14.455	1.369	3.140		0.522	0.061	0.238		0.571	0.198	0.162		1.070		1.070	U
SB-03	10/21/2015	18	20		14.200	1.319	2.980		0.506	0.055	0.218		0.660	0.170	0.118		0.957		0.957	U
SB-03	10/21/2015	20	22		12.626	1.274	3.020		0.443	0.052	0.207		0.404	0.176	0.150		0.974		0.974	U
SB-03	10/21/2015	22	24		13.474	1.309	3.070		0.511	0.511	0.206		0.769	0.183	0.159		1.040		1.040	U
SB-03	10/21/2015	24	26		14.355	1.362	3.130		0.459	0.057	0.216		0.578	0.187	0.164		1.010		1.010	U
SB-03	10/21/2015	26	28		13.570	1.356	3.190		0.603	0.060	0.229		0.681	0.168	0.193		1.090		1.090	U
SB-03	10/21/2015	28	30		14.143	1.347	3.070		0.507	0.060	0.245		0.766	0.177	0.178		1.080		1.080	U
SB-04	10/21/2015	0	2		8.180	1.707	4.810		**5.624**	0.248	0.674		**43.792**	2.176	0.396		3.780		3.780	U
SB-04	10/21/2015	2	4		13.303	1.351	3.200		0.563	0.062	0.251		1.018	0.216	0.175		1.020		1.020	U
SB-04	10/21/2015	4	6		12.223	1.298	3.160		0.541	0.057	0.214		0.911	0.199	0.172		1.050		1.050	U
SB-04	10/21/2015	6	8		13.144	1.410	3.460		0.620	0.063	0.240		0.951	0.205	0.159		1.060		1.060	U
SB-04	10/21/2015	8	10		15.562	1.434	3.230		0.669	0.065	0.222		**1.257**	0.217	0.177		1.070		1.070	U
SB-04	10/21/2015	10	12		14.253	1.375	3.200		0.579	0.061	0.221		0.959	0.189	0.171		1.020		1.020	U
SB-04	10/21/2015	12	14		14.612	1.397	3.230		0.508	0.058	0.230		0.887	0.197	0.149		1.030		1.030	U
SB-04	10/21/2015	14	16		16.878	1.491	3.290		0.496	0.058	0.238		0.647	0.181	0.167	J	1.040		1.040	U
SB-04	10/21/2015	16	18		14.331	1.368	3.140		0.570	0.062	0.218		0.546	0.187	0.153	J	1.090		1.090	U
SB-04	10/21/2015	16	18	SB-04-16-18	13.898	1.345	3.120		0.501	0.059	0.239		0.608	0.176	0.165		1.000		1.000	U
SB-04	10/21/2015	18	20		13.031	1.465	3.660		0.462	0.062	0.269		**1.391**	0.226	0.190		1.160		1.160	U
SB-04	10/21/2015	20	22		14.338	1.378	3.160		0.624	0.064	0.244		0.973	0.196	0.187		0.917	0.609	1.820	
SB-04	10/21/2015	22	24		15.238	1.434	3.240		0.506	0.058	0.226		0.799	0.180	0.191		1.040		1.040	U
SB-04	10/21/2015	24	26		14.569	1.344	3.010		0.466	0.055	0.221		0.559	0.172	0.121		1.060		1.060	U
SB-04	10/21/2015	26	28		14.414	1.407	3.290		0.597	0.060	0.241		1.164	0.212	0.190		0.977		0.977	U
SB-04	10/21/2015	28	30		12.607	1.326	3.170		0.548	0.058	0.202		0.666	0.212	0.177		0.177		0.177	U
SB-05	10/26/2015	0	2		17.198	1.658	3.760		**2.001**	0.125	0.397		**11.321**	0.704	0.213		2.250		2.250	U
SB-05	10/26/2015	2	4		13.988	1.382	3.250		0.536	0.063	0.252		1.190	0.218	0.179		1.040		1.040	U
SB-05	10/26/2015	4	6		14.290	1.317	2.940		0.667	0.061	0.191		1.181	0.191	0.160		1.030		1.030	U
SB-05	10/26/2015	6	8		13.333	1.273	2.900		0.533	0.057	0.223		1.048	0.194	0.174		1.020		1.020	U
SB-05	10/26/2015	8	10		11.885	1.292	3.170		0.536	0.060	0.225		0.997	0.199	0.187		1.120		1.120	U
SB-05	10/26/2015	10	12		11.011	1.292	3.300		0.545	0.058	0.198		0.858	0.213	0.181		1.030		1.030	U
SB-05	10/26/2015	12	14		15.841	1.436	3.190		0.624	0.061	0.234		**1.380**	0.216	0.123		1.190		1.190	U
SB-05	10/26/2015	14	16		13.663	1.401	3.360		0.487	0.058	0.224		0.958	0.198	0.162		1.080		1.080	U
SB-05	10/26/2015	16	18		11.719	1.254	3.050		0.451	0.059	0.244		0.609	0.175	0.154		1.000		1.000	U
SB-05	10/26/2015	18	20		11.118	1.241	3.100		0.515	0.054	0.217		0.593	0.158	0.190		1.020		1.020	U
SB-05	10/26/2015	20	22		16.459	1.498	3.340		0.422	0.063	0.269		0.947	0.203	0.203		1.050		1.050	U

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	CSU (+/-2 s)	MDA	Q	Radium-226 Result	CSU (+/-2 s)	MDA	Q	Thorium-232 Result	CSU (+/-2 s)	MDA	Q	Uranium-238 Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria									0.919				1.220				1.061			
Soil Borings (continued)																				
SB-05	10/26/2015	20	22	SB-05-20-22	14.380	1.355	3.100		0.558	0.057	0.208		0.471	0.180	0.172		1.110		1.110	U
SB-05	10/26/2015	22	24		11.643	1.391	3.540		0.598	0.066	0.235		0.608	0.188	0.210		1.080		1.080	U
SB-05	10/26/2015	24	26		13.745	1.306	2.980		0.548	0.059	0.207		0.504	0.193	0.109		1.080		1.080	U
SB-05	10/26/2015	26	28		15.121	1.418	3.210		0.480	0.060	0.247		0.992	0.212	0.178		0.987		0.987	U
SB-05	10/26/2015	28	30		15.275	1.443	3.290		0.457	0.062	0.247		0.787	0.200	0.182		1.120		1.120	U
SB-05	10/26/2015	54	55		13.324	1.268	2.890		0.274	0.057	0.223		0.284	0.153	0.152		0.823		0.823	U
SB-06	10/29/2015	0	2		13.077	1.365	3.300		**1.111**	0.076	0.248		**1.482**	0.221	0.192		1.340		1.340	U
SB-06	10/29/2015	5	6		14.926	1.478	3.460		**1.046**	0.079	0.281		0.947	0.201	0.197		1.280		1.280	U
SB-06	10/29/2015	6	8		11.537	1.230	2.960		0.604	0.060	0.234		0.846	0.196	0.168		0.982		0.982	U
SB-06	10/29/2015	8	10		13.641	1.332	3.110		0.594	0.058	0.204		0.824	0.174	0.155		1.070		1.070	U
SB-06	10/29/2015	10	12		15.662	1.364	2.910		0.645	0.062	0.230		**1.265**	0.202	0.181		1.300		1.300	U
SB-06	10/29/2015	12	14		11.293	1.187	2.870		0.502	0.054	0.190		0.838	0.174	0.144		3.721	1.136	1.380	
SB-06	10/29/2015	14	16		12.991	1.253	2.870		0.631	0.063	0.224		0.581	0.159	0.162		1.140		1.140	U
SB-06	10/29/2015	16	18		12.966	1.302	3.080		0.576	0.060	0.239		0.730	0.155	0.172		1.120		1.120	U
SB-06	10/29/2015	18	20		14.335	1.371	3.160		0.544	0.059	0.208		0.744	0.189	0.128		1.090		1.090	U
SB-06	10/29/2015	20	22		14.277	1.339	3.040		0.486	0.054	0.220		**1.326**	0.189	0.165		0.956		0.956	U
SB-06	10/29/2015	22	24		11.053	1.253	3.130		0.481	0.055	0.215		0.717	0.186	0.174		1.010		1.010	U
SB-06	10/29/2015	24	26		12.491	1.311	3.170		0.526	0.059	0.212		0.861	0.199	0.172		1.100		1.100	U
SB-06	10/29/2015	26	28		13.992	1.374	3.230		0.539	0.057	0.216		0.687	0.193	0.157		0.959		0.959	U
SB-06	10/29/2015	28	30		13.588	1.363	3.190		0.467	0.061	0.265		0.892	0.204	0.164		1.070		1.070	U
SB-07	10/26/2015	0	2		13.155	2.686	5.900		**6.787**	0.321	1.310		**261.196**	12.132	1.550		6.930		6.930	U
SB-07	10/26/2015	2	4		17.689	1.728	4.250		**1.154**	0.160	0.702		**65.386**	3.550	0.886		4.150		4.150	U
SB-07	10/26/2015	4	6		14.366	1.696	4.540		0.916	0.121	0.595		**66.203**	3.595	0.933		4.180		4.180	U
SB-07	10/26/2015	6	8		15.076	1.541	3.810		0.406		0.406	U	**50.031**	2.452	1.010		8.022	4.235	3.560	
SB-07	10/26/2015	8	10		11.336	1.779	4.290		0.517		0.517	U	**94.155**	4.462	1.020		4.800		4.800	U
SB-07	10/26/2015	10	12		13.315	1.443	3.370		0.644	0.115	0.500		**27.019**	1.398	0.778		6.429	2.613	3.020	
SB-07	10/26/2015	12	14		17.877	1.563	3.390		0.652	0.068	0.284		1.208	0.224	0.535		6.422	1.916	1.400	
SB-07	10/26/2015	14	16		12.875	1.405	3.340		0.577	0.086	0.396		**15.894**	0.890	0.744		8.777	2.759	2.310	
SB-07	10/26/2015	17	19		15.590	1.323	2.770		0.533	0.057	0.205		0.818	0.201	0.401		1.010		1.010	U
SB-07	10/26/2015	18	20		12.613	1.314	3.160		0.847	0.069	0.215		0.624	0.194	0.415		0.979		0.979	U
SB-07	10/26/2015	20	22		14.057	1.391	3.220		0.653	0.066	0.261		**1.965**	0.252	0.547		1.070		1.070	U
SB-07	10/26/2015	22	24		16.308	1.450	3.220		0.521	0.056	0.212		0.559	0.171	0.415	J	0.646		0.646	U
SB-07	10/26/2015	22	24	SB-07-22-24	14.975	1.310	2.840		0.055	0.055	0.192		1.123	0.180	0.531	J	0.597		0.597	U
SB-07	10/26/2015	24	26		13.933	1.334	3.070		0.512	0.060	0.233		0.678	0.177	0.366		0.615		0.615	U
SB-07	10/26/2015	26	28		16.080	1.479	3.300		0.582	0.066	0.279		**4.253**	0.356	0.452		1.398	0.700	1.640	J
SB-07	10/26/2015	28	30		13.490	1.278	2.900		0.512	0.055	0.195		0.834	0.180	0.342		0.605		0.605	U
SB-08	10/23/2015	1	2		10.207	1.824	5.060		**28.858**	0.772	0.845		**37.819**	1.915	1.090		4.390		4.390	U
SB-08	10/23/2015	2	4		14.987	1.502	3.540		**2.245**	0.119	0.313		**3.423**	0.336	0.492		1.580		1.580	U
SB-08	10/23/2015	4	6		11.651	1.457	3.720		**0.932**	0.095	0.422		**14.106**	0.813	0.730		2.230		2.230	U
SB-08	10/23/2015	6	8		10.306	3.900	7.690		**2.359**	0.422	1.880		**533.804**	24.658	2.190		20.866	8.895	12.300	J
SB-08	10/23/2015	8	10		10.224	1.236	3.120		0.311	0.067	0.262		**4.290**	0.359	0.456		1.470		1.470	U
SB-08	10/23/2015	10	12		9.000		9.000	U	1.460		1.460	UJ	**759.990**	40.008	2.930		39.210	13.862	15.500	J
SB-08	10/23/2015	12	14		22.987	2.014	4.020		0.496		0.496	U	**70.420**	3.365	0.844		17.384	5.454	4.580	J
SB-08	10/23/2015	14	16		15.537	2.051	4.660		**2.245**	0.222	0.865		**114.421**	5.398	1.110		10.839	4.463	5.790	J
SB-08	10/23/2015	16	18		11.506	1.335	3.370		0.684	0.069	0.260		**2.323**	0.285	0.414		14.221	4.037	1.470	J
SB-08	10/23/2015	18	20		13.536	1.208	2.630		0.696	0.056	0.192		**1.593**	0.205	0.323		8.510	2.446	1.290	J
SB-08	10/23/2015	18	20	SB-08-18-20	13.397	1.228	2.750		0.734	0.061	0.217		**1.568**	0.211	0.419		7.279	2.121	1.120	J
SB-08	10/23/2015	20	22		17.339	2.124	4.710		**1.579**	0.202	0.922		**120.442**	5.690	1.330		5.840		5.840	U
SB-08	10/23/2015	22	24		11.872	1.187	2.820		0.304	0.046	0.191		0.358	0.153	0.333		0.898		0.898	U
SB-08	10/23/2015	24	26		14.954	1.317	0.258		0.608	0.058	0.224		**2.633**	0.258	0.396		0.975		0.975	U
SB-08	10/23/2015	26	28		13.313	1.278	2.960		0.522	0.056	0.219		0.931	0.183	0.302		0.784		0.784	U
SB-08	10/23/2015	28	30		18.191	1.450	2.910		0.660	0.060	0.230		0.612	0.173	0.358		0.728		0.728	U
SB-11	10/20/2015	0	2		10.970	1.288	3.260		0.530	0.059	0.230		0.949	0.195	0.156		1.100		1.100	U
SB-11	10/20/2015	2	4		14.202	1.412	3.300		0.586	0.061	0.253		1.022	0.215	0.163		1.080		1.080	U
SB-11	10/20/2015	4	6		10.692	1.277	3.270		0.478	0.056	0.204		0.843	0.186	0.207		1.030		1.030	U
SB-11	10/20/2015	6	8		15.418	1.421	3.220		0.651	0.061	0.227		0.940	0.186	0.134		1.000		1.000	U
SB-11	10/20/2015	8	9		12.805	1.329	3.190		0.518	0.060	0.231		0.727	0.198	0.220		1.190		1.190	U
SB-12	10/20/2015	0	2		14.161	1.390	3.220		0.804	0.070	0.239		**1.243**	0.242	0.205		1.200		1.200	U
SB-12	10/20/2015	2	4		11.900	1.254	3.040		0.581	0.058	0.177		0.813	0.168	0.170		1.000		1.000	U
SB-12	10/20/2015	4	6		12.984	1.244	2.860		0.539	0.053	0.176		0.626	0.187	0.162		1.020		1.020	U
SB-12	10/20/2015	4	6	SB-12-04-06	16.909	1.457	3.110		0.645	0.063	0.250		0.897	0.205	0.203	J	1.160		1.160	U
SB-12	10/20/2015	6	8		13.460	1.410	3.400		0.619	0.067	0.254		0.656	0.206	0.187	J	1.160		1.160	U
SB-12	10/20/2015	8	10		15.525	1.480	3.430		0.612	0.065	0.263		0.837	0.202	0.190	J	1.200		1.200	U
SB-12	10/20/2015	8	10	SB-12-08-10	15.013	1.439	3.320		0.709	0.062	0.198		0.787	0.203	0.179	J	1.000		1.000	U
SB-13	10/20/2015	0	2		13.039	1.466	3.650		**1.189**	0.085	0.242		**2.402**	0.276	0.244		1.510		1.510	U
SB-13	10/20/2015	2	4		11.318	1.338	3.410		0.412	0.054	0.234		0.570	0.051	0.162		0.899		0.899	U
SB-13	10/20/2015	4	6		13.855	1.362	3.200		0.526	0.061	0.250		0.642	0.188	0.176		1.090		1.090	U
SB-13	10/20/2015	6	8		16.668	1.426	3.040		0.560	0.058	0.240		0.935	0.213	0.213		1.040		1.040	U
SB-13	10/20/2015	8	10		14.191	1.323	3.020		0.487	0.057	0.222		1.065	0.189	0.200		1.020		1.020	U

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	Potassium-40 CSU (+/-2 s)	Potassium-40 MDA	Potassium-40 Q	Radium-226 Result	Radium-226 CSU (+/-2 s)	Radium-226 MDA	Radium-226 Q	Thorium-232 Result	Thorium-232 CSU (+/-2 s)	Thorium-232 MDA	Thorium-232 Q	Uranium-238 Result	Uranium-238 CSU (+/-2 s)	Uranium-238 MDA	Uranium-238 Q
Soil Screening Criteria										0.919				1.220				1.061		
Soil Borings (continued)																				
SB-14	10/21/2015	0	2		11.777	1.365	3.470		**0.964**	0.071	0.239		0.625	0.173	0.201		1.240		1.240	U
SB-14	10/21/2015	2	4		11.674	1.283	3.180		0.593	0.060	0.213		0.520	0.177	0.170		0.943		0.943	U
SB-14	10/21/2015	4	6		11.072	1.240	3.080		0.467	0.053	0.161		0.758	0.188	0.187		1.040		1.040	U
SB-14	10/21/2015	6	8		12.973	1.238	2.860		0.535	0.054	0.194		0.905	0.164	0.109		1.020		1.020	U
SB-14	10/21/2015	8	10		14.078	1.294	2.880		0.633	0.057	0.198		1.200	0.190	0.161		1.040		1.040	U
SB-15	10/28/2015	0	2		12.150	1.349	3.330		0.633	0.066	0.236		0.970	0.194	0.414		0.657		0.657	U
SB-15	10/28/2015	2	4		9.931	1.265	3.303		0.440	0.056	0.219		0.661	0.185	0.549		0.525		0.525	U
SB-15	10/28/2015	4	6		13.459	1.367	3.230		0.633	0.064	0.263		0.826	0.181	0.420		0.693		0.693	U
SB-15	10/28/2015	6	8		12.203	1.247	2.970		0.650	0.057	0.211		0.882	0.187	0.523		0.631		0.631	U
SB-15	10/28/2015	8	10		14.208	1.375	3.170		0.510	0.066	0.244		0.889	0.188	0.522		0.584		0.584	U
SB-15	10/28/2015	8	10	SB-15-08-10	13.096	1.338	3.210		0.533	0.051	0.201		1.005	0.177	0.450		0.591		0.591	U
SB-16	10/21/2015	0	2		13.285	1.399	3.370		0.686	0.068	0.250		1.101	0.211	0.127		1.310		1.310	U
SB-16	10/21/2015	2	4		14.844	1.488	3.510		0.592	0.063	0.244		0.571	0.189	0.178		1.160		1.160	U
SB-16	10/21/2015	4	6		10.104	1.225	3.120		0.682	0.062	0.209		0.883	0.200	0.180		1.200		1.200	U
SB-16	10/21/2015	6	8		13.838	1.403	3.320		0.550	0.062	0.239		**1.303**	0.211	0.183		1.140		1.140	U
SB-16	10/21/2015	8	10		15.967	1.424	3.130		0.658	0.067	0.255		1.011	0.203	0.180	J	1.260		1.260	U
SB-17	10/27/2015	0	2		12.273	1.300	3.160		0.672	0.060	0.227		0.914	0.185	0.504		0.639		0.639	U
SB-17	10/27/2015	2	4		11.660	1.324	3.320		0.614	0.059	0.187		0.852	0.213	0.624		0.626		0.626	U
SB-17	10/27/2015	4	6		12.329	1.404	3.530		0.712	0.064	0.226		0.982	0.220	0.629		0.677		0.677	U
SB-17	10/27/2015	6	8		11.183	1.210	2.980		0.744	0.058	0.160		0.911	0.194	0.549		0.619		0.619	U
SB-17	10/27/2015	8	10		14.571	1.309	2.890		0.657	0.059	0.201		0.693	0.186	0.553		0.587		0.587	U
SB-18	10/27/2015	0	2		9.868	1.222	3.180		0.449	0.053	0.209		**1.434**	0.209	0.499		1.080		1.080	U
SB-18	10/27/2015	2	4		10.882	1.265	3.210		0.639	0.061	0.212		0.698	0.175	0.504		0.577		0.577	U
SB-18	10/27/2015	4	6		10.628	1.350	3.530		0.289	0.052	0.235		0.411	0.177	0.402		0.759		0.759	U
SB-18	10/27/2015	6	8		18.247	1.525	3.210		0.657	0.059	0.187		1.151	0.205	0.541		0.584		0.584	U
SB-18	10/27/2015	6	8	SB-18-06-08	16.148	1.372	2.930		0.713	0.061	0.218		1.166	0.186	0.156		1.050		1.050	U
SB-18	10/27/2015	8	10		13.678	1.320	3.080		0.654	0.060	0.195		0.998	0.187	0.502		0.545		0.545	U
SB-19	10/22/2015	0	2		10.681	1.408	3.730		**1.012**	0.081	0.290		**1.339**	0.241	0.212		1.450		1.450	U
SB-19	10/22/2015	2	4		12.574	1.315	3.160		0.534	0.058	0.222		0.518	0.208	0.206		1.090		1.090	U
SB-19	10/22/2015	4	6		10.370	1.288	3.350		0.540	0.060	0.217		0.848	0.177	0.173		1.100		1.100	U
SB-19	10/22/2015	6	8		13.542	1.324	3.110		0.584	0.056	0.163		0.775	0.163	0.163		0.923		0.923	U
SB-19	10/22/2015	8	10		14.129	1.339	3.080		0.725	0.062	0.223		0.750	0.192	0.114		1.600		1.600	U
SB-20	11/9/2015	0	2		8.820	1.341	3.700		**0.955**	0.081	0.295		**2.045**	0.266	0.135		1.470		1.470	U
SB-20	11/9/2015	2	4		11.667	1.258	3.090		0.652	0.061	0.222		1.205	0.221	0.180		1.130		1.130	U
SB-21	10/22/2015	0	2		13.833	1.343	3.120		0.657	0.062	0.236		0.602	0.203	0.176		1.180		1.180	U
SB-21	10/22/2015	2	4		10.475	1.195	2.990		0.553	0.057	0.245		1.014	0.193	0.163		0.997		0.997	U
SB-21	10/22/2015	4	6		11.395	1.256	3.110		0.555	0.059	0.219		0.784	0.180	0.169		0.955		0.955	U
SB-21	10/22/2015	4	6	SB-21-04-06	12.700	1.293	3.070		0.532	0.057	0.238		0.950	0.186	0.158		0.973		0.973	U
SB-21	10/22/2015	6	8		14.897	1.548	3.720		0.883	0.076	0.254		0.914	0.218	0.200		1.210		1.210	U
SB-21	10/22/2015	8	10		13.617	1.390	3.290		0.755	0.067	0.229		0.258		0.258	U	1.140		1.140	U
SB-22	10/22/2015	0	2		10.812	1.271	3.230		0.597	0.066	0.292		**2.048**	0.253	0.142		1.180		1.180	U
SB-22	10/22/2015	2	4		11.953	1.181	2.750		0.560	0.055	0.183		0.779	0.172	0.099		1.010		1.010	U
SB-22	10/22/2015	4	6		15.233	1.393	3.150		0.517	0.059	0.225		0.517	0.189	0.200		1.050		1.050	U
SB-22	10/22/2015	6	8		11.196	1.251	3.120		0.721	0.062	0.193		1.119	0.192	0.172		1.080		1.080	U
SB-22	10/22/2015	8	10		14.574	1.386	3.200		0.619	0.060	0.217		**1.249**	0.209	0.184		1.070		1.070	U
SB-26	10/21/2015	0	2		11.499	1.484	3.890		**2.117**	0.123	0.363		**8.660**	0.577	0.184		2.030		2.030	U
SB-26	10/21/2015	2	4		9.155	1.347	3.680		**1.195**	0.084	0.299		**2.601**	0.305	0.221	J	1.520		1.520	U
SB-26	10/21/2015	2	4	SB-26-02-04	11.513	1.442	3.760		**1.150**	0.086	0.278		1.210	0.223	0.219	J	1.520		1.520	U
SB-26	10/21/2015	4	6		13.610	1.377	3.280		0.606	0.062	0.243		0.908	0.209	0.129		1.110		1.110	U
SB-26	10/21/2015	5	7		15.819	1.433	3.170		0.602	0.061	0.244		0.950	0.196	0.174		1.010		1.010	U
SB-29	10/20/2015	0	2		13.177	1.462	3.630		**1.920**	0.110	0.305		**6.958**	0.493	0.187		1.770		1.770	U
SB-29	10/20/2015	2	4		15.233	1.613	3.900		**0.943**	0.080	0.280		**1.394**	0.255	0.218		1.490		1.490	U
SB-29	10/20/2015	4	6		14.581	1.572	3.850		0.634	0.071	0.286		0.531	0.186	0.196		1.010		1.010	U
SB-29	10/20/2015	6	8		14.535	1.398	3.240		0.611	0.065	0.208		0.969	0.203	0.172		1.120		1.120	U
SB-29	10/20/2015	8	10		12.489	1.257	2.960		0.395	0.052	0.216		0.612	0.165	0.152	J	0.860		0.860	U
SB-31	10/19/2015	0	2		15.230	1.342	2.910		0.894	0.067	0.238		**2.454**	0.256	0.150		1.240		1.240	U
SB-31	10/19/2015	2	4		14.671	1.700	4.200		**2.705**	0.148	0.481		**16.999**	0.970	0.268		2.600		2.600	U
SB-31	10/19/2015	4	6		14.224	1.336	3.010		0.537	0.060	0.227		0.968	0.213	0.155		1.110		1.110	U
SB-31	10/19/2015	6	8		12.938	1.342	3.210		0.571	0.062	0.224		0.741	0.208	0.168		1.050		1.050	U
SB-31	10/19/2015	8	10		13.543	1.396	3.360		0.637	0.060	0.210		1.019	0.206	0.195		1.110		1.110	U
SB-33	10/20/2015	0	2		11.832	1.393	3.530		0.846	0.077	0.285		0.932	0.229	0.201		1.170		1.170	U
SB-33	10/20/2015	2	4		12.327	1.400	3.500		**0.929**	0.074	0.268		0.911	0.192	0.230		1.170		1.170	U
SB-33	10/20/2015	4	6		8.431	1.545	4.450		**2.329**	0.132	0.359		**2.105**	0.308	0.174		2.663	1.173	2.940	
SB-33	10/20/2015	6	8		10.805	1.599	4.370		**1.172**	0.095	0.328		1.117	0.269	0.244		1.540		1.540	U
SB-33	10/20/2015	8	10		17.775	1.525	3.270		0.788	0.068	0.272		**1.269**	0.228	0.117		1.180		1.180	U
SB-34	10/20/2015	0	2		13.338	1.305	3.050		0.631	0.059	0.246		0.723	0.191	0.171		1.030		1.030	U
SB-34	10/20/2015	2	4		13.174	1.436	3.540		**1.298**	0.083	0.227		**1.512**	0.250	0.150		1.520		1.520	U
SB-34	10/20/2015	4	6		8.519	1.692	4.940		**2.734**	0.148	0.376		**2.775**	0.376	0.201		3.039	1.318	3.260	
SB-34	10/20/2015	6	8		13.893	1.669	4.250		0.794	0.081	0.301		0.905	0.264	0.149		1.430		1.430	U

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232				Uranium-238			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria										0.919				1.220				1.061		
Soil Borings (continued)																				
SB-34	10/20/2015	8	10		11.960	1.291	3.160		0.608	0.061	0.217		0.629	0.197	0.177		1.220		1.220	U
SB-35	10/27/2015	0	2		12.700	1.348	3.260		0.799	0.069	0.259		0.952	0.211	0.203		1.190		1.190	U
SB-35	10/27/2015	2	4		9.191	1.266	3.350		**2.336**	0.125	0.363		**10.058**	0.615	0.215		4.394	1.611	3.400	J
SB-35	10/27/2015	4	6		5.956	1.302	3.860		**2.318**	0.124	0.327		**3.523**	0.372	0.185		1.950		1.950	U
SB-35	10/27/2015	6	8		8.863	1.516	4.280		**3.112**	0.157	0.384		**2.526**	0.344	0.178		5.024	1.696	3.030	J
SB-35	10/27/2015	8	10		14.318	1.456	3.440		0.765	0.071	0.266		1.177	0.203	0.215		1.240		1.240	U
SB-35	10/27/2015	10	12		14.955	1.311	2.840		0.572	0.060	0.230		0.932	0.184	0.163		1.080		1.080	U
SB-35	10/27/2015	12	14		13.189	1.198	2.640		0.450	0.052	0.195		0.667	0.162	0.148		0.959		0.959	U
SB-35	10/27/2015	14	16		13.667	1.321	3.080		0.689	0.060	0.218		0.893	0.193	0.210		1.040		1.040	U
SB-35	10/27/2015	16	18		14.557	1.356	3.100		0.444	0.056	0.223		0.864	0.191	0.163		0.934		0.934	U
SB-35	10/27/2015	18	20		9.829	1.184	3.050		0.384	0.052	0.195		0.537	0.162	0.152		0.947		0.947	U
SB-35	10/27/2015	20	22		7.987	1.414	4.070		**0.948**	0.079	0.275		1.124	0.228	0.224	J	1.390		1.390	U
SB-35	10/27/2015	22	24		12.918	1.283	3.010		0.518	0.059	0.238		0.647	0.170	0.178	J	1.685	0.662	1.480	J
SB-35	10/27/2015	24	26		16.154	1.429	3.130		0.817	0.062	0.199		0.790	0.178	0.107	J	1.140		1.140	U
SB-35	10/27/2015	26	28		14.044	1.347	3.110		0.457	0.054	0.224		0.839	0.177	0.168	J	0.941		0.941	U
SB-35	10/27/2015	28	30		13.730	1.300	2.930		0.555	0.057	0.214		**1.221**	0.186	0.166	J	1.020		1.020	U
SB-36	10/22/2015	0	2		9.414	1.324	3.440		**5.546**	0.224	0.499		**28.549**	1.435	0.741		4.749	2.551	3.040	J
SB-36	10/22/2015	0	2	SB-36-00-02	8.575	1.450	3.950		**6.345**	0.253	0.653		**32.665**	1.666	0.314		3.510		3.510	U
SB-36	10/22/2015	2	4		10.616	1.237	3.130		0.719	0.064	0.231		1.140	0.190	0.398		0.717		0.717	U
SB-36	10/22/2015	4	6		12.812	1.313	3.110		0.502	0.059	0.232		0.435		0.435	U	0.631		0.631	U
SB-36	10/22/2015	6	7		13.527	1.362	3.200		0.568	0.058	0.206		0.968	0.187	0.180		1.010		1.010	U
SB-37	10/22/2015	0	2		14.021	1.566	3.910		**3.686**	0.171	0.436		**10.146**	0.652	0.774		3.137	0.919	2.420	
SB-37	10/22/2015	2	4		14.106	1.334	3.020		0.627	0.059	0.222		0.959	0.261	0.336		0.545		0.545	U
SB-37	10/22/2015	4	6		13.188	1.336	3.180		0.564	0.063	0.238		0.895	0.201	0.424		0.613		0.613	U
SB-37	10/22/2015	6	8		14.758	1.329	2.920		0.668	0.059	0.194		0.815	0.198	0.400		0.632		0.632	U
SB-37	10/22/2015	8	10		14.631	1.297	2.810		0.615	0.057	0.202		0.835	0.173	0.335		0.603		0.603	U
SB-38	10/27/2015	0	2		11.159	1.276	3.210		**1.873**	0.103	0.242	J	**4.211**	0.371	0.654		1.670		1.670	U
SB-38	10/27/2015	2	4		12.612	1.313	3.170		0.753	0.065	0.220	J	**1.250**	0.208	0.538		0.612		0.612	U
SB-38	10/27/2015	4	6		11.367	1.279	3.190		0.793	0.062	0.210		0.803	0.182	0.515		0.604		0.604	U
SB-38	10/27/2015	6	8		9.778	1.198	3.080		0.559	0.060	0.238		0.625	0.178	0.529		0.591		0.591	U
SB-38	10/27/2015	8	10		13.060	1.303	3.080		0.579	0.054	0.171		0.680	0.176	0.516		0.727		0.727	U
SB-39	10/27/2015	0	2		12.086	1.403	3.550		**1.204**	0.079	0.222	J	1.133	0.225	0.621		0.785		0.785	U
SB-39	10/27/2015	2	4		9.186	1.283	3.500		0.766	0.065	0.224	J	0.477	0.174	0.541		0.777		0.777	U
SB-39	10/27/2015	2	4	SB-39-02-04	12.253	1.300	3.160		0.753	0.062	0.228	J	0.967	0.194	0.532		0.572		0.572	U
SB-39	10/27/2015	4	6		10.001	1.252	3.280		0.834	0.066	0.209	J	0.709	0.206	0.576		0.606		0.606	U
SB-39	10/27/2015	6	8		9.744	1.216	3.180		0.708	0.064	0.218	J	0.972	0.180	0.470		0.652		0.652	U
SB-39	10/27/2015	8	10		12.710	1.324	3.170		0.834	0.063	0.191	J	0.488	0.189	0.593		0.662		0.662	U
SB-40	10/27/2015	0	2		12.015	1.263	3.060		0.653	0.058	0.193		1.045	0.188	0.495		0.581		0.581	U
SB-40	10/27/2015	2	4		11.851	1.280	3.130		0.567	0.058	0.204		0.888	0.188	0.521		0.535		0.535	U
SB-40	10/27/2015	4	6		10.597	1.220	3.080		0.682	0.058	0.204		0.867	0.186	0.520		0.569		0.569	U
SB-40	10/27/2015	6	7		12.004	1.220	2.900		0.753	0.060	0.223		1.027	0.191	0.515		0.629		0.629	U
SB-41	10/26/2015	0	2		10.510	1.435	3.860		**1.840**	0.109	0.340		**4.371**	0.387	0.727		3.342	0.818	1.410	
SB-41	10/26/2015	2	4		11.299	1.384	3.570		0.702	0.063	0.241		0.888	0.198	0.552		0.629		0.629	U
SB-41	10/26/2015	4	6		11.898	1.333	3.330		0.773	0.067	0.226		0.699		0.699	U	0.691		0.691	U
SB-41	10/26/2015	6	8		9.506	1.208	3.170		0.567	0.061	0.202		0.696	0.199	0.598		0.569		0.569	U
SB-41	10/26/2015	8	10		12.687	1.255	2.950		0.793	0.061	0.203		0.756	0.165	0.458		0.566		0.566	U
SB-42	10/26/2015	0	2		10.321	1.279	3.320		**1.119**	0.075	0.212		**1.491**	0.221	0.537		0.719		0.719	U
SB-42	10/26/2015	2	4		14.052	1.350	3.090		0.814	0.066	0.215		0.865	0.194	0.550		0.613		0.613	U
SB-42	10/26/2015	2	4	SB-42-02-04	12.050	1.293	3.150		0.718	0.063	0.212		1.219	0.207	0.536		0.606		0.606	U
SB-42	10/26/2015	4	6		13.974	1.344	3.080		0.725	0.062	0.223		0.898	0.176	0.469		0.732		0.732	U
SB-42	10/26/2015	6	8		11.495	1.231	3.030		0.593	0.053	0.173		0.954	0.183	0.496		0.597		0.597	U
SB-42	10/26/2015	8	10		12.284	1.258	1.258		0.448	0.045	0.188		0.774	0.159	0.428		0.634		0.634	U
SB-43	10/29/2015	0	2		11.600	1.340	3.390		0.550	0.059	0.208	J	0.859	0.180	0.488		0.560		0.560	U
SB-43	10/29/2015	2	4		12.723	1.277	3.030		0.643	0.059	0.210	J	0.626	0.166	0.486		0.602		0.602	U
SB-43	10/29/2015	4	6		11.003	1.224	3.040		0.682	0.060	0.161	J	0.640	0.188	0.568		0.689		0.689	U
SB-44	10/28/2015	0	2		9.178	1.951	5.620		**62.834**	1.356	0.978		**54.227**	2.694	1.010		4.970		4.970	U
SB-44	10/28/2015	2	4		12.595	1.370	3.260		0.878	0.075	0.265		0.885	0.212	0.422		0.700		0.700	U
SB-44	10/28/2015	4	6		10.862	1.142	2.740		0.320	0.046	0.197		0.418	0.166	0.394		0.527		0.527	U
SB-44	10/28/2015	6	8		15.872	1.410	3.090		0.504	0.054	0.208		1.145	0.182	0.386		0.600		0.600	U
SB-44	10/28/2015	8	10		13.502	1.410	3.420		0.607	0.060	0.223		0.754	0.173	0.433		0.641		0.641	U
SB-45	10/28/2015	0	2		18.448	1.538	3.240		0.867	0.072	0.290		**2.619**	0.299	0.509		1.050	0.508	1.200	J
SB-45	10/28/2015	2	4		11.812	1.341	3.340		0.390	0.057	0.218		0.450		0.450	U	0.627		0.627	U
SB-45	10/28/2015	4	6		11.739	1.279	3.130		0.453	0.054	0.201		0.389		0.389	U	0.607		0.607	U
SB-45	10/28/2015	6	8		15.502	1.368	2.980		0.573	0.060	0.222		0.933	0.181	0.391		0.649		0.649	U
SB-45	10/28/2015	8	10		15.028	1.391	3.140		0.696	0.063	0.196		0.680	0.183	0.377		0.632		0.632	U
SB-50	12/1/2015	0	1		9.025	2.532	6.440		**38.648**	1.019	1.280		**209.934**	9.785	0.756		13.100		13.100	UJ
SB-50	12/1/2015	1	2		10.877	1.293	3.290		0.801	0.072	0.262		**2.235**	0.267	0.158		1.310		1.310	U
SB-50	12/1/2015	2	4		10.648	1.196	2.970		0.498	0.057	0.207		0.959	0.184	0.158		1.010		1.010	U
SB-50	12/1/2015	4	6		9.773	1.670	4.740		**2.308**	0.137	0.384		**3.161**	0.350	0.189		5.249	1.689	2.610	J

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	Potassium-40 CSU (+/-2 s)	Potassium-40 MDA	Potassium-40 Q	Radium-226 Result	Radium-226 CSU (+/-2 s)	Radium-226 MDA	Radium-226 Q	Thorium-232 Result	Thorium-232 CSU (+/-2 s)	Thorium-232 MDA	Thorium-232 Q	Uranium-238 Result	Uranium-238 CSU (+/-2 s)	Uranium-238 MDA	Uranium-238 Q
Soil Screening Criteria										0.919				1.220				1.061		
Soil Borings (continued)																				
SB-50	12/1/2015	6	8		9.990	1.286	3.390		0.685	0.061	0.225		0.834	0.197	0.183		1.170		1.170	U
SB-50	12/1/2015	6	8	SB-50-06-08	12.540	1.370	3.370		0.671	0.066	0.234		0.677	0.180	0.166		1.170		1.170	U
SB-50	12/1/2015	8	10		14.772	1.379	3.120		0.559	0.059	0.218		1.129	0.206	0.196		1.120		1.120	U
SB-50	12/1/2015	10	12		15.461	1.326	2.820		0.537	0.057	0.204		0.670	0.179	0.173		1.010		1.010	U
SB-50	12/1/2015	12	14		13.585	1.342	3.160		0.619	0.062	0.209		1.002	0.184	0.167		1.090		1.090	U
SB-50	12/1/2015	14	16		18.528	1.498	3.060		0.634	0.060	0.194		1.216	0.214	0.186		1.070		1.070	U
SB-50	12/1/2015	16	18		11.071	1.253	3.140		0.611	0.059	0.213		1.202	0.187	0.172		1.120		1.120	U
SB-50	12/1/2015	18	20		13.304	1.300	3.000		0.681	0.066	0.249		1.015	0.210	0.165		1.120		1.120	U
SB-50	12/1/2015	20	22		13.506	1.297	2.990		0.568	0.059	0.230		**1.324**	0.217	0.171		1.100		1.100	U
SB-50	12/1/2015	22	24		13.776	1.329	3.080		0.381	0.060	0.269		1.008	0.179	0.145		0.975		0.975	U
SB-50	12/1/2015	24	26		13.004	1.322	3.160		0.568	0.057	0.195		0.789	0.200	0.167		0.918		0.918	U
SB-50	12/1/2015	26	27		15.610	1.420	3.170		0.529	0.057	0.218		1.135	0.200	0.169		1.090		1.090	U
SB-51	12/3/2015	0	1		10.811	1.745	4.560		**11.128**	0.386	0.749		**59.350**	2.904	0.413	J	9.008	3.528	8.160	J
SB-51	12/3/2015	1	2		16.896	1.558	3.500		**1.285**	0.088	0.294		**2.365**	0.304	0.150	J	2.320		2.320	U
SB-51	12/3/2015	2	4		13.419	1.334	3.140		0.525	0.059	0.227		**1.278**	0.220	0.172	J	1.070		1.070	U
SB-51	12/3/2015	4	6		7.756	1.798	5.390		**3.158**	0.165	0.438		**3.408**	0.440	0.232	J	2.630		2.630	U
SB-51	12/3/2015	6	8		10.791	1.334	3.440		0.881	0.071	0.196		**1.353**	0.222	0.202	J	1.290		1.290	U
SB-51	12/3/2015	8	10		16.334	1.426	3.070		0.469	0.469	0.191		0.931	0.199	0.114	J	1.040		1.040	U
SB-52	12/1/2015	0	1		9.911	1.401	3.710		**4.200**	0.183	0.413		**16.072**	0.912	0.236		5.768	2.136	4.590	
SB-52	12/1/2015	1	2		11.874	1.339	3.330		**1.142**	0.080	0.218		**1.662**	0.222	0.203		1.320		1.320	U
SB-52	12/1/2015	2	4		13.395	1.371	3.270		0.567	0.061	0.244		0.829	0.200	0.159		1.070		1.070	U
SB-52	12/1/2015	4	6		10.520	1.282	3.280		0.372	0.054	0.188		0.453	0.188	0.168		1.030		1.030	U
SB-52	12/1/2015	6	8		11.132	1.262	3.140		0.440	0.058	0.232		0.518	0.188	0.164		0.968		0.968	U
SB-52	12/1/2015	8	10		10.286	1.197	3.000		0.323	0.060	0.205		0.172		0.172	U	0.843		0.843	U
SB-53	12/1/2015	0	1		11.505	11.505	4.300		**5.185**	0.216	0.471		**19.352**	1.081	0.273	J	8.070	2.715	4.950	J
SB-53	12/1/2015	1	2		11.919	1.398	3.550		0.791	0.070	0.225		**1.368**	0.234	0.207	J	1.240		1.240	U
SB-53	12/1/2015	2	4		13.130	1.316	3.080		0.558	0.058	0.210		0.655	0.190	0.183	J	1.070		1.070	U
SB-53	12/1/2015	4	6		15.601	1.428	3.200		0.516	0.057	0.195		0.994	0.185	0.174		1.000		1.000	U
SB-53	12/1/2015	6	8		10.672	1.286	3.290		0.621	0.065	0.257		**1.314**	0.218	0.189		1.060		1.060	U
SB-53	12/1/2015	8	10		13.546	1.372	3.290		0.545	0.063	0.231		0.819	0.182	0.186		1.100		1.100	U
SB-54	12/3/2015	0	1		12.466	1.651	4.160		**6.875**	0.262	0.608		**39.304**	1.986	0.368		3.610		3.610	U
SB-54	12/3/2015	1	2		12.071	1.253	3.030		0.524	0.057	0.219		0.624	0.181	0.148		1.010		1.010	U
SB-54	12/3/2015	2	4		14.044	1.270	2.810		0.598	0.058	0.201		0.806	0.180	0.174		1.080		1.080	U
SB-54	12/3/2015	2	4	SB-54-02-04	15.552	1.365	2.990		0.756	0.063	0.213		0.927	0.189	0.116		1.190		1.190	U
SB-54	12/3/2015	4	6		14.697	1.329	2.950		0.578	0.057	0.198		0.671	0.170	0.157		1.070		1.070	U
SB-54	12/3/2015	6	8		12.296	1.183	2.730		0.476	0.051	0.215		0.727	0.174	0.143		0.843		0.843	U
SB-54	12/3/2015	8	10		10.452	0.938	2.080		0.362	0.039	0.142		0.681	0.123	0.108		0.693		0.693	U
SB-55	12/2/2015	0	2		14.538	1.435	3.370		0.647	0.066	0.267		0.803	0.175	0.132		1.240		1.240	U
SB-55	12/2/2015	2	4		13.483	1.339	3.180		0.634	0.059	0.235		0.796	0.188	0.111		1.090		1.090	U
SB-55	12/2/2015	4	6		14.978	1.382	3.120		0.686	0.064	0.220		1.059	0.181	0.192		1.040		1.040	U
SB-55	12/2/2015	6	8		14.434	1.337	3.010		0.516	0.056	0.205		0.816	0.182	0.159		1.060		1.060	U
SB-55	12/2/2015	8	10		16.293	1.440	3.160		0.582	0.059	0.231		0.706	0.175	0.176		0.968		0.968	U
SB-56	11/30/2015	0	2		14.560	1.731	4.400		**1.669**	0.117	0.405		**6.445**	0.494	0.218		1.970		1.970	U
SB-56	11/30/2015	2	4		12.931	1.400	3.400		0.421	0.056	0.216		0.746	0.194	0.153		1.090		1.090	U
SB-56	11/30/2015	4	6		13.509	1.377	3.280		0.243	0.054	0.235		0.468	0.192	0.158		0.975		0.975	U
SB-56	11/30/2015	6	8		14.853	1.374	3.080		0.520	0.067	0.225		0.748	0.194	0.227		0.996		0.996	U
SB-56	11/30/2015	8	10		12.823	1.262	2.940		0.412	0.055	0.242		1.033	0.173	0.102		1.097	0.580	1.610	
SB-56	11/30/2015	10	12		15.136	1.359	2.980		0.632	0.060	0.230		0.638	0.187	0.181		1.100		1.100	U
SB-56	11/30/2015	12	14		13.222	1.317	3.100		0.484	0.058	0.208		1.023	0.199	0.169		1.120		1.120	U
SB-56	11/30/2015	14	16		16.533	1.456	3.200		0.589	0.058	0.190		0.819	0.181	0.200		1.100		1.100	U
SB-56	11/30/2015	16	18		14.522	1.323	2.930		0.557	0.055	0.214		0.756	0.182	0.164		0.935		0.935	U
SB-56	11/30/2015	18	20		13.777	1.388	3.280		0.626	0.062	0.213		0.714	0.182	0.187		1.170		1.170	U
SB-56	11/30/2015	20	22		14.707	1.395	3.180		0.497	0.066	0.245		1.001	0.205	0.174		1.010		1.010	U
SB-56	11/30/2015	22	24		13.699	1.382	3.260		0.566	0.058	0.224		0.701	0.202	0.178		1.080		1.080	U
SB-57	12/1/2015	0	2		9.850	1.415	3.850		**0.959**	0.079	0.251		**1.486**	0.253	0.139		1.420		1.420	U
SB-57	12/1/2015	0	2	SB-57-00-02	11.239	1.400	3.620		**1.015**	0.081	0.256		**1.484**	0.241	0.150		1.330		1.330	U
SB-57	12/1/2015	2	4		13.583	1.246	2.820		0.384	0.050	0.222		0.746	0.164	0.105		0.884		0.884	U
SB-57	12/1/2015	4	6		12.406	1.328	3.240		0.323	0.050	0.215		0.473	0.182	0.157		0.945		0.945	U
SB-57	12/1/2015	6	8		13.831	1.364	3.230		0.623	0.063	0.242		**1.392**	0.211	0.115		1.050		1.050	U
SB-57	12/1/2015	8	10		15.017	1.337	2.920		0.499	0.058	0.217		0.934	0.179	0.180		1.050		1.050	U
SB-58	11/30/2015	0	2		14.228	1.412	3.340		0.853	0.068	0.242		**1.299**	0.241	0.193		1.150		1.150	U
SB-58	11/30/2015	2	3		12.075	1.294	3.170		0.825	0.067	0.244		0.901	0.197	0.189		1.110		1.110	U
SB-58	11/30/2015	5	6		13.154	1.367	3.280		**0.966**	0.966	0.255		0.792	0.182	0.166		1.200		1.200	U
SB-58	11/30/2015	6	8		9.961	1.445	3.920		0.662	0.071	0.234		0.960	0.222	0.205		1.260		1.260	U
SB-58	11/30/2015	8	10		12.323	1.312	3.200		0.648	0.063	0.247		1.183	0.202	0.163		0.990		0.990	U
SB-59	11/30/2015	0	2		12.799	1.470	3.690		0.650	0.073	0.270		**1.255**	0.228	0.217		1.320		1.320	U
SB-59	11/30/2015	2	4		13.079	1.372	3.300		0.681	0.061	0.210		1.111	0.208	0.160		1.210		1.210	U
SB-59	11/30/2015	4	6		12.136	1.372	3.410		0.644	0.063	0.255		0.603	0.202	0.191	J	1.200		1.200	U
SB-59	11/30/2015	8	10		12.493	1.295	3.120		0.612	0.060	0.233		0.711	0.157	0.103	J	1.120		1.120	U

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	Potassium-40 CSU (+/-2 s)	Potassium-40 MDA	Potassium-40 Q	Radium-226 Result	Radium-226 CSU (+/-2 s)	Radium-226 MDA	Radium-226 Q	Thorium-232 Result	Thorium-232 CSU (+/-2 s)	Thorium-232 MDA	Thorium-232 Q	Uranium-238 Result	Uranium-238 CSU (+/-2 s)	Uranium-238 MDA	Uranium-238 Q
Soil Screening Criteria										0.919				1.220				1.061		
Soil Borings (continued)																				
SB-59	11/30/2015	8	10	SB-59-08-10	12.292	1.299	3.150		0.537	0.055	0.197		0.785	0.192	0.162		1.060		1.060	U
SB-60	11/30/2015	0	2		13.757	1.341	3.090		0.815	0.069	0.236		1.083	0.206	0.196		1.030		1.030	U
SB-60	11/30/2015	2	2.6		13.209	1.359	3.220		0.843	0.072	0.258		**1.883**	0.259	0.163		1.150		1.150	U
SB-60	11/30/2015	6	8		9.768	1.315	3.510		0.852	0.071	0.264		0.884	0.239	0.223		1.140		1.140	U
SB-60	11/30/2015	8	10		16.281	1.368	2.920		0.498	0.056	0.210		0.948	0.164	0.177		1.030		1.030	U
SB-61	12/1/2015	0	2		11.176	1.337	3.430		0.777	0.069	0.260		1.072	0.211	0.125		1.220		1.220	U
SB-61	12/1/2015	2	3		11.569	1.452	3.770		0.706	0.067	0.271		0.731	0.236	0.136		1.330		1.330	U
SB-61	12/1/2015	5	6		9.803	1.428	3.890		0.767	0.076	0.270		0.741	0.215	0.195		1.360		1.360	U
SB-61	12/1/2015	6	8		13.365	1.325	3.090		0.613	0.058	0.207		1.069	0.209	0.178		1.060		1.060	U
SB-61	12/1/2015	8	10		13.381	1.319	3.110		0.588	0.057	0.186		**1.320**	0.191	0.121		1.060		1.060	U
SB-61	12/1/2015	15	16		15.728	1.407	3.100		0.592	0.061	0.245		0.988	0.195	0.190		1.080		1.080	U
SB-61	12/1/2015	16	18		12.702	1.394	3.470		0.498	0.060	0.250		1.164	0.211	0.174		1.070		1.070	U
SB-61	12/1/2015	18	20		15.193	1.427	3.240		0.532	0.057	0.231		0.664	0.185	0.175		1.100		1.100	U
SB-61	12/1/2015	20	22		14.119	1.447	3.480		0.672	0.067	0.229		0.649	0.196	0.172		1.130		1.130	U
SB-61	12/1/2015	22	24		13.170	1.389	3.380		0.521	0.058	0.219		0.844	0.186	0.218		1.120		1.120	U
SB-61	12/1/2015	24	26		13.330	1.470	3.640		0.570	0.065	0.230		**1.317**	0.228	0.202		1.130		1.130	U
SB-61	12/1/2015	26	28		13.211	1.395	3.370		0.623	0.064	0.258		1.036	0.210	0.188		1.050		1.050	U
SB-61	12/1/2015	28	30		14.165	1.282	2.820		0.628	0.057	0.207		0.670	0.182	0.181		1.140		1.140	U
SB-62	11/30/2015	0	2		14.245	1.527	3.720		0.815	0.079	0.272		0.834	0.194	0.183		1.230		1.230	U
SB-62	11/30/2015	2	4		15.047	1.464	3.380		0.705	0.067	0.228		0.880	0.218	0.180		1.160		1.160	U
SB-62	11/30/2015	6	8		13.228	1.398	3.380		0.689	0.067	0.246		0.969	0.202	0.205		1.080		1.080	U
SB-62	11/30/2015	8	10		12.494	1.367	3.370		0.576	0.062	0.220		0.842	0.189	0.164		1.060		1.060	U
SB-63	11/30/2015	0	2		13.136	1.402	3.410		0.857	0.071	0.243		1.026	0.206	0.170		1.150		1.150	U
SB-63	11/30/2015	2	4		14.656	1.522	3.660		0.781	0.074	0.274		**1.246**	0.222	0.206		1.270		1.270	U
SB-63	11/30/2015	4	6		10.921	1.427	3.760		0.482	0.067	0.276		0.618	0.214	0.159		1.230		1.230	U
SB-63	11/30/2015	6	8		13.239	1.396	3.350		0.492	0.061	0.242		1.201	0.191	0.198	J	1.200		1.200	U
SB-63	11/30/2015	8	10		12.908	1.346	3.220		0.443	0.059	0.243		0.587	0.179	0.177		1.010		1.010	U
Sewer Borings																				
SWSB-01	12/4/2015	0	2		13.093	1.276	2.950		0.388	0.054	0.234		0.855	0.191	0.177		1.010		1.010	U
SWSB-01	12/4/2015	2	4		10.029	1.363	3.650		0.499	0.064	0.269		0.802	0.188	0.167		1.100		1.100	U
SWSB-01	12/4/2015	4	6		14.034	1.465	3.540		0.509	0.065	0.244		0.851	0.202	0.162		1.060		1.060	U
SWSB-01	12/4/2015	4	6	SWSB-01-04-06	12.586	1.272	2.990		0.436	0.056	0.234		0.650	0.180	0.168		0.978		0.978	U
SWSB-02	12/4/2015	0	2		12.913	1.401	3.430		0.778	0.066	0.203		**1.761**	0.247	0.151		1.320		1.320	U
SWSB-02	12/4/2015	5	6		15.353	1.400	3.140		0.703	0.063	0.228		0.882	0.180	0.184		1.030		1.030	U
SWSB-02	12/4/2015	6	8		13.693	1.309	3.020		0.563	0.057	0.223		1.043	0.198	0.167		1.110		1.110	U
SWSB-02	12/4/2015	8	10		11.851	1.292	3.170		0.554	0.058	0.209		0.931	0.207	0.113		1.060		1.060	U
SWSB-02	12/4/2015	10	12		13.387	1.299	3.020		0.571	0.056	0.220		0.903	0.203	0.188		1.140		1.140	U
SWSB-02	12/4/2015	12	14		14.451	1.428	3.360		0.549	0.059	0.233		0.848	0.184	0.174		1.040		1.040	U
SWSB-03	12/4/2015	0	1		8.016	1.547	4.150		**7.774**	0.297	0.642		**58.008**	2.804	0.401		4.290		4.290	U
SWSB-03	12/4/2015	1	2		12.054	1.446	3.710		0.547	0.069	0.259		1.020	0.234	0.183		1.100		1.100	U
SWSB-03	12/4/2015	2	4		12.857	1.511	3.870		0.593	0.066	0.260		0.778	0.226	0.190		1.190		1.190	U
SWSB-03	12/4/2015	2	4	SWSB-03-02-04	13.674	1.382	3.260		0.742	0.065	0.222		0.729	0.196	0.190		1.140		1.140	U
SWSB-03	12/4/2015	4	6		11.994	1.317	3.270		0.409	0.055	0.224		0.382	0.164	0.163		1.040		1.040	U
SWSB-03	12/4/2015	6	8		12.472	1.501	3.840		0.618	0.072	0.271		0.885	0.203	0.199		1.240		1.240	U
SWSB-03	12/4/2015	8	10		14.202	1.569	3.880		0.698	0.076	0.263		1.197	0.238	0.206		1.210		1.210	U
SWSB-03	12/4/2015	10	12		16.473	1.517	3.410		0.579	0.066	0.246		0.908	0.203	0.199		1.140		1.140	U
SWSB-03	12/4/2015	12	14		14.530	1.306	2.880		0.581	0.058	0.215		0.836	0.182	0.146		1.020		1.020	U
SWSB-03	12/4/2015	14	16		14.756	1.328	2.930		0.606	0.060	0.188		0.812	0.185	0.173		0.966		0.966	U
SWSB-03	12/4/2015	16	18		13.807	1.350	3.160		0.564	0.060	0.218		0.576	0.168	0.117		1.040		1.040	U
SWSB-03	12/4/2015	18	20		11.596	1.197	2.870		0.507	0.054	0.196		0.899	0.168	0.143		1.020		1.020	U
SWSB-04	12/3/2015	0	2		11.834	1.369	3.440		0.626	0.064	0.239		0.723	0.190	0.192		1.110		1.110	U
SWSB-04	12/3/2015	2	4		12.559	1.277	3.030		0.674	0.059	0.228		1.056	0.216	0.112		1.100		1.100	U
SWSB-04	12/3/2015	4	6		15.678	1.454	3.280		0.638	0.064	0.245		0.727	0.186	0.185	J	1.160		1.160	U
SWSB-04	12/3/2015	4	6	SWSB-04-04-06	12.693	1.387	3.400		0.713	0.069	0.280		**1.509**	0.225	0.192	J	1.220		1.220	U
SWSB-04	12/3/2015	6	8		15.270	1.521	3.560		0.604	0.065	0.251		0.883	0.213	0.186		1.110		1.110	U
SWSB-04	12/3/2015	8	10		10.456	1.243	3.180		0.411	0.057	0.217		0.893	0.183	0.111		1.520		1.520	U
SWSB-04	12/3/2015	10	12		12.140	1.282	3.130		0.595	0.059	0.199		0.442	0.163	0.167		1.000		1.000	U
SWSB-04	12/3/2015	12	14		13.546	1.387	3.300		0.794	0.070	0.251		1.198	0.214	0.152		1.140		1.140	U
SWSB-04	12/3/2015	14	16		13.586	1.322	3.060		0.531	0.057	0.196		0.907	0.184	0.215		1.610		1.610	U
SWSB-04	12/3/2015	16	18		13.020	1.377	3.340		0.523	0.058	0.227		1.219	0.208	0.177		1.160		1.160	U
SWSB-04	12/3/2015	18	20		14.126	1.329	3.010		0.433	0.055	0.237		1.174	0.188	0.171		0.921		0.921	U
SWSB-06	12/3/2015	1.5	5		13.307	1.279	2.930		0.695	0.062	0.231		1.185	0.194	0.177		1.030		1.030	U
SWSB-06	12/3/2015	5	6		14.359	1.361	3.100		0.731	0.064	0.235		0.759	0.176	0.182		1.040		1.040	U
SWSB-06	12/3/2015	6	8		14.527	1.349	3.050		0.504	0.056	0.238		**1.249**	0.207	0.153		1.090		1.090	U
SWSB-06	12/3/2015	8	10		13.730	1.303	3.010		0.623	0.057	0.216		0.734	0.179	0.156		1.030		1.030	U
SWSB-06	12/3/2015	8	10	SWSB-06-08-10	13.781	1.323	3.020		0.509	0.060	0.254		0.737	0.187	0.175		1.070		1.070	U
SWSB-06	12/3/2015	10	12		10.430	1.217	3.100		0.714	0.060	0.205		0.774	0.202	0.122		0.973		0.973	U
SWSB-06	12/3/2015	12	14		13.969	1.333	3.050		0.543	0.058	0.232		0.482	0.169	0.222		1.080		1.080	U
SWSB-06	12/3/2015	14	16		14.752	1.381	3.140		0.621	0.063	0.249		0.870	0.203	0.221		1.090		1.090	U

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	Potassium-40 CSU (+/-2 s)	Potassium-40 MDA	Q	Radium-226 Result	Radium-226 CSU (+/-2 s)	Radium-226 MDA	Q	Thorium-232 Result	Thorium-232 CSU (+/-2 s)	Thorium-232 MDA	Q	Uranium-238 Result	Uranium-238 CSU (+/-2 s)	Uranium-238 MDA	Q
Soil Screening Criteria										0.919				1.220				1.061		
Sewer Borings (continued)																				
SWSB-06	12/3/2015	16	18		16.235	1.401	3.020		0.508	0.054	0.203		0.727	0.174	0.184		1.050		1.050	U
SWSB-06	12/3/2015	18	20		13.900	1.281	2.880		0.514	0.054	0.180		0.923	0.194	0.991		0.991		0.991	U
SWSB-07	12/3/2015	0	2		10.329	1.319	3.450		0.571	0.060	0.222		0.698	0.201	0.126		1.120		1.120	U
SWSB-07	12/3/2015	2	4		14.871	1.432	3.300		0.635	0.065	0.227		1.010	0.214	0.187		1.130		1.130	U
SWSB-07	12/3/2015	4	6		15.114	1.389	3.130		0.472	0.057	0.198		0.600	0.199	0.171		1.090		1.090	U
SWSB-07	12/3/2015	6	8		16.183	1.386	2.960		0.592	0.055	0.186		0.880	0.172	0.176		1.050		1.050	U
SWSB-07	12/3/2015	8	10		13.377	1.313	3.070		0.535	0.055	0.208		0.917	0.192	0.169		0.982		0.982	U
SWSB-07	12/3/2015	10	12		15.511	1.388	3.030		0.703	0.062	0.218		0.828	0.184	0.194		1.160		1.160	U
SWSB-07	12/3/2015	12	14		13.729	1.334	3.120		0.822	0.066	0.222		0.897	0.202	0.168		1.160		1.160	U
SWSB-07	12/3/2015	14	16		12.372	1.223	2.870		0.534	0.054	0.208		0.698	0.166	0.177		0.896		0.896	U
SWSB-07	12/3/2015	16	18		11.629	1.207	2.910		0.421	0.053	0.199		0.621	0.152	0.151		0.936		0.936	U
SWSB-07	12/3/2015	18	20		13.442	1.345	3.170		0.421	0.054	0.223		0.670	0.179	0.162		1.010		1.010	U
SWSB-08	12/2/2015	0	2		11.971	1.321	3.270		0.497	0.061	0.238		0.549	0.177	0.125		1.720		1.720	U
SWSB-08	12/2/2015	2	4		11.675	1.349	3.410		0.719	0.069	0.254		1.002	0.220	0.187		1.110		1.110	U
SWSB-08	12/2/2015	4	6		12.787	1.287	3.030		0.747	0.068	0.245		**2.367**	0.266	0.205		1.130		1.130	U
SWSB-08	12/2/2015	6	8		14.520	1.330	2.950		0.503	0.066	0.255		0.716	0.181	0.172		1.070		1.070	U
SWSB-08	12/2/2015	8	10		14.833	1.390	3.150		0.537	0.062	0.225		1.067	0.181	0.175		1.070		1.070	U
SWSB-08	12/2/2015	10	12		11.743	1.291	3.190		0.548	0.058	0.229		1.178	0.192	0.185		0.995		0.995	U
SWSB-08	12/2/2015	12	14		16.678	1.431	3.080		0.710	0.059	0.199		0.871	0.189	0.170		0.973		0.973	U
SWSB-08	12/2/2015	14	16		14.925	1.364	3.050		0.627	0.060	0.210		0.943	0.192	0.170		1.090		1.090	U
SWSB-08	12/2/2015	16	18		14.651	1.288	2.800		0.519	0.054	0.211		0.761	0.177	0.150		0.973		0.973	U
SWSB-08	12/2/2015	18	20		13.004	1.238	2.870		0.487	0.050	0.193		0.428	0.155	0.092		0.995		0.995	U
SWSB-09	12/2/2015	0	2		13.926	1.415	3.370		0.650	0.065	0.225		**1.249**	0.215	0.178		1.240		1.240	U
SWSB-09	12/2/2015	2	4		15.186	1.526	3.580		0.590	0.068	0.265		0.268		0.268	U	1.130		1.130	U
SWSB-09	12/2/2015	2	4	SWSB-09-02-04	15.614	1.502	3.460		0.514	0.063	0.241		**1.369**	0.239	0.186		1.150		1.150	U
SWSB-09	12/2/2015	4	6		13.860	1.358	3.170		0.709	0.061	0.205		0.926	0.207	0.160		1.080		1.080	U
SWSB-09	12/2/2015	6	8		15.228	1.408	3.180		0.672	0.063	0.253		1.101	0.211	0.130		1.120		1.120	U
SWSB-09	12/2/2015	8	10		13.691	1.346	3.160		**0.943**	0.069	0.221		1.000	0.207	0.178		1.020		1.020	U
SWSB-09	12/2/2015	10	12		15.220	1.381	3.070		0.706	0.062	0.218		1.085	0.208	0.162		1.100		1.100	U
SWSB-09	12/2/2015	12	14		14.122	1.422	3.380		0.660	0.061	0.210		0.913	0.206	0.220		1.070		1.070	U
SWSB-09	12/2/2015	15	16		11.992	1.290	3.140		0.496	0.057	0.219		0.190		0.190	U	0.952		0.952	U
SWSB-09	12/2/2015	16	18		11.615	1.291	3.210		0.240	0.046	0.173		0.180		0.180	U	0.871		0.871	U
SWSB-09	12/2/2015	18	20		11.598	1.228	2.980		0.619	0.060	2.980		0.930	0.189	0.189		1.020		1.020	U
SWSB-11	12/2/2015	0	2		10.718	1.241	3.130		0.561	0.066	0.209		0.659	0.165	0.166		0.894		0.894	U
SWSB-11	12/2/2015	2	4		10.355	1.175	2.930		0.639	0.057	0.195		0.760	0.188	0.124		1.080		1.080	U
SWSB-11	12/2/2015	4	6		13.825	1.297	2.920		0.770	0.066	0.219		**1.518**	0.216	0.219		1.180		1.180	U
SWSB-11	12/2/2015	6	8		14.601	1.412	3.290		0.708	0.064	0.223		1.117	0.212	0.152		1.120		1.120	U
SWSB-11	12/2/2015	8	10		12.018	1.273	3.060		0.619	0.063	0.232		0.832	0.196	0.210		1.100		1.100	U
SWSB-11	12/2/2015	10	11		13.145	1.261	2.900		0.539	0.055	0.203		0.684	0.172	0.160		0.987		0.987	U
SWSB-11	12/2/2015	15	16		13.794	1.308	3.020		0.387	0.052	0.218		1.020	0.194	0.159		0.979		0.979	U
School Borings																				
SCSB-01	10/31/2015	0	2		9.455	1.331	3.600		0.452	0.061	0.265		0.586	0.173	0.176		1.210		1.210	U
SCSB-01	10/31/2015	2	4		15.233	1.580	3.780		0.664	0.073	0.287		0.971	0.204	0.220		1.310		1.310	U
SCSB-01	10/31/2015	4	6		14.901	1.356	2.990		0.541	0.053	0.192		**1.291**	0.211	0.176	J	1.050		1.050	U
SCSB-01	10/31/2015	4	6	SCSB-01-04-06	13.010	1.283	2.980		0.436	0.055	0.211		0.682	0.166	0.174	J	0.975		0.975	U
SCSB-01	10/31/2015	6	8		13.140	1.308	3.100		0.588	0.058	0.192		0.918	0.182	0.174		1.040		1.040	U
SCSB-01	10/31/2015	8	10		13.234	1.304	3.020		0.505	0.055	0.185		0.761	0.185	0.179		1.010		1.010	U
SCSB-02	10/31/2015	0	2		11.359	1.234	3.020		0.501	0.052	0.193		0.840	0.180	0.142		1.020		1.020	U
SCSB-02	10/31/2015	2	4		13.714	1.571	3.920		0.796	0.076	0.285		**1.363**	0.232	0.220		1.240		1.240	U
SCSB-02	10/31/2015	4	6		10.631	1.248	3.160		0.473	0.054	0.193		1.051	0.217	0.204		1.050		1.050	U
SCSB-02	10/31/2015	6	8		16.103	1.432	3.160		0.769	0.065	0.223		**1.353**	0.205	0.191		1.180		1.180	U
SCSB-02	10/31/2015	8	10		12.262	1.321	3.250		0.366	0.051	0.199		0.874	0.177	0.186	J	0.958		0.958	U
SCSB-03	10/31/2015	0	2		9.851	1.205	3.100		0.369	0.053	0.215		0.604	0.181	0.200	J	1.030		1.030	U
SCSB-03	10/31/2015	2	4		10.874	1.205	2.970		0.381	0.050	0.203		0.712	0.179	0.162		0.920		0.920	U
SCSB-03	10/31/2015	4	6		9.139	1.243	3.320		0.530	0.064	0.214		0.227		0.227	U	1.020		1.020	U
SCSB-03	10/31/2015	6	8		17.539	1.461	3.060		0.777	0.066	0.224		**1.548**	0.236	0.122		1.200		1.200	U
SCSB-03	10/31/2015	8	10		9.532	1.156	2.970		0.276	0.055	0.198		0.616	0.154	0.163		0.875		0.875	U
SCSB-04	10/31/2015	0	2		12.514	1.351	3.310		0.564	0.060	0.235		0.923	0.187	0.164		1.030		1.030	U
SCSB-04	10/31/2015	2	4		6.515	1.086	3.060		0.286	0.051	0.184		0.554	0.152	0.164		0.867		0.867	U
SCSB-04	10/31/2015	4	6		18.531	1.556	3.290		0.580	0.059	0.247		1.129	0.211	0.179		1.180		1.180	U
SCSB-04	10/31/2015	6	8		11.212	1.253	3.100		0.464	0.057	0.217		1.019	0.197	0.195		0.953		0.953	U
SCSB-04	10/31/2015	8	10		10.026	1.218	3.150		0.311	0.054	0.238		0.343	0.178	0.164		0.818		0.818	U
SCSB-05	10/31/2015	0	2		8.747	1.221	3.280		0.755	0.065	0.225		1.165	0.197	0.184		1.180		1.180	U
SCSB-05	10/31/2015	2	4		12.012	1.377	3.460		0.647	0.068	0.233		0.924	0.192	0.194		1.200		1.200	U
SCSB-05	10/31/2015	4	6		12.500	1.356	3.310		0.526	0.063	0.244		0.652	0.202	0.207		1.050		1.050	U
SCSB-05	10/31/2015	6	8		14.685	1.405	3.240		0.549	0.060	0.231		0.839	0.194	0.195		1.180		1.180	U
SCSB-05	10/31/2015	8	10		16.858	1.490	3.230		0.459	0.060	0.259		0.887	0.204	0.129		1.010		1.010	U
SCSB-06	10/31/2015	0	2		10.571	1.265	3.230		0.413	0.055	0.216		0.865	0.187	0.163		1.030		1.030	U
SCSB-06	10/31/2015	0	2	SCSB-06-00-02	10.633	1.272	3.260		0.499	0.056	0.202		0.906	0.204	0.189		1.050		1.050	U

Table 4
ISOCS Radiological Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232				Uranium-238			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria										**0.919**				**1.220**				**1.061**		
School Borings (continued)																				
SCSB-06	10/31/2015	2	4		14.811	1.400	3.180		0.525	0.059	0.240		0.755	0.188	0.177		1.080		1.080	U
SCSB-06	10/31/2015	4	6		14.382	1.411	3.280		0.548	0.059	0.228		0.586	0.169	0.170		1.110		1.110	U
SCSB-06	10/31/2015	6	8		10.460	1.233	3.120		0.538	0.059	0.225		0.815	0.200	0.173		1.020		1.020	U
SCSB-06	10/31/2015	8	10		10.289	1.216	3.100		0.532	0.062	0.247		1.041	0.199	0.174		1.000		1.000	U
Sewer Sediments																				
I-2	11/18/2015				8.170		8.170	U	**51.957**	1.414	2.550		**1022.759**	53.755	1.940		53.458	16.301	22.600	J
I-2	11/18/2015				14.800		14.800	U	**13.960**	0.904	4.070		**1405.109**	73.973	2.760		110.860	33.363	43.300	J
I-7	11/18/2015				5.967	2.025	5.360		**10.025**	0.402	1.010		**148.831**	6.975	0.632		6.190		6.190	U
Background																				
BKSB-01	12/16/2015	0	2		11.012	1.239	3.070		0.342	0.053	0.224		0.523	0.170	0.137		1.050		1.050	U
BKSB-02	12/16/2015	0	2		14.920	1.558	3.740		0.667	0.074	0.276		0.683	0.232	0.207		1.230		1.230	U
BKSB-02	12/16/2015	0	2	BKSB-02-00-02	11.238	1.388	3.570		0.558	0.067	0.274		0.645	0.202	0.205		1.300		1.300	U
BKSB-03	12/16/2015	0	1		11.125	1.442	3.780		0.449	0.066	0.291		0.595	0.202	0.198		1.210		1.210	U
BKSB-04	12/22/2015	0	2		13.009	1.405	3.470		0.508	0.062	0.221		0.745	0.181	0.186		1.110		1.110	U
BKSB-04	12/22/2015	0	2	BKSB-04-00-02	11.059	1.309	3.330		0.478	0.059	0.246		0.972	0.196	0.231		1.050		1.050	U
BKSB-04	12/22/2015	4	6		12.212	1.380	3.460		0.176	0.057	0.224		0.184		0.184	U	0.860		0.860	U
BKSB-04	12/22/2015	8	10		14.806	1.371	3.090		0.429	0.056	0.227		0.779	0.187	0.173		1.020		1.020	U
BKSB-04	12/22/2015	18	20		14.518	1.354	3.070		0.512	0.058	0.214		1.030	0.191	0.188		0.986		0.986	U
BKSB-04	12/22/2015	23	25		14.562	1.381	3.140		0.713	0.065	0.222		0.687	0.167	0.165		1.060		1.060	U
BKSB-05	12/16/2015	0	1		10.841	1.381	3.610		0.669	0.066	0.210		0.846	0.204	0.125		1.040		1.040	U
BKSB-06	10/30/2015	0	2		11.569	1.343	3.390		0.814	0.073	0.235		1.007	0.224	0.178		1.120		1.120	U
BKSB-06	10/30/2015	4	6		13.102	1.387	3.360		0.530	0.061	0.246		0.911	0.198	0.198		1.150		1.150	U
BKSB-06	10/30/2015	8	10		10.777	1.607	4.410		0.919	0.088	0.344		0.690	0.241	0.256		1.390		1.390	U
BKSB-06	10/30/2015	18	20		12.850	1.371	3.340		0.513	0.060	0.233		0.869	0.197	0.168		1.110		1.110	U
BKSB-06	10/30/2015	28	30		12.589	1.341	3.290		0.474	0.058	0.234		1.132	0.212	0.181		1.520		1.520	U
BKSB-07	10/30/2015	0	2		14.256	1.365	3.110		0.464	0.055	0.210		0.487	0.172	0.178		0.998		0.998	U
BKSB-07	10/30/2015	4	6		11.702	1.415	3.630		0.406	0.058	0.233		0.588	0.202	0.210		1.210		1.210	U
BKSB-07	10/30/2015	8	10		14.354	1.526	3.720		0.475	0.066	0.257		0.694	0.217	0.216		1.170		1.170	U
BKSB-07	10/30/2015	18	20		11.988	1.329	3.310		0.536	0.062	0.245		0.617	0.188	0.159		1.160		1.160	U
BKSB-07	10/30/2015	28	30		14.057	1.372	3.180		0.441	0.054	0.201		0.878	0.190	0.183		0.930		0.930	U
BKSB-08	10/30/2015	0	2		10.967	1.460	3.900		0.513	0.064	0.229		0.741	0.229	0.131		1.200		1.200	U
BKSB-08	10/30/2015	0	2	BKSB-08-00-02	14.169	1.545	3.770		0.627	0.069	0.261		0.766	0.241	0.213		1.320		1.320	U
BKSB-08	10/30/2015	4	6		11.285	1.212	2.930		0.518	0.056	0.216		0.687	0.181	0.155		1.030		1.030	U
BKSB-08	10/30/2015	8	10		15.806	1.469	3.340		0.484	0.059	0.248		0.649	0.197	0.170		1.040		1.040	U
BKSB-08	10/30/2015	18	20		14.436	1.382	3.190		0.383	0.056	0.241		1.027	0.196	0.168		1.050		1.050	U
BKSB-08	10/30/2015	28	30		12.552	1.240	2.880		0.499	0.056	0.222		0.821	0.163	0.119		1.000		1.000	U

Notes:

All units in picoCurie per gram (pCi/g).

CSU (+/- s) = combined standard uncertainty (2 sigma)

MDA - minimum detectable activity

Q - qualifier

U - not detected

J - estimated value

* Parent sample ID listed for duplicate samples.

Highlighted cell and bold format indicates that concentration exceeded screening criteria.

Note: Combined standard uncertainty is not reported when chemical is not detected.

Table 5
Soil Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria										**0.919**				**1.220**		
Soil Borings																
SB-01	10/30/2015	10	12		14.409	1.713	0.708		**1.416**	0.235	0.173		**3.22**	0.499	0.529	
SB-02	11/6/2015	0	2		13.436	1.89	0.519		**1.239**	0.209	0.191		**3.183**	0.459	0.208	
SB-03	10/21/2015	0	2		8.006	1.967	1.39	J	**2.681**	0.38	0.238	J	**6.248**	0.656	0.244	J
SB-03	10/21/2015	20	22		14.497	1.981	0.524		0.584	0.138	0.139		1.094	0.205	0.222	
SB-04	10/21/2015	0	2		14.037	2.856	2.15	J	**7.558**	0.819	0.548		**40.024**	2.825	0.698	
SB-07	10/26/2015	0	2		19.724	3.758	4.94	J	**7.455**	1.302	1.334		**221.83**	13.743	1.58	
SB-07	10/26/2015	2	4		19.982	3.131	1.86	J	**1.12**	0.445	0.636		**54.571**	3.831	0.846	
SB-07	10/26/2015	10	12		17.196	2.005	0.663		0.897	0.28	0.328		**23.58**	1.73	0.487	
SB-07	10/26/2015	14	16		13.755	1.727	0.781		**0.983**	0.246	0.32		**13.396**	1.061	0.329	
SB-08	10/23/2015	6	8		9.161	5.563	8.97	J	**2.934**	1.316	2.109		**505.17**	30.986	2.26	
SB-08	10/23/2015	14	16		24.865	4.148	3.02	J	**2.914**	0.73	0.857		**118.88**	7.492	1.1	
SB-13	10/20/2015	0	2		11.909	1.845	0.787		**1.308**	0.253	0.189		**2.451**	0.39	0.284	
SB-14	10/21/2015	2	4		12.433	1.799	0.518		0.731	0.164	0.136		0.463	0.181	0.267	J
SB-15	10/28/2015	0	2		12.084	1.62	0.885		**0.935**	0.17	0.111		**1.425**	0.245	0.067	
SB-16	10/21/2015	6	8		13.659	1.733	0.523		0.775	0.15	0.097		1.068	0.209	0.067	J
SB-17	10/27/2015	4	6		12.583	1.919	0.596		0.819	0.201	0.177		1.017	0.237	0.147	
SB-18	10/27/2015	4	6		11.247	1.502	0.275		0.397	0.117	0.09		0.553	0.147	0.07	
SB-19	10/22/2015	0	2		12.119	1.606	0.289		**1.033**	0.196	0.131		**1.472**	0.287	0.123	
SB-20	11/9/2015	0	2		10.84	1.723	0.563		**1.472**	0.261	0.178		**2.075**	0.374	0.159	
SB-21	10/22/2015	8	10		13.772	1.911	0.514		0.774	0.166	0.17		0.889	0.218	0.364	
SB-22	10/22/2015	0	2		10.553	1.538	1.2		0.776	0.163	0.111		**1.476**	0.25	0.114	
SB-23	2/15/2016	0	2		9.554	1.533	0.511		0.689	0.145	0.144		1.034	0.209	0.126	J
SB-23	2/15/2016	2	4		12.577	1.706	0.443		0.752	0.154	0.132		0.957	0.174	0.166	J
SB-23	2/15/2016	2	4	SB-23-02-04	14.979	1.761	0.713		0.748	0.134	0.104		0.826	0.173	0.217	J
SB-23	2/15/2016	4	6		14.018	1.871	0.674		0.728	0.155	0.128		**1.282**	0.244	0.114	J
SB-23	2/15/2016	6	8		13.747	1.734	0.626		0.774	0.147	0.098		0.986	0.215	0.113	J
SB-23	2/15/2016	8	10		14.318	1.764	0.823		0.604	0.13	0.117		1.108	0.239	0.13	J
SB-24	2/15/2016	0	2		12.341	2.027	0.697		**2.349**	0.334	0.2		**1.896**	0.342	0.326	J
SB-24	2/15/2016	2	4		9.374	1.494	0.841		0.206	0.096	0.147		0.098	0.153	0.268	UJ
SB-24	2/15/2016	4	6		13.07	1.622	0.475		0.548	0.115	0.078		0.706	0.137	0.107	J
SB-24	2/15/2016	6	8		13.754	1.813	0.722		0.705	0.161	0.122		0.929	0.216	0.144	J
SB-24	2/15/2016	8	10		13.832	1.96	1		**0.999**	0.174	0.099		1.093	0.22	0.107	J
SB-25	2/15/2016	0	2		11.275	1.538	0.791		0.89	0.176	0.128		**1.282**	0.245	0.088	J
SB-25	2/15/2016	2	4		11.29	1.787	0.726		0.697	0.177	0.176		0.979	0.203	0.211	J
SB-25	2/15/2016	4	6		10.205	1.523	0.456		0.53	0.146	0.161		0.292	0.163	0.23	J
SB-25	2/15/2016	6	8		14.287	1.858	0.637		0.665	0.135	0.116		0.649	0.156	0.292	J
SB-25	2/15/2016	8	10		13.37	1.679	0.512		0.732	0.152	0.098		1.195	0.215	0.062	J
SB-26	10/21/2015	0	2		14.652	1.841	0.304		**2.724**	0.376	0.254		**8.329**	0.8	0.306	
SB-26	10/21/2015	2	4		10.5	1.622	1.01		**1.634**	0.266	0.168		**2.464**	0.357	0.162	
SB-27	2/15/2016	0	2		9.53	1.892	1.27	J	**1.643**	0.286	0.21	J	**1.786**	0.336	0.254	J
SB-27	2/15/2016	2	4		8.532	1.474	1		0.755	0.161	0.127		1.033	0.232	0.125	
SB-27	2/15/2016	4	6		12.576	1.88	1.04		0.88	0.18	0.128		0.623	0.223	0.253	
SB-27	2/15/2016	6	8		13.858	1.848	0.665		0.833	0.166	0.132		1.097	0.229	0.204	
SB-27	2/15/2016	8	10		12.934	1.71	0.427		0.722	0.152	0.153		**1.244**	0.219	0.173	
SB-28	2/15/2016	0	2		11.235	1.633	0.341		**1.715**	0.253	0.144		**2.927**	0.365	0.149	J
SB-28	2/15/2016	0	2	SB-28-00-02	11.891	1.627	0.84		**1.514**	0.252	0.181		**3.52**	0.417	0.219	J
SB-28	2/15/2016	2	4		8.827	1.533	0.885		0.55	0.15	0.149		0.485	0.177	0.232	
SB-28	2/15/2016	4	6		12.026	1.687	0.461		0.45	0.117	0.135		0.359	0.153	0.288	
SB-28	2/15/2016	6	8		11.7	1.884	1.25		0.672	0.152	0.141		0.779	0.213	0.275	
SB-28	2/15/2016	8	10		12.822	1.759	0.912		0.656	0.158	0.146		0.689	0.185	0.258	
SB-29	10/20/2015	0	2		12.89	1.869	1.17		**2.022**	0.307	0.213		**5.253**	0.573	0.272	
SB-30	2/18/2016	0	2		10.63	1.677	1.06	J	**0.952**	0.202	0.183		1.03	0.261	0.211	
SB-30	2/18/2016	2	4		15.324	1.837	0.523	J	0.754	0.141	0.105		1.102	0.166	0.125	
SB-30	2/18/2016	4	6		12.035	1.631	0.83	J	0.399	0.106	0.098		0.445	0.118	0.166	
SB-30	2/18/2016	6	8		12.817	1.835	0.749	J	0.778	0.16	0.126		0.831	0.198	0.17	
SB-30	2/18/2016	8	10		7.863	1.364	0.504	J	0.49	0.131	0.135		0.844	0.186	0.18	
SB-31	10/19/2015	2	4		16.27	2.237	1.18		**3.239**	0.46	0.326		**12.217**	1.068	0.457	
SB-32	2/15/2016	0	2		11.896	1.789	1.14		**3.793**	0.557	0.343		**11.949**	1.028	0.36	
SB-32	2/15/2016	5	7		13.203	1.919	0.762		0.786	0.161	0.157		**1.403**	0.226	0.125	
SB-33	10/20/2015	4	6		11.804	2.077	0.781	J	**2.717**	0.419	0.253	J	**2.485**	0.398	0.192	J
SB-34	10/20/2015	4	6		11.448	1.901	0.8	J	**2.965**	0.387	0.188	J	**3.042**	0.478	0.186	J
SB-35	10/27/2015	2	4		12.464	1.725	0.462		**2.663**	0.379	0.254		**7.737**	0.749	0.321	

Table 5
Soil Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	CSU (+/-2 s)	MDA	Q	Radium-226 Result	CSU (+/-2 s)	MDA	Q	Thorium-232 Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria										**0.919**				**1.220**		
Soil Borings (continued)																
SB-35	10/27/2015	4	6		8.667	1.641	0.676		**2.104**	0.342	0.239		**3.74**	0.585	0.277	
SB-35	10/27/2015	6	8		9.963	1.564	0.365	J	**2.878**	0.365	0.193	J	**2.977**	0.509	0.274	J
SB-36	10/22/2015	0	2		16.631	2.588	1.43	J	**7.182**	0.825	0.551	J	**32.047**	2.429	0.711	J
SB-36	10/22/2015	0	2	SB-36-00-02	12.748	2.024	1.1	J	**5.944**	0.66	0.483	J	**28.055**	2.113	0.638	J
SB-37	10/22/2015	0	2		14.282	1.991	0.832		**4.228**	0.462	0.252		**9.629**	0.922	0.426	
SB-41	10/26/2015	0	2		7.447	1.303	1.12		**1.62**	0.254	0.201		**3.917**	0.461	0.24	
SB-42	10/26/2015	0	2		11.553	1.738	0.53		**0.982**	0.185	0.162		**1.355**	0.247	0.191	
SB-44	10/28/2015	0	2		15.836	3.603	2.85	J	**57.113**	4.36	0.786		**49.243**	3.296	1.09	
SB-45	10/28/2015	0	2		17.56	1.999	0.511		**1.113**	0.213	0.157		**2.894**	0.388	0.164	
SB-50	12/1/2015	0	1		29.618	5.429	3.37	J	**43.349**	3.432	1.154		**156.15**	9.968	1.46	
SB-50	12/1/2015	0	1	SB-50-00-01	16.234	3.495	4.71	J	**41.135**	3.264	1.135		**147.65**	9.496	1.68	
SB-50	12/1/2015	1	2		10.705	1.477	0.772		**1.174**	0.201	0.143		**2.206**	0.329	0.132	
SB-51	12/3/2015	0	1		16.04	2.724	1.94	J	**11.004**	1.129	0.604		**43.93**	3.047	0.789	
SB-52	12/1/2015	0	1		13.209	2.054	0.906		**4.273**	0.567	0.382		**12.05**	1.136	0.468	
SB-52	12/1/2015	0	1	SB-52-00-01	13.382	1.882	1.05		**4.35**	0.51	0.296		**12.502**	1.137	0.386	
SB-52	12/1/2015	1	2		12.116	1.585	0.765		**1.317**	0.203	0.135		**1.579**	0.285	0.143	J
SB-54	12/3/2015	0	1		15.746	2.554	1.48		**5.852**	0.714	0.484		**25.405**	1.823	0.598	
SB-56	11/30/2015	0	2		12.657	1.815	0.667		**2.277**	0.312	0.205		**6.178**	0.568	0.193	
SB-57	12/1/2015	6	8		15.007	1.908	0.446		0.874	0.184	0.141		0.947	0.211	0.126	J
SB-64	2/17/2016	1	2		12.229	1.819	0.542		**0.939**	0.19	0.172		1.085	0.264	0.362	
SB-64	2/17/2016	2	4		11.186	1.763	1.22		0.673	0.152	0.122		0.584	0.175	0.216	
SB-64	2/17/2016	4	6		15.432	1.833	0.756		0.747	0.151	0.11		1.149	0.203	0.137	
SB-64	2/17/2016	6	8		18.291	2.129	0.912		**1.111**	0.173	0.136		**1.522**	0.282	0.185	
SB-64	2/17/2016	8	10		12.216	1.782	0.52		0.74	0.155	0.137		0.851	0.212	0.128	
SB-65	2/17/2016	0	2		12.973	2.054	0.672	J	**3.212**	0.517	0.427		**4.909**	1.142	1.6	J
SB-65	2/17/2016	0	2	SB-65-00-02	17.5	2.373	0.881	J	**3.522**	0.482	0.376		**13.146**	1.178	0.537	J
SB-65	2/17/2016	2	4		13.761	1.924	0.523		**1.108**	0.226	0.175		1.202	0.267	0.148	J
SB-65	2/17/2016	4	6		11.64	1.75	0.683		**1.509**	0.241	0.137		**1.533**	0.278	0.081	J
SB-65	2/17/2016	6	8		13.01	1.649	0.758		0.753	0.16	0.129		1.174	0.178	0.084	J
SB-65	2/17/2016	8	10		13.535	1.969	0.966		0.621	0.129	0.097		0.677	0.2	0.168	J
SB-66	2/17/2016	0	2		13.463	1.829	0.935		**1.733**	0.276	0.186		**2.353**	0.384	0.16	
SB-66	2/17/2016	2	4		12.678	1.822	0.749		**1.018**	0.187	0.123		0.854	0.2	0.294	
SB-66	2/17/2016	4	6		11.151	1.823	0.623		**1.699**	0.316	0.228		**1.793**	0.288	0.234	
SB-66	2/17/2016	6	8		12.115	2.024	0.707	J	**0.94**	0.215	0.205	J	**1.375**	0.32	0.395	J
SB-66	2/17/2016	8	10		17.365	2.037	0.543		**1.386**	0.198	0.107		**1.414**	0.221	0.179	
SB-67	2/17/2016	0	2		13.079	1.756	0.881		**1.246**	0.215	0.174		**1.996**	0.335	0.16	
SB-67	2/17/2016	2	4		13.894	2.157	1.38		**1.484**	0.248	0.211		**2.028**	0.376	0.22	
SB-67	2/17/2016	4	6		11.834	1.794	0.741		0.64	0.145	0.137		0.677	0.173	0.247	
SB-67	2/17/2016	6	8		11.741	1.875	0.448	J	**2.387**	0.341	0.179	J	**2.19**	0.439	0.356	J
SB-67	2/17/2016	8	10		11.247	1.993	1.45	J	0.831	0.194	0.211	J	0.92	0.259	0.403	J
SB-68	2/18/2016	0	2		10.127	1.751	0.639	J	**1.852**	0.288	0.192	J	**2.072**	0.349	0.308	J
SB-68	2/18/2016	2	4		12.755	1.633	0.277	J	0.758	0.154	0.099		1.066	0.191	0.07	
SB-68	2/18/2016	4	6		6.463	1.41	1.23	J	**2.137**	0.343	0.22	J	**2.004**	0.3	0.24	J
SB-68	2/18/2016	6	8		13.643	1.895	0.734	J	0.69	0.164	0.141		0.644	0.179	0.322	J
SB-68	2/18/2016	6	8	SB-68-06-08	10.252	1.64	1.11	J	0.703	0.166	0.151		1.03	0.206	0.12	J
SB-68	2/18/2016	8	10		13.295	1.901	0.538	J	0.486	0.128	0.143		0.442	0.189	0.269	
SB-69	2/16/2016	0	2		8.248	1.66	1.2	J	**1.436**	0.262	0.205	J	1.159	0.3	0.367	J
SB-69	2/16/2016	2	4		8.026	1.649	1.55		**1.453**	0.247	0.165		**1.748**	0.296	0.283	
SB-69	2/16/2016	4	5		9.591	1.739	1.01	J	**1.831**	0.293	0.187	J	**2.235**	0.408	0.242	J
SB-69	2/16/2016	6	8		12.046	1.646	0.311		**1.071**	0.196	0.12		**1.222**	0.234	0.138	
SB-69	2/16/2016	8	10		14.327	1.717	0.719		0.771	0.157	0.122		0.792	0.176	0.248	
SB-70	2/18/2016	0	2		11.969	1.984	0.686	J	**1.328**	0.245	0.218	J	**1.772**	0.366	0.193	J
SB-70	2/18/2016	2	4		10.582	1.533	0.318	J	**0.933**	0.185	0.13		1.06	0.219	0.133	
SB-70	2/18/2016	4	6		12.391	1.945	0.629		**1.322**	0.251	0.183		**1.834**	0.314	0.234	
SB-70	2/18/2016	6	8		13.07	1.673	0.396		0.556	0.125	0.128		0.77	0.192	0.184	
SB-70	2/18/2016	8	10		16.061	1.825	0.248		0.774	0.153	0.105		0.918	0.178	0.146	
SB-71	2/19/2016	0	1		9.117	1.456	0.348		**1.392**	0.237	0.157		**1.502**	0.278	0.088	
SB-72	2/19/2016	0	2		12.162	1.619	0.803		0.87	0.16	0.118		1.156	0.234	0.089	
SB-73	2/19/2016	0	2		11.602	1.705	0.727		**0.946**	0.18	0.131		**1.261**	0.282	0.176	
SB-74	2/17/2016	0.5	3		11.36	1.654	0.932		**1.487**	0.221	0.138		**1.651**	0.268	0.172	
SB-74	2/17/2016	3	5		11.51	1.846	0.902		**0.991**	0.208	0.159		**1.336**	0.288	0.226	
SB-74	2/17/2016	5	7		12.369	1.969	1.08		0.609	0.168	0.173		1.09	0.245	0.232	

Table 5
Soil Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40 Result	Potassium-40 CSU (+/-2 s)	Potassium-40 MDA	Potassium-40 Q	Radium-226 Result	Radium-226 CSU (+/-2 s)	Radium-226 MDA	Radium-226 Q	Thorium-232 Result	Thorium-232 CSU (+/-2 s)	Thorium-232 MDA	Thorium-232 Q
Soil Screening Criteria										**0.919**				**1.220**		
Soil Borings (continued)																
SB-74	2/17/2016	7	9		13.719	1.977	0.563		0.699	0.182	0.181		1.14	0.225	0.22	
SB-75	2/17/2016	0.5	3		13.248	2.048	0.947	J	**1.813**	0.275	0.161	J	**2.32**	0.393	0.357	J
SB-75	2/17/2016	3	4		16.709	2.366	0.661		**1.693**	0.292	0.208		**2.393**	0.35	0.163	
SB-75	2/17/2016	6	8		15.511	2.197	0.613		**1.457**	0.246	0.203		**2.237**	0.327	0.151	
SB-75	2/17/2016	8	10		16.22	2.214	0.832		**1.375**	0.239	0.159		**1.551**	0.325	0.35	
SB-76	2/16/2016	1	6		12.262	1.976	0.663		**1.887**	0.33	0.222		**2.042**	0.333	0.276	
SB-76	2/16/2016	6	8		9.798	1.632	0.744		0.86	0.185	0.17		0.85	0.222	0.332	
SB-76	2/16/2016	8	10		14.217	1.857	0.946		**1.132**	0.207	0.149		1.215	0.238	0.212	J
SB-77	2/16/2016	1	3		9.716	1.587	0.754		0.548	0.137	0.161		0.637	0.189	0.259	J
SB-77	2/16/2016	3	5		10.75	1.616	0.755		0.445	0.128	0.161		0.609	0.187	0.272	J
SB-77	2/16/2016	6	7.5		12.421	1.67	0.61		0.687	0.146	0.108		0.946	0.222	0.16	J
SB-78	2/19/2016	0	2		10.914	1.759	0.59		0.741	0.182	0.167		1.022	0.228	0.25	J
SB-78	2/19/2016	2	4		11.603	1.62	0.44		0.382	0.112	0.144		0.668	0.204	0.172	J
SB-78	2/19/2016	4	6		13.802	1.662	0.702	J	0.466	0.102	0.09		0.339	0.127	0.22	
SB-79	2/18/2016	0	2		12.761	2.408	1.48	J	**3.587**	0.524	0.32	J	**5.37**	0.773	0.369	J
SB-79	2/18/2016	2	4		11.731	1.727	0.51	J	0.667	0.165	0.153		0.776	0.205	0.242	
SB-79	2/18/2016	4	6		13.313	1.837	0.489	J	0.366	0.126	0.165		0.637	0.199	0.232	
SB-79	2/18/2016	6	8		13.485	1.658	0.262	J	0.888	0.158	0.093	J	0.944	0.212	0.108	
SB-79	2/18/2016	6	8	SB-79-06-08	11.666	1.745	0.528	J	0.634	0.15	0.138	J	1.086	0.225	0.188	
SB-79	2/18/2016	8	10		13.25	1.695	0.79	J	0.548	0.121	0.135		0.613	0.169	0.259	
SB-80	2/18/2016	0	1		12.244	1.935	1.75		**3.834**	0.495	0.348		**20.176**	1.54	0.53	J
SB-80	2/18/2016	1	2		13.41	1.75	0.842		**0.936**	0.166	0.116		**1.331**	0.283	0.175	J
SB-80	2/18/2016	2	4		9.748	1.524	0.639		0.592	0.146	0.158		0.579	0.162	0.233	J
SB-80	2/18/2016	4	6		11.108	1.583	0.443		0.377	0.118	0.153		0.438	0.199	0.269	J
SB-80	2/18/2016	6	8		11.141	1.584	0.64		0.359	0.105	0.1		0.21	0.124	0.259	UJ
SB-80	2/18/2016	8	9		12.013	1.486	0.237		0.468	0.114	0.095		0.626	0.198	0.189	J
SB-81	2/18/2016	0	1		15.177	2.296	1.45		**8.26**	0.876	0.451		**24.945**	1.849	0.605	J
SB-81	2/18/2016	1	2		10.535	1.653	0.535		0.585	0.153	0.149		0.659	0.226	0.309	J
SB-81	2/18/2016	2	4		11.474	1.588	0.425		0.341	0.106	0.126		0.51	0.163	0.192	J
SB-81	2/18/2016	4	6		9.97	1.49	0.653		0.374	0.108	0.099		0.432	0.132	0.217	J
SB-81	2/18/2016	6	8		9.624	1.405	0.524		0.336	0.081	0.053		0.338	0.216	0.203	J
SB-81	2/18/2016	8	9		9.798	1.388	0.752		0.311	0.099	0.122		0.201	0.117	0.219	UJ
SB-82	2/19/2016	0	2		14.252	2.55	1.43	J	**5.702**	0.749	0.478	J	**17.893**	1.646	0.478	J
SB-82	2/19/2016	0	2	SB-82-00-02	11.921	2.254	1.7	J	**5.484**	0.642	0.39	J	**17.7**	1.413	0.509	J
SB-83	2/19/2016	0	2		13.786	2.339	1.13	J	**5.795**	0.716	0.469	J	**19.341**	1.699	0.608	J
SB-83	2/19/2016	2	4		9.081	1.881	1.92	J	**5.261**	0.645	0.391	J	**15.6**	1.385	0.518	J
Sewer Borings																
SWSB-01	12/4/2015	2	4		9.919	1.553	0.501		0.631	0.137	0.121		0.707	0.173	0.123	J
SWSB-03	12/4/2015	0	1		9.479	1.795	2.17		**8.738**	0.892	0.546		**57.796**	3.96	0.79	
SWSB-03	12/4/2015	18	20		12.971	1.611	0.466		0.536	0.117	0.096		0.868	0.157	0.105	J
SWSB-04	12/3/2015	6	8		12.403	1.665	0.835		0.837	0.148	0.115		0.848	0.231	0.197	
SWSB-06	12/3/2015	12	14		16.048	1.895	0.773		0.703	0.144	0.124		0.538	0.19	0.226	J
SWSB-07	12/3/2015	2	4		14.28	1.903	0.481		0.617	0.148	0.166		0.996	0.199	0.177	J
SWSB-07	12/3/2015	8	10		13.797	1.827	0.457		0.673	0.143	0.14		1.042	0.222	0.207	
SWSB-08	12/2/2015	4	6		14.339	1.912	0.486		0.797	0.186	0.15		1.193	0.231	0.12	
School Borings																
SCSB-04	10/31/2015	4	6		16.237	2.135	0.531		**0.967**	0.203	0.151		1.217	0.241	0.183	J
SCSB-04	10/31/2015	8	10		13.032	1.702	0.416		0.486	0.123	0.123		0.605	0.15	0.191	
SCSB-06	10/31/2015	6	8		10.882	1.413	0.246		0.753	0.135	0.101		0.873	0.205	0.116	J
SCSB-11	3/27/2017	0	2		12.261	1.773	0.531		0.709	0.158	0.127		0.976	0.198	0.253	
SCSB-11	3/27/2017	2	3.5		12.084	1.692	0.662		0.731	0.149	0.109		0.819	0.181	0.241	
SCSB-12	3/27/2017	0	2		11.475	1.665	0.792		0.678	0.142	0.113		1.015	0.224	0.159	
SCSB-12	3/27/2017	2	4		14.248	2.007	0.579		0.748	0.167	0.134		1.076	0.206	0.19	
SCSB-13	3/27/2017	0	2		11.329	1.662	0.945		0.75	0.147	0.104		0.725	0.179	0.268	
SCSB-13	3/27/2017	2	4		13.596	1.769	0.636		0.731	0.148	0.117		1.085	0.185	0.104	
SCSB-14	3/28/2017	0	2		13.807	1.865	0.504		0.711	0.141	0.128		0.905	0.186	0.181	
SCSB-14	3/28/2017	2	4		13.131	1.711	0.544		0.691	0.154	0.145		1.044	0.207	0.224	
SCSB-14	3/28/2017	4	5		14.43	1.805	0.537		0.784	0.17	0.13		0.832	0.193	0.217	
SCSB-15	3/28/2017	0	2		12.794	1.74	0.592		0.8	0.171	0.134		0.866	0.226	0.201	
SCSB-15	3/28/2017	2	4		13.39	1.623	0.622		0.75	0.138	0.107		0.934	0.173	0.135	
SCSB-15	3/28/2017	4	5		13.813	1.854	0.701		0.848	0.176	0.13		1.009	0.221	0.114	

Table 5
Soil Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Soil Screening Criteria										**0.919**				**1.220**		
Daycare Borings																
SCSB-16	3/29/2017	0	2		10.233	1.407	0.658		0.542	0.116	0.113		0.708	0.153	0.091	
SCSB-16	3/29/2017	2	4		13.617	1.791	0.655		0.735	0.146	0.139		0.67	0.177	0.237	
SCSB-17	3/29/2017	0	2		11.766	1.645	0.469		0.574	0.142	0.139		0.662	0.163	0.246	
SCSB-17	3/29/2017	2	3		14.551	1.944	0.793		0.729	0.146	0.109		0.578	0.167	0.233	
SCSB-18	3/31/2017	0	2		8.741	1.364	0.933	J	**1.004**	0.201	0.134	J	0.954	0.191	0.137	
SCSB-18	3/31/2017	0	2	SCSB-18-2	12.313	1.704	0.675	J	0.747	0.153	0.155	J	0.882	0.204	0.11	
SCSB-18	3/31/2017	2	4		11.129	1.667	0.526		0.606	0.14	0.138		0.741	0.154	0.185	
SCSB-18	3/31/2017	4	6		15.299	2.103	0.898		0.907	0.176	0.127		0.922	0.268	0.317	
SCSB-18	3/31/2017	6	8		16.024	2.013	0.603		**0.976**	0.215	0.17		1.165	0.202	0.199	J
SCSB-19	3/31/2017	0	2		9.648	1.359	0.657		0.621	0.131	0.115		0.978	0.182	0.091	J
SCSB-19	3/31/2017	2	4		14.544	2.009	0.562		0.822	0.189	0.16		0.996	0.244	0.298	J
SCSB-19	3/31/2017	4	6		13.721	1.862	0.689		0.79	0.165	0.119		0.918	0.187	0.195	J
SCSB-19	3/31/2017	6	8		13.366	2.103	1.18	J	**1.181**	0.244	0.178	J	**1.298**	0.281	0.374	J
SCSB-20	3/31/2017	0	2		10.924	1.634	0.639		0.771	0.175	0.157		0.804	0.206	0.227	J
SCSB-20	3/31/2017	2	4		10.222	1.55	0.7		0.816	0.169	0.139		1.008	0.2	0.166	J
SCSB-20	3/31/2017	4	6		11.25	1.667	0.517		0.623	0.151	0.134		0.81	0.196	0.185	J
SCSB-20	3/31/2017	4	6	SCSB-20-6	13.478	1.835	0.683		0.794	0.154	0.105		0.725	0.189	0.23	J
SCSB-20	3/31/2017	6	8		15.17	1.864	0.848		0.916	0.176	0.133		1.212	0.236	0.093	J
Background																
BKSB-04	12/22/2015	0	2		12.925	1.836	0.511		0.593	0.164	0.176		0.571	0.235	0.324	J
BKSB-04	12/22/2015	0	2	BKSB-04-00-02	12.279	1.779	0.51		0.677	0.184	0.195		0.661	0.199	0.325	J
BKSB-06	10/30/2015	18	20		12.616	1.869	0.983		0.575	0.154	0.181		1.036	0.203	0.2	J
BKSB-08	10/30/2015	28	30		13.355	1.593	0.662		0.558	0.139	0.149		0.79	0.167	0.117	J

Notes:

All units in picoCurie per gram (pCi/g).
CSU (+/- s) = combined standard uncertainty (2 sigma)
MDA - minimum detectable activity
Q - qualifier
U - not detected
J - estimated value
* Parent sample ID listed for duplicate samples.
Highlighted cell and bold format indicates that concentration exceeded screening criteria.

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

		SB-01		SB-01		SB-02		SB-02		SB-03		SB-03		SB-04		SB-04		SB-04		SB-05		SB-05		SB-05		SB-05	
	Sample ID	SB-01-00-02		SB-01-16-18		SB-02-00-02		SB-02-18-20		SB-03-00-02		SB-03-24-26		SB-04-00-02		SB-04-18-20		SB-904-18-20		SB-05-00-02		SB-05-20-22		SB-905-20-22		SB-05-54-55	
	Parent Sample ID																	SB-04-18-20						SB-05-20-22			
	Sample Date	10/29/2015		10/29/2015		11/6/2015		11/6/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/26/2015		10/26/2015		10/26/2015		10/26/2015	
	Type	0-2 feet		16-18 feet		0-2 feet		18-20 feet		0-2 feet		24-26 feet		0-2 feet		18-20 feet		18-20 feet		0-2 feet		20-22 feet		20-22 feet		54-55 feet	
Chemical	RI Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organic Compounds (µg/kg)																											
1,1,1-Trichloroethane	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,1,2,2-Tetrachloroethane	600	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,1,2-Trichloroethane	1100	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,1-Dichloroethane	3600	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,1-Dichloroethene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2,3-Trichlorobenzene	63000	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2,4-Trichlorobenzene	24000	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2-Dibromo-3-chloropropane	5.3	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2-Dibromoethane	36	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2-Dichlorobenzene	100000	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2-Dichloroethane	460	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,2-Dichloropropane	1000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,3-Dichlorobenzene	17000	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,4-Dichlorobenzene	2600	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
1,4-Dioxane	5300	44	UJ	47	U	53	R	40	R	64	R	42	R	52	R	51	R	47	R	66	R	55	R	49	R	57	R
2-Butanone	100000	8.7	UJ	9.4	U	8.3	J	7.9	U	13	UJ	8.4	U	10	U	10	U	9.3	U	13	U	11	U	9.7	U	11	U
2-Hexanone	200000	8.7	UJ	9.4	U	11	U	7.9	U	13	R	8.4	U	10	UJ	10	U	9.3	U	13	U	11	U	9.7	U	11	U
4-Methyl-2-pentanone	33000000	8.7	UJ	9.4	U	11	U	7.9	U	13	R	8.4	U	10	UJ	10	U	9.3	U	13	U	11	U	9.7	U	11	U
Acetone	100000	39		19	UJ	80		12	J	25	UJ	17	U	21	U	110		19	U	26	UJ	26		17	J	23	U
Benzene	1200	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Bromochloromethane	150000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Bromodichloromethane	290	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Bromoform	19000	4.4	UJ	4.7	U	5.3	UJ	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Bromomethane	6800	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Carbon Disulfide	100000	4.4	UJ	4.7	UJ	5.3	U	4	UJ	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Carbon Tetrachloride	650	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Chlorobenzene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Chloroethane	14000000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Chloroform	320	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Chloromethane	110000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
cis-1,2-Dichloroethene	59000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
cis-1,3-Dichloropropene	NL	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Cyclohexane	6500000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Dibromochloromethane	8300	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Dichlorodifluoromethane	87000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	UJ	5.2	UJ	5.1	UJ	4.7	UJ	6.6	UJ	5.5	UJ	4.9	UJ	5.7	UJ
Ethylbenzene	5800	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Isopropylbenzene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
m,p-Xylene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Methyl acetate	78000000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Methyl tert-Butyl Ether	47000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Methylcyclohexane	NL	4.4	UJ	4.7	U	5.3	U	4	U	6.4	U	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Methylene Chloride	51000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	UJ	4.9	UJ	27	

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

		SB-01		SB-01		SB-02		SB-02		SB-03		SB-03		SB-04		SB-04		SB-04		SB-05		SB-05		SB-05		SB-05	
	Sample ID	SB-01-00-02		SB-01-16-18		SB-02-00-02		SB-02-18-20		SB-03-00-02		SB-03-24-26		SB-04-00-02		SB-04-18-20		SB-904-18-20		SB-05-00-02		SB-05-20-22		SB-905-20-22		SB-05-54-55	
	Parent Sample ID																	SB-04-18-20						SB-05-20-22			
	Sample Date	10/29/2015		10/29/2015		11/6/2015		11/6/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/26/2015		10/26/2015		10/26/2015		10/26/2015	
	Type	0-2 feet		16-18 feet		0-2 feet		18-20 feet		0-2 feet		24-26 feet		0-2 feet		18-20 feet		18-20 feet		0-2 feet		20-22 feet		20-22 feet		54-55 feet	
Chemical	RI Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organic Compounds (µg/kg) (continued)																											
o-Xylene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Styrene	6000000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Tetrachloroethene	5500	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Toluene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	UJ	5.5	UJ	4.9	UJ	5.7	UJ
trans-1,2-Dichloroethene	100000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
trans-1,3-Dichloropropene	NL	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Trichloroethene	940	4.4	UJ	4.7	U	5.3	U	4	U	6.4	R	4.2	U	5.2	UJ	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Trichlorofluoromethane	23000000	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Vinyl Chloride	59	4.4	UJ	4.7	U	5.3	U	4	U	6.4	UJ	4.2	U	5.2	U	5.1	U	4.7	U	6.6	U	5.5	U	4.9	U	5.7	U
Semivolatile Organic Compounds (µg/kg)																											
1,1'-Biphenyl	47000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
1,2,4,5-Tetrachlorobenzene	23000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2,2'-Oxybis(1-chloropropane)	3100000	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2,3,4,6-Tetrachlorophenol	1900000	72	UJ	72	UJ	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	UJ	73	UJ	72	UJ	70	UJ
2,4,5-Trichlorophenol	100000	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2,4,6-Trichlorophenol	49000	35	UJ	35	UJ	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	UJ	36	UJ	36	UJ	34	UJ
2,4-Dichlorophenol	100000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2,4-Dimethylphenol	1300000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2,4-Dinitrophenol	100000	180	UJ	180	U	1900	U	190	U	2000	R	190	U	1900	R	190	U	180	U	2000	U	180	U	180	U	180	U
2,4-Dinitrotoluene	1700	72	U	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	U	70	U
2,6-Dinitrotoluene	360	72	UJ	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	U	70	U
2-Chloronaphthalene	4800000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2-Chlorophenol	100000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2-Methylnaphthalene	410	7.2	UJ	7.2	U	76	U	7.3	U	81	U	7.5	U	77	U	7.4	U	7.3	U	270		10		4.9	J	7	U
2-Methylphenol	100000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
2-Nitroaniline	630000	72	UJ	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	UJ	70	U
2-Nitrophenol	NL	72	UJ	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	U	70	U
3,3'-Dichlorobenzidine	1200	180	U	180	U	1900	U	190	U	2000	U	190	U	1900	U	190	U	180	U	2000	U	180	U	180	U	180	U
3-Nitroaniline	NL	72	UJ	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	UJ	70	U
4,6-Dinitro-2-methylphenol	5100	180	UJ	180	U	1900	U	190	U	2000	R	190	U	1900	R	190	U	180	U	2000	U	180	U	180	U	180	U
4-Bromophenyl-phenylether	NL	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
4-Chloro-3-methylphenol	6300000	35	UJ	35	UJ	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	UJ	36	UJ	36	UJ	34	UJ
4-Chloroaniline	2700	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
4-Chlorophenyl-phenylether	NL	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
4-Methylphenol	34000	72	UJ	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	U	70	U
4-Nitroaniline	27000	72	UJ	72	U	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	U	73	U	72	UJ	70	U
4-Nitrophenol	NL	180	U	180	U	1900	U	190	U	2000	U	190	U	1900	U	190	U	180	U	2000	U	180	U	180	UJ	180	U
Acenaphthene	100000	5.4	J	7.2	U	76	U	7.3	U	81	U	7.5	U	77	U	7.4	U	7.3	U	430		11		5.4	J	7	U
Acenaphthylene	100000	6.6	J	7.2	U	76	U	7.3	U	81	U	7.5	U	77	U	7.4	U	7.3	U	110		10		5.1	J	7	U
Acetophenone	7800000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Anthracene	100000	16		7.2	U	76	U	7.3	U	52	J	7.5	U	130		7.4	U	7.3	U	1200		27		13		7	U
Atrazine	2400	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Benzaldehyde	7800000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

		SB-01		SB-01		SB-02		SB-02		SB-03		SB-03		SB-04		SB-04		SB-04		SB-05		SB-05		SB-05		SB-05	
	Sample ID	SB-01-00-02		SB-01-16-18		SB-02-00-02		SB-02-18-20		SB-03-00-02		SB-03-24-26		SB-04-00-02		SB-04-18-20		SB-904-18-20		SB-05-00-02		SB-05-20-22		SB-905-20-22		SB-05-54-55	
	Parent Sample ID																	SB-04-18-20						SB-05-20-22			
	Sample Date	10/29/2015		10/29/2015		11/6/2015		11/6/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/26/2015		10/26/2015		10/26/2015		10/26/2015	
	Type	0-2 feet		16-18 feet		0-2 feet		18-20 feet		0-2 feet		24-26 feet		0-2 feet		18-20 feet		18-20 feet		0-2 feet		20-22 feet		20-22 feet		54-55 feet	
Chemical	RI Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Semivolatile Organic Compounds (µg/kg) (continued)																											
Benzo(a)anthracene	160	120		7.2	U	150		7.3	U	**280**		7.5	U	**670**		7.4	U	7.3	U	**2600**		96	J	51	J	7	U
Benzo(a)pyrene	16	**150**	J	7.2	UJ	**160**		7.3	U	**290**	J	7.5	U	**620**	J	7.4	U	7.3	U	**2500**	J	**89**	J	**47**	J	7	UJ
Benzo(b)fluoranthene	160	**200**		7.2	U	**190**		7.3	U	**460**		7.5	U	**890**		7.4	U	7.3	U	**4400**	J	120	J	64	J	7	U
Benzo(g,h,i)perylene	100000	52	J	7.2	U	100	J	7.3	U	110		7.5	U	140		7.4	U	7.3	U	660	J	26	J	18	J	7	U
Benzo(k)fluoranthene	1000	76	J	7.2	UJ	86		7.3	U	150	J	7.5	U	320	J	7.4	U	7.3	U	**1300**	J	44	J	20	J	7	UJ
Bis(2-chloroethoxy)methane	190000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Bis(2-chloroethyl)ether	230	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Bis(2-ethylhexyl)phthalate	39000	120	J	17	J	370	U	45		400	U	37	U	380	U	36	U	36	U	360	J	33	J	15	J	13	J
Butylbenzylphthalate	100000	72	UJ	72	UJ	760	U	73	U	810	U	75	U	770	U	74	U	73	U	780	UJ	73	UJ	37	J	70	UJ
Caprolactam	31000000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	UJ	36	U	36	U	34	U
Carbazole	NL	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	400		36	U	36	U	34	U
Chrysene	1000	120		7.2	U	160		7.3	U	340		7.5	U	770		7.4	U	7.3	U	**2700**		130	J	69	J	7	U
Dibenzo(a,h)anthracene	16	7.2	UJ	7.2	U	76	UJ	7.3	U	81	U	7.5	U	77	U	7.4	U	7.3	U	78	UJ	7.3	U	7.2	U	7	U
Dibenzofuran	14000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	300	J	36	U	36	U	34	U
Diethylphthalate	100000	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Dimethylphthalate	100000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Di-n-butylphthalate	100000	21	J	25	J	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Di-n-octylphthalate	100000	44	J	72	U	760	U	45	J	810	U	75	U	770	U	74	U	73	U	780	UJ	73	U	72	U	70	U
Fluoranthene	100000	210		7.2	U	270	J	7.3	U	460		7.5	U	1000		7.4	U	7.3	U	6000		180	J	89	J	7	U
Fluorene	100000	4.1	J	7.2	U	76	U	7.3	U	81	U	7.5	U	43	J	7.4	U	7.3	U	450		13		7.1	J	7	U
Hexachlorobenzene	210	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Hexachlorobutadiene	1200	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Hexachlorocyclopentadiene	1800	180	UJ	180	U	1900	U	190	U	2000	R	190	U	1900	R	190	U	180	U	2000	U	180	U	180	UJ	180	U
Hexachloroethane	1800	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Indeno(1,2,3-cd)pyrene	160	48	J	7.2	U	77	J	7.3	U	120		7.5	U	120		7.4	U	7.3	U	**630**	J	25	J	15	J	7	U
Isophorone	100000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	UJ	36	UJ	36	UJ	34	UJ
Naphthalene	3800	7.2	UJ	7.2	U	76	U	7.3	U	81	U	7.5	U	77	U	7.4	U	7.3	U	190		7.5		3.6	J	7	U
Nitrobenzene	3700	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
N-Nitroso-di-n-propylamine	78	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
N-Nitrosodiphenylamine	110000	35	U	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	UJ	36	UJ	36	UJ	34	UJ
Pentachlorophenol	1000	180	U	180	U	1900	U	190	U	2000	U	190	U	1900	U	190	U	180	U	2000	U	180	U	180	U	180	U
Phenanthrene	100000	82	J	7.2	U	130	J	7.3	U	250		7.5	U	650		7.4	U	7.3	U	6100		200	J	94	J	7	U
Phenol	100000	35	UJ	35	U	370	U	36	U	400	U	37	U	380	U	36	U	36	U	380	U	36	U	36	U	34	U
Pyrene	100000	210	J	7.2	U	280	J	7.3	U	450		7.5	U	1400		7.4	U	7.3	U	6100		240	J	110	J	7	U
Polychlorinated Biphenyls (µg/kg)																											
Aroclor 1016	1000	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Aroclor 1221	200	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Aroclor 1232	170	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Aroclor 1242	230	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Aroclor 1248	230	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Aroclor 1254	240	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Aroclor 1260	240	6.3	J	10	U	3.6	J	11	U	7.8	J	11	U	8	J	11	UJ	10	U	190		4.1	J	3.7	J	10	U
Aroclor 1262	1000	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

		SB-01		SB-01		SB-02		SB-02		SB-03		SB-03		SB-04		SB-04		SB-04		SB-05		SB-05		SB-05		SB-05	
	Sample ID	SB-01-00-02		SB-01-16-18		SB-02-00-02		SB-02-18-20		SB-03-00-02		SB-03-24-26		SB-04-00-02		SB-04-18-20		SB-904-18-20		SB-05-00-02		SB-05-20-22		SB-905-20-22		SB-05-54-55	
	Parent Sample ID																	SB-04-18-20						SB-05-20-22			
	Sample Date	10/29/2015		10/29/2015		11/6/2015		11/6/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/26/2015		10/26/2015		10/26/2015		10/26/2015	
	Type	0-2 feet		16-18 feet		0-2 feet		18-20 feet		0-2 feet		24-26 feet		0-2 feet		18-20 feet		18-20 feet		0-2 feet		20-22 feet		20-22 feet		54-55 feet	
Chemical	RI Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Polychlorinated Biphenyls (µg/kg) (continued)																											
Aroclor 1268	1000	10	U	10	U	11	U	11	U	12	U	11	U	11	U	11	U	10	U	12	U	11	U	11	U	10	U
Pesticides (µg/kg)																											
4,4'-DDD	2300	1	UJ	1	U	23	U	1.1	U	12	UJ	1.1	U	22	UJ	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
4,4'-DDE	1800	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
4,4'-DDT	1700	0.39	J	1	U	7.8	J	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	UJ	1.1	U	1.1	U	1	U
Aldrin	19	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
alpha-BHC	86	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
alpha-Chlordane	910	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
beta-BHC	72	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
delta-BHC	86	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
Dieldrin	34	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
Endosulfan I	4800	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
Endosulfan II	4800	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	UJ	1.1	U	1.1	U	1	U
Endosulfan Sulfate	4800	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	18	J	1.1	UJ	1.1	U	1	U
Endrin	2200	0.79	J	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	16	J	1.1	UJ	1.1	UJ	1	U
Endrin aldehyde	2200	1	UJ	1	U	23	U	1.1	U	6.1	J	1.1	U	5.1	J	1.1	U	1	U	23	UJ	1.1	U	1.1	U	1	U
Endrin Ketone	2200	1	UJ	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	18	J	1.1	UJ	1.1	UJ	1	U
gamma-BHC (Lindane)	280	1	U	1	U	23	U	1.1	U	12	UJ	1.1	U	22	U	1.1	U	1	U	23	UJ	1.1	U	1.1	U	1	U
gamma-Chlordane	540	1	UJ	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
Heptachlor	130	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
Heptachlor Epoxide	70	1	U	1	U	23	U	1.1	U	12	U	1.1	U	22	U	1.1	U	1	U	23	U	1.1	U	1.1	U	1	U
Methoxychlor	100000	7.4		4.2	U	12	J	4.3	U	26	J	4.2	U	33	J	4.2	U	4.1	U	91	J	7.6		5.1		4.2	U
Toxaphene	490	10	U	10	U	230	U	11	U	120	U	11	U	220	U	11	U	10	U	230	U	11	U	11	U	10	U
Inorganics (µg/kg)																											
Aluminum	77000	8500		7000		6500		5900		7800	J	6300	J	9500	J	4300	J	5400	J	8800	J	9200	J	8000	J	3000	J
Antimony	31	1	UJ	1.1	UJ	1.1	U	1.1	U	6	R	2.2	R	5.3	R	1	R	1.1	R	5.6	UJ	1	UJ	1	UJ	0.99	UJ
Arsenic	0.68	**14**	J	**1.9**	J	**2.9**		**1.4**		**13**	J	**1.4**	J	**15**	J	**1.3**	J	**1.6**	J	**14**		**2.3**		**1.9**		**0.85**	
Barium	350	43	J-	44	J-	52		39		120		40		66		30		39		130	J	47	J	38	J	21	J
Beryllium	14	0.1	J	0.21	J	0.2	J	0.15	J	1.5	U	0.27	U	0.23	J	0.09	J	0.1	J	1.4	U	0.26	U	0.034	J	0.12	J
Cadmium	2.5	0.091	J	0.26	U	0.11	J	0.053	J	0.54	J	0.043	J	0.45	J	0.042	J	0.038	J	0.89	J	0.056	J	0.05	J	0.044	J
Calcium	NL	950		1300		3800		1100		9900	J+	1300	J+	2100	J+	1000	J+	1100	J+	7300	J-	3200	J-	2000	J-	1000	J-
Chromium	NL	13	J-	17	J-	13		15		13		15		15		11		12		20	J-	25	J-	20	J-	8.3	J-
Cobalt	23	3.3	J-	4.8	J-	3.6		5.3		6.3	J	5.3	J	6.2	J	3.3	J	3.8	J	7.1	J	5.4		5		3.3	
Copper	270	15	J-	13	J-	27		9		82		11		66		7.9		9.7		120		25		22		8.4	
Iron	2000	**9600**		**13000**		**9400**		**11000**		**17000**		**13000**		**16000**		**20000**		**11000**		**26000**	J	**15000**	J	**13000**	J	**8100**	J
Lead	400	69		3.6		110		3.3		250	J	2.8	J	150	J	2.6	J	3.1	J	350	J-	13	J-	7.3	J-	2.6	J-
Magnesium	NL	1300		2000		1800		2200		4600	J+	2600	J+	1500	J+	1200	J+	1700	J+	3100		2500		2100		3900	
Manganese	2000	260		310		390		250		160	J+	290	J+	290	J+	250	J+	210	J+	270	J+	280	J+	270	J+	210	J+
Mercury	0.81	0.14		0.081	U	0.56		0.078	U	0.24		0.09	U	0.71		0.086	U	0.082	U	**1.3**	J+	0.054	J+	0.086	UJ	0.076	UJ
Nickel	140	7.6	J-	9.8	J-	6.9		11		14		8.2		13		6.5		7.8		16		11		9.8		33	
Potassium	NL	570		1300		440		930		850	J+	2000	J+	710	J+	800	J+	1000	J+	2500	J+	1400	J+	1200	J+	530	J+
Selenium	36	1	UJ	1.1	UJ	0.76	J	0.44	J	16	J	1.1	UJ	6.3	J	1	UJ	1.1	UJ	5.6	U	1	U	1	U	0.99	U
Silver	36	0.51	U	0.53	U	0.54	U	0.53	U	3	U	0.54	U	2.7	U	0.52	U	0.55	U	2.8	U	0.51	U	0.5	U	0.49	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

		SB-01		SB-01		SB-02		SB-02		SB-03		SB-03		SB-04		SB-04		SB-04		SB-05		SB-05		SB-05		SB-05	
	Sample ID	SB-01-00-02		SB-01-16-18		SB-02-00-02		SB-02-18-20		SB-03-00-02		SB-03-24-26		SB-04-00-02		SB-04-18-20		SB-904-18-20		SB-05-00-02		SB-05-20-22		SB-905-20-22		SB-05-54-55	
	Parent Sample ID																	SB-04-18-20						SB-05-20-22			
	Sample Date	10/29/2015		10/29/2015		11/6/2015		11/6/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/21/2015		10/26/2015		10/26/2015		10/26/2015		10/26/2015	
	Type	0-2 feet		16-18 feet		0-2 feet		18-20 feet		0-2 feet		24-26 feet		0-2 feet		18-20 feet		18-20 feet		0-2 feet		20-22 feet		20-22 feet		54-55 feet	
Chemical	**RI Screening Criteria**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Inorganics (µg/kg) (continued)																											
Sodium	NL	200	J	150	J	440		240	J	390	J	78	J	1300	UJ	64	J	55	J	160	J	270		200	J	110	J
Thallium	0.78	2.5	UJ	2.6	UJ	2.7	U	2.6	U	15	U	2.7	U	13	U	2.6	U	2.7	U	14	UJ	2.6	UJ	2.5	UJ	2.5	UJ
Vanadium	100	17	J-	23	J-	21		19		28		20		21		14		18		27		27		22		8.6	
Zinc	2200	63		23		48		23		210		22		210		28		32		280	J+	28	J+	24	J+	13	J+
Miscellaneous																											
Solids, Percent	NL	93.1		92.3		88.1		91.7		80.9		89.7		87.3		89.9		90.6		86		92.4		92.3		95.9	

Notes:
ID - identification
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
Q - qualifier
J - estimated value
J- - estimated value, biased low
J+ - estimated value, biased high
U - not detected
R - rejected value
Highlighted cell and bold format indicates that concentration exceeded screening criteria.

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-06 SB-06-00-02 10/29/2015 0-2 feet		SB-06 SB-06-28-30 10/29/2015 28-30 feet		SB-07 SB-07-00-02 10/26/2015 0-2 feet		SB-07 SB-07-17-19 10/26/2015 17-19 feet		SB-08 SB-08-01-02 10/23/2015 1-2 feet		SB-08 SB-08-28-30 10/23/2015 28-30 feet		SB-11 SB-11-00-02 10/20/2015 0-2 feet		SB-11 SB-11-08-09 10/20/2015 8-9 feet		SB-13 SB-13-00-02 10/20/2015 0-2 feet		SB-13 SB-13-08-10 10/20/2015 8-10 feet		SB-19 SB-19-00-02 10/22/2015 0-2 feet		SB-19 SB-19-08-10 10/22/2015 8-10 feet		SB-21 SB-21-00-02 10/22/2015 0-2 feet		SB-21 SB-21-08-10 10/22/2015 8-10 feet		SB-26 SB-26-00-02 10/21/2015 0-2 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Volatile Organic Compounds (µg/kg)																														
1,1,1-Trichloroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,1,2,2-Tetrachloroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,1,2-Trichloro-1,2,2-trifluoroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,1,2-Trichloroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,1-Dichloroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,1-Dichloroethene	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,2,3-Trichlorobenzene	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,2,4-Trichlorobenzene	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,2-Dibromo-3-chloropropane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,2-Dibromoethane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,2-Dichlorobenzene	4.2	U	5.5	U	4.5	U	3.9	J	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,2-Dichloroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
1,2-Dichloropropane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,3-Dichlorobenzene	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,4-Dichlorobenzene	4.2	U	5.5	U	4.5	U	4	J	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
1,4-Dioxane	42	U	55	U	45	R	44	R	60	R	56	R	45	R	40	R	51	R	47	R	47	R	52	R	48	R	45	R	52	R
2-Butanone	8.4	U	11	U	9.1	U	5.2	J	12	U	11	U	9	U	8	U	10	U	9.4	U	9.4	U	10	U	9.6	U	9	U	10	U
2-Hexanone	8.4	U	11	U	9.1	U	8.7	U	12	UJ	11	U	9	U	8	U	10	U	9.4	U	9.4	U	10	U	9.6	U	9	U	10	U
4-Methyl-2-pentanone	8.4	U	11	U	9.1	U	8.7	U	12	UJ	11	U	9	U	8	U	10	U	9.4	U	9.4	U	10	U	9.6	U	9	U	10	U
Acetone	17	U	22	UJ	18	UJ	29		63		22	U	18	U	71		93		19	U	48		21	U	93		63	J	21	U
Benzene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Bromochloromethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Bromodichloromethane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Bromoform	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Bromomethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Carbon Disulfide	4.2	U	5.5	U	4.5	U	1.9	J	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Carbon Tetrachloride	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Chlorobenzene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Chloroethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Chloroform	4.2	U	5.5	U	13		4.4	U	35		5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Chloromethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
cis-1,2-Dichloroethene	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
cis-1,3-Dichloropropene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Cyclohexane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Dibromochloromethane	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Dichlorodifluoromethane	4.2	U	5.5	U	4.5	UJ	4.4	UJ	6	UJ	5.6	UJ	4.5	UJ	4	UJ	5.1	UJ	4.7	UJ	4.7	UJ	5.2	UJ	4.8	UJ	4.5	UJ	5.2	UJ
Ethylbenzene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Isopropylbenzene	4.2	U	5.5	U	4.5	U	4	J	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
m,p-Xylene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Methyl acetate	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Methyl tert-Butyl Ether	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Methylcyclohexane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Methylene Chloride	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Chemical	SB-06 SB-06-00-02 10/29/2015 0-2 feet		SB-06 SB-06-28-30 10/29/2015 28-30 feet		SB-07 SB-07-00-02 10/26/2015 0-2 feet		SB-07 SB-07-17-19 10/26/2015 17-19 feet		SB-08 SB-08-01-02 10/23/2015 1-2 feet		SB-08 SB-08-28-30 10/23/2015 28-30 feet		SB-11 SB-11-00-02 10/20/2015 0-2 feet		SB-11 SB-11-08-09 10/20/2015 8-9 feet		SB-13 SB-13-00-02 10/20/2015 0-2 feet		SB-13 SB-13-08-10 10/20/2015 8-10 feet		SB-19 SB-19-00-02 10/22/2015 0-2 feet		SB-19 SB-19-08-10 10/22/2015 8-10 feet		SB-21 SB-21-00-02 10/22/2015 0-2 feet		SB-21 SB-21-08-10 10/22/2015 8-10 feet		SB-26 SB-26-00-02 10/21/2015 0-2 feet	
	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organic Compounds (µg/kg) (continu																														
o-Xylene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Styrene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
Tetrachloroethene	20	J	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Toluene	4.2	U	5.5	U	4.5	UJ	1.7	J	6	UJ	5.6	U	4.5	U	4	U	1.8	J	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
trans-1,2-Dichloroethene	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	UJ	5.2	U
trans-1,3-Dichloropropene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Trichloroethene	4.2	U	5.5	U	4.5	U	4.4	U	6	UJ	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Trichlorofluoromethane	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Vinyl Chloride	4.2	U	5.5	U	4.5	U	4.4	U	6	U	5.6	U	4.5	U	4	U	5.1	U	4.7	U	4.7	U	5.2	U	4.8	U	4.5	U	5.2	U
Semivolatile Organic Compounds (µg/kg)																														
1,1'-Biphenyl	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
1,2,4,5-Tetrachlorobenzene	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
2,2'-Oxybis(1-chloropropane)	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
2,3,4,6-Tetrachlorophenol	75	UJ	74	UJ	760	UJ	750	UJ	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
2,4,5-Trichlorophenol	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	UJ	39	U	380	U
2,4,6-Trichlorophenol	37	UJ	36	UJ	370	UJ	370	UJ	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	UJ	39	U	380	U
2,4-Dichlorophenol	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
2,4-Dimethylphenol	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	UJ	380	U
2,4-Dinitrophenol	190	UJ	190	U	1900	U	1900	U	2100	U	190	U	190	UJ	190	U	200	UJ	180	U	190	UJ	190	U	190	UJ	200	U	2000	R
2,4-Dinitrotoluene	75	U	74	U	760	U	750	U	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
2,6-Dinitrotoluene	75	U	74	U	760	U	750	U	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
2-Chloronaphthalene	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
2-Chlorophenol	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	UJ	380	U
2-Methylnaphthalene	12		7.4	U	76	U	75	U	83	U	7.4	U	7.4	U	7.6	U	7.9	U	7.3	U	7.7	U	7.3	U	7.5	U	7.9	U	77	U
2-Methylphenol	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	UJ	37	U	39	UJ	380	U
2-Nitroaniline	75	U	74	U	760	U	750	UJ	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
2-Nitrophenol	75	U	74	U	760	U	750	U	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
3,3'-Dichlorobenzidine	190	U	190	U	1900	U	1900	U	2100	U	190	U	190	U	190	U	200	U	180	U	190	U	190	U	190	U	200	U	2000	U
3-Nitroaniline	75	U	74	U	760	U	750	UJ	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
4,6-Dinitro-2-methylphenol	190	UJ	190	U	1900	U	1900	U	2100	U	190	U	190	UJ	190	U	200	UJ	180	U	190	UJ	190	U	190	UJ	200	U	2000	R
4-Bromophenyl-phenylether	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
4-Chloro-3-methylphenol	37	UJ	36	UJ	370	UJ	370	UJ	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
4-Chloroaniline	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	UJ	380	U
4-Chlorophenyl-phenylether	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
4-Methylphenol	75	U	74	U	760	U	750	U	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	UJ	75	U	79	UJ	770	U
4-Nitroaniline	75	U	74	U	760	U	750	UJ	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
4-Nitrophenol	190	U	190	U	1900	U	1900	UJ	2100	U	190	U	190	U	190	U	200	U	180	U	190	U	190	U	190	U	200	U	2000	U
Acenaphthene	45		7.4	U	76	UJ	75	UJ	83	U	7.4	U	7.4	U	7.6	U	14		7.3	U	3.4	J	7.3	U	7.5	U	7.9	U	45	J
Acenaphthylene	7.5	U	7.4	U	76	UJ	75	UJ	65	J	7.4	U	7.4	U	7.6	U	7.1	J	7.3	U	5.4	J	7.3	U	7.5	U	7.9	U	95	
Acetophenone	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Anthracene	79		7.4	U	38	J	75	U	73	J	7.4	U	7.4	U	7.6	U	47		7.3	U	15		7.3	U	7.5	U	7.9	U	160	
Atrazine	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Benzaldehyde	37	U	36	U	370	U	370	U	1300		37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	UJ	380	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-06		SB-06		SB-07		SB-07		SB-08		SB-08		SB-11		SB-11		SB-13		SB-13		SB-19		SB-19		SB-21		SB-21		SB-26	
	SB-06-00-02		SB-06-28-30		SB-07-00-02		SB-07-17-19		SB-08-01-02		SB-08-28-30		SB-11-00-02		SB-11-08-09		SB-13-00-02		SB-13-08-10		SB-19-00-02		SB-19-08-10		SB-21-00-02		SB-21-08-10		SB-26-00-02	
	10/29/2015		10/29/2015		10/26/2015		10/26/2015		10/23/2015		10/23/2015		10/20/2015		10/20/2015		10/20/2015		10/20/2015		10/22/2015		10/22/2015		10/22/2015		10/22/2015		10/21/2015	
	0-2 feet		28-30 feet		0-2 feet		17-19 feet		1-2 feet		28-30 feet		0-2 feet		8-9 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet		0-2 feet	
Chemical	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Semivolatile Organic Compounds (µg/kg) (co																														
Benzo(a)anthracene	210		7.4	U	200		75	U	450		7.4	U	7.4		7.6	U	180		7.3	U	89		7.3	U	13		7.9	U	940	
Benzo(a)pyrene	200	J	7.4	UJ	190	J	75	UJ	320	J	7.4	U	9	J	7.6	U	180	J	7.3	U	100	J	7.3	U	18	J	7.9	U	1100	J
Benzo(b)fluoranthene	270		7.4	U	370		75	U	1900		7.4	U	11		7.6	U	240		7.3	U	140		7.3	U	26		7.9	U	2000	
Benzo(g,h,i)perylene	66	J	7.4	U	57	J	75	U	330		7.4	U	7	J	7.6	U	78	J	7.3	U	40	J	7.3	U	8.1	J	7.9	U	330	
Benzo(k)fluoranthene	110	J	7.4	UJ	110	J	75	UJ	670		7.4	U	7.4	U	7.6	U	82	J	7.3	U	53	J	7.3	U	7.1	J	7.9	U	720	J
Bis(2-chloroethoxy)methane	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Bis(2-chloroethyl)ether	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	UJ	380	U
Bis(2-ethylhexyl)phthalate	99	J	32	J	370	U	370	U	410	U	37	U	14	J	37	U	20	J	36	U	120	J	36	U	49	J	39	U	760	J
Butylbenzylphthalate	75	UJ	31	J	760	UJ	750	UJ	830	U	74	U	74	U	76	U	79	U	73	U	56	J	73	U	75	U	79	U	770	U
Caprolactam	37	U	36	U	370	U	370	UJ	410	UJ	37	UJ	37	U	37	U	39	U	36	U	38	U	36	UJ	37	U	39	UJ	380	U
Carbazole	50		36	U	370	U	370	U	410	U	37	U	37	U	37	U	17	J	36	U	38	U	36	U	37	U	39	U	380	U
Chrysene	210		7.4	U	220		75	U	730		7.4	U	11		7.6	U	200		7.3	U	95		7.3	U	17		7.9	U	1100	
Dibenzo(a,h)anthracene	7.5	U	7.4	U	76	U	75	U	83	U	7.4	U	7.4	U	7.6	U	7.9	U	7.3	U	7.7	U	7.3	U	7.5	U	7.9	U	77	U
Dibenzofuran	33	J	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Diethylphthalate	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Dimethylphthalate	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Di-n-butylphthalate	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Di-n-octylphthalate	75	UJ	41	J	760	U	750	U	830	U	74	U	74	U	76	U	79	U	73	U	77	U	73	U	75	U	79	U	770	U
Fluoranthene	490		7.4	U	350		75	U	530		7.4	U	20		7.6	U	390		7.3	U	160		7.3	U	53		7.9	U	1600	
Fluorene	33		7.4	U	76	UJ	75	UJ	83	U	7.4	U	7.4	U	7.6	U	13		7.3	U	7.7	U	7.3	U	7.5	U	7.9	U	77	U
Hexachlorobenzene	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Hexachlorobutadiene	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	UJ	380	U
Hexachlorocyclopentadiene	190	UJ	190	U	1900	U	1900	UJ	2100	U	190	U	190	R	190	U	200	R	180	U	190	R	190	U	190	R	200	U	2000	R
Hexachloroethane	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	UJ	37	U	39	UJ	380	U
Indeno(1,2,3-cd)pyrene	64		7.4	U	65	J	75	U	390		7.4	U	5.4	J	7.6	U	71		7.3	U	37		7.3	U	7.6		7.9	U	350	
Isophorone	37	U	36	U	370	UJ	370	UJ	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Naphthalene	18		7.4	U	76	U	75	U	83	U	7.4	U	7.4	U	7.6	U	7.9	U	7.3	U	7.7	U	7.3	U	7.5	U	7.9	U	32	J
Nitrobenzene	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
N-Nitroso-di-n-propylamine	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	UJ	37	U	39	UJ	380	U
N-Nitrosodiphenylamine	37	U	36	U	370	UJ	370	UJ	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	U	37	U	39	U	380	U
Pentachlorophenol	190	U	190	U	1900	U	1900	U	2100	U	190	U	190	U	190	U	200	U	180	U	190	U	190	U	190	U	200	U	2000	U
Phenanthrene	460		7.4	U	200		75	U	250		7.4	U	29		7.6	U	250		7.3	U	77		7.3	U	48		7.9	U	620	
Phenol	37	U	36	U	370	U	370	U	410	U	37	U	37	U	37	U	39	U	36	U	38	U	36	UJ	37	U	39	UJ	380	U
Pyrene	390		7.4	U	290		75	U	460		7.4	U	26		7.6	U	350		7.3	U	150		7.3	U	40		7.9	U	1500	
Polychlorinated Biphenyls (µg/kg)																														
Aroclor 1016	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Aroclor 1221	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Aroclor 1232	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Aroclor 1242	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Aroclor 1248	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Aroclor 1254	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Aroclor 1260	4.8	J	11	U	6.6	J	11	U	12	U	11	U	3.7	J	11	U	38		10	U	11	U	11	U	10	U	11	U	1200	
Aroclor 1262	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-06 SB-06-00-02 10/29/2015 0-2 feet		SB-06 SB-06-28-30 10/29/2015 28-30 feet		SB-07 SB-07-00-02 10/26/2015 0-2 feet		SB-07 SB-07-17-19 10/26/2015 17-19 feet		SB-08 SB-08-01-02 10/23/2015 1-2 feet		SB-08 SB-08-28-30 10/23/2015 28-30 feet		SB-11 SB-11-00-02 10/20/2015 0-2 feet		SB-11 SB-11-08-09 10/20/2015 8-9 feet		SB-13 SB-13-00-02 10/20/2015 0-2 feet		SB-13 SB-13-08-10 10/20/2015 8-10 feet		SB-19 SB-19-00-02 10/22/2015 0-2 feet		SB-19 SB-19-08-10 10/22/2015 8-10 feet		SB-21 SB-21-00-02 10/22/2015 0-2 feet		SB-21 SB-21-08-10 10/22/2015 8-10 feet		SB-26 SB-26-00-02 10/21/2015 0-2 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Polychlorinated Biphenyls (µg/kg) (continued																														
Aroclor 1268	11	U	11	U	11	U	11	U	12	U	11	U	11	U	11	U	12	U	10	U	11	U	11	U	10	U	11	U	110	U
Pesticides (µg/kg)																														
4,4'-DDD	11	U	1.1	U	23	U	1.1	U	13	U	1.1	U	1.1	UJ	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
4,4'-DDE	11	U	1.1	U	23	U	1.1	U	12	UJ	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
4,4'-DDT	11	U	1.1	U	23	UJ	1.1	U	32	J	1.1	U	0.46	J	1.1	U	5.2	J	1	U	11	U	1.1	U	1	U	0.17	J	110	J+
Aldrin	11	U	1.1	U	23	U	1.1	U	12	UJ	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
alpha-BHC	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	0.36	J	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
alpha-Chlordane	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	UJ
beta-BHC	11	U	1.1	U	23	U	1.1	U	12	UJ	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
delta-BHC	11	U	1.1	U	23	U	1.1	U	4.2	J	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Dieldrin	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Endosulfan I	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Endosulfan II	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Endosulfan Sulfate	11	U	1.1	U	23	U	1.1	U	6.1	J	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	UJ	23	U
Endrin	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	34	J+
Endrin aldehyde	11	U	1.1	U	23	U	1.1	U	12	UJ	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Endrin Ketone	11	U	1.1	U	23	U	1.1	U	12	UJ	1.1	U	1.1	U	1.1	U	8.1	J	1	U	11	U	1.1	U	1	U	1.1	U	51	J
gamma-BHC (Lindane)	11	U	1.1	U	23	U	1.1	UJ	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
gamma-Chlordane	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	0.27	J	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Heptachlor	11	U	1.1	U	23	U	1.1	U	18	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	UJ	1.1	U	23	U
Heptachlor Epoxide	11	U	1.1	U	23	U	1.1	U	12	U	1.1	U	1.1	U	1.1	U	12	U	1	U	11	U	1.1	U	1	U	1.1	U	23	U
Methoxychlor	45	UJ	4.3	U	33	J	4.5	U	49	UJ	4.4	U	4.4	U	4.3	U	47	UJ	4.2	U	2.8	J	4.2	U	0.74	J	4.5	U	63	J
Toxaphene	110	U	11	U	230	U	11	U	120	U	11	U	11	U	11	U	120	U	10	U	110	U	11	U	10	U	11	U	230	U
Inorganics (µg/kg)																														
Aluminum	5000		2800		4000	J	9300	J	1300	J	8500	J	9900	J	11000	J	9200	J	7600	J	9000	J	9700	J	10000	J	17000	J	9100	J
Antimony	1.1	UJ	1	UJ	1.1	UJ	1	UJ	11	UJ	1.1	UJ	1	R	1.1	R	1.2	R	1	R	1.1	R	1.1	UJ	1.1	R	5.7	UJ	5.7	R
Arsenic	**8.5**	J	**4.8**	J	**31**		**45**		**8.9**	J	**11**	J	**2.4**	J	**1**	J	**5.5**	J	**1.6**	J	**4.8**	J	**2.5**	J	**4.5**	J	4.3	UJ	**14**	J
Barium	40	J-	57	J-	**760**	J	32	J	200		35		45		46		56		40		48		21		44		34		150	
Beryllium	0.13	J	0.064	J	0.28	U	0.26	U	2.8	U	0.27	U	0.2	J	0.21	J	0.28	J	0.15	J	0.41		0.27	U	0.2	J	1.4	U	0.11	J
Cadmium	0.21	J	0.25	U	0.28	U	0.34		0.34	J	0.27	U	0.076	J	0.027	J	0.22	J	0.042	J	0.13	J	0.048	J	0.049	J	1.4	U	1.2	J
Calcium	14000		1200		1300	J-	560	J-	31000		1600		1600	J+	780	J+	14000	J+	1000	J+	3300	J+	1300		8200	J+	640	J	3800	J+
Chromium	13	J-	7	J-	14	J-	21	J-	8.9		16		21		17		13		15		19		16		19		24		22	
Cobalt	4.3	J-	3.3	J-	6.5		9.5		1.4	J	3.1		5.5	J	4.1	J	3.4	J	5.5	J	4.6	J	4.8		5.8	J	2.3	J	6.5	J
Copper	23	J-	6.2	J-	56		19		260		14		15		17		25		17		25		11		16		9.9		200	
Iron	**11000**		**20000**		**15000**	J	**8900**	J	1300		**13000**		**15000**		**11000**		**10000**		**14000**		**14000**		**10000**		**20000**		**12000**		**22000**	
Lead	58		2.2		190	J-	13	J-	**510**	J	6.4	J	33	J	5.6	J	88	J	4.2	J	90	J	4.2	J	14	J	6.9	J	290	J
Magnesium	5600		1100		610		1700		250	J	1800		2000	J+	2400	J+	1600	J+	1900	J+	2100	J+	1500		2000	J+	1600		2300	J+
Manganese	150		690		52	J+	66	J+	17	J	77	J	230	J+	250	J+	230	J+	310	J+	180	J+	200	J	390	J+	57	J	280	J+
Mercury	0.052	J	0.08	U	0.59	J+	0.08	UJ	**1.7**		0.081	U	0.014	J	0.09	U	0.46		0.082	U	0.21		0.088	U	0.026	J	0.094	U	**1.1**	
Nickel	11	J-	6.7	J-	4.4		12		23	U	9.4		11		9		8.9		10		14		8.1		12		6.9	J	21	
Potassium	900		540		640	J+	1100	J+	580	J	1100		950	J+	1500	J+	680	J+	1100	J+	830	J+	780		880	J+	900	J	1000	J+
Selenium	1.1	UJ	0.51	J-	**50**		0.43	J	**1100**		1.1	U	1	UJ	1.1	UJ	1.3	J	1	UJ	0.52	J	1.1	U	0.5	J	5.7	U	2.3	J
Silver	0.53	U	0.51	U	0.56	U	0.52	U	5.7	U	0.54	U	0.5	U	0.54	U	0.58	U	0.52	U	0.54	U	0.53	U	0.55	U	2.8	U	2.9	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-06 SB-06-00-02 10/29/2015 0-2 feet		SB-06 SB-06-28-30 10/29/2015 28-30 feet		SB-07 SB-07-00-02 10/26/2015 0-2 feet		SB-07 SB-07-17-19 10/26/2015 17-19 feet		SB-08 SB-08-01-02 10/23/2015 1-2 feet		SB-08 SB-08-28-30 10/23/2015 28-30 feet		SB-11 SB-11-00-02 10/20/2015 0-2 feet		SB-11 SB-11-08-09 10/20/2015 8-9 feet		SB-13 SB-13-00-02 10/20/2015 0-2 feet		SB-13 SB-13-08-10 10/20/2015 8-10 feet		SB-19 SB-19-00-02 10/22/2015 0-2 feet		SB-19 SB-19-08-10 10/22/2015 8-10 feet		SB-21 SB-21-00-02 10/22/2015 0-2 feet		SB-21 SB-21-08-10 10/22/2015 8-10 feet		SB-26 SB-26-00-02 10/21/2015 0-2 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Inorganics (µg/kg) (continued)																														
Sodium	200	J	180	J	190	J	130	J	410	J	220	J	85	J	82	J	87	J	100	J	140	J	49	J	150	J	160	J	110	J
Thallium	2.7	UJ	2.5	UJ	2.8	UJ	2.6	UJ	28	U	2.7	U	2.5	U	2.7	U	2.9	U	2.6	U	2.7	U	2.7	U	2.7	U	14	U	14	U
Vanadium	18	J-	10	J-	21		32		5.2	J	21		27		27		19		23		24		23		28		32		47	
Zinc	65		12		31	J+	110	J+	35		23		50		23		73		20		78		23		35		24		390	
Miscellaneous																														
Solids, Percent	88.1		90.4		88.5		89.1		80.4		89.6		90.1		88.7		84.3		91.9		87.4		90.8		89.3		85.2		87.1	

Notes:
ID - identification
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
Q - qualifier
J - estimated value
J- - estimated value, biased low
J+ - estimated value, biased high
U - not detected
R - rejected value
Highlighted cell and bold format indicates that conc

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-26		SB-29		SB-29		SB-29		SB-31		SB-31		SB-32		SB-33		SB-33		SB-35		SB-35		SB-44		SB-44		SB-45		SB-45	
	SB-26-05-07		SB-29-00-02		SB-929-00-02 SB-29-00-02		SB-29-08-10		SB-31-00-02		SB-31-08-10		SB-32-05-07		SB-33-00-02		SB-33-08-10		SB-35-00-02		SB-35-20-22		SB-44-00-02		SB-44-08-10		SB-45-00-02		SB-45-08-10	
	10/21/2015		10/20/2015		10/20/2015		10/20/2015		10/19/2015		10/19/2015		2/15/2016		10/20/2015		10/20/2015		10/27/2015		10/27/2015		10/28/2015		10/28/2015		10/28/2015		10/28/2015	
	5-7 feet		0-2 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet		5-7 feet		0-2 feet		8-10 feet		0-2 feet		20-22 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Volatile Organic Compounds (µg/kg)																														
1,1,1-Trichloroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,1,2,2-Tetrachloroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,1,2-Trichloroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,1-Dichloroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,1-Dichloroethene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,2,3-Trichlorobenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
1,2,4-Trichlorobenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
1,2-Dibromo-3-chloropropane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
1,2-Dibromoethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,2-Dichlorobenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
1,2-Dichloroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,2-Dichloropropane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
1,3-Dichlorobenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
1,4-Dichlorobenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
1,4-Dioxane	50	R	61	R	79	R	55	R	47	R	47	R	22000	R	40	R	49	R	48	R	61	R	75	R	43	R	52	R	54	R
2-Butanone	10	U	12	U	16	U	11	U	9.4	U	9.5	U	4400	U	8	U	9.9	U	9.7	U	12	U	15	U	8.6	U	10	U	11	U
2-Hexanone	10	U	12	U	16	U	11	U	9.4	U	9.5	U	4400	U	8	U	9.9	U	9.7	U	12	U	15	U	8.6	U	10	U	11	U
4-Methyl-2-pentanone	10	U	12	U	16	U	11	U	9.4	U	9.5	U	4400	U	8	U	9.9	U	9.7	U	12	U	15	U	8.6	U	10	U	11	U
Acetone	20	U	24	U	32	U	22	U	19	U	19	U	8800	U	16	U	20	U	19	UJ	26		21	J	17	UJ	21	UJ	21	UJ
Benzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Bromochloromethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Bromodichloromethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Bromoform	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
Bromomethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Carbon Disulfide	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	UJ	4.3	UJ	5.2	UJ	5.4	UJ
Carbon Tetrachloride	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Chlorobenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Chloroethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Chloroform	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Chloromethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
cis-1,2-Dichloroethene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
cis-1,3-Dichloropropene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Cyclohexane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2500		4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	U	4.3	U	5.2	U	5.4	U
Dibromochloromethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Dichlorodifluoromethane	5	UJ	6.1	UJ	7.9	UJ	5.5	UJ	4.7	UJ	4.7	UJ	2200	U	4	UJ	4.9	UJ	4.8	UJ	6.1	UJ	7.5	UJ	4.3	UJ	5.2	UJ	5.4	UJ
Ethylbenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	5300		4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Isopropylbenzene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	1600	J	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
m,p-Xylene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	8000		4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Methyl acetate	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Methyl tert-Butyl Ether	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Methylcyclohexane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	7400	J	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Methylene Chloride	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-26		SB-29		SB-29		SB-29		SB-31		SB-31		SB-32		SB-33		SB-33		SB-35		SB-35		SB-44		SB-44		SB-45		SB-45	
	SB-26-05-07		SB-29-00-02		SB-929-00-02		SB-29-08-10		SB-31-00-02		SB-31-08-10		SB-32-05-07		SB-33-00-02		SB-33-08-10		SB-35-00-02		SB-35-20-22		SB-44-00-02		SB-44-08-10		SB-45-00-02		SB-45-08-10	
					SB-29-00-02																									
	10/21/2015		10/20/2015		10/20/2015		10/20/2015		10/19/2015		10/19/2015		2/15/2016		10/20/2015		10/20/2015		10/27/2015		10/27/2015		10/28/2015		10/28/2015		10/28/2015		10/28/2015	
	5-7 feet		0-2 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet		5-7 feet		0-2 feet		8-10 feet		0-2 feet		20-22 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Volatile Organic Compounds (µg/kg) (continu																														
o-Xylene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	4600		4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Styrene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Tetrachloroethene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Toluene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	UJ	6.1	UJ	7.5	UJ	4.3	UJ	5.2	UJ	5.4	UJ
trans-1,2-Dichloroethene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
trans-1,3-Dichloropropene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Trichloroethene	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Trichlorofluoromethane	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Vinyl Chloride	5	U	6.1	U	7.9	U	5.5	U	4.7	U	4.7	U	2200	U	4	U	4.9	U	4.8	U	6.1	U	7.5	U	4.3	U	5.2	U	5.4	U
Semivolatile Organic Compounds (µg/kg)																														
1,1'-Biphenyl	35	U	35	U	360	U	34	U	470		38	U	13000		350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
1,2,4,5-Tetrachlorobenzene	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2,2'-Oxybis(1-chloropropane)	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2,3,4,6-Tetrachlorophenol	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	UJ	88	UJ	770	UJ	73	UJ	73	UJ	71	UJ
2,4,5-Trichlorophenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2,4,6-Trichlorophenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	UJ	43	UJ	380	UJ	36	UJ	36	UJ	35	UJ
2,4-Dichlorophenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2,4-Dimethylphenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2,4-Dinitrophenol	180	U	180	UJ	1900	R	180	U	1900	R	200	U	47000	U	1800	R	190	U	1900	U	220	U	2000	U	190	U	180	U	180	U
2,4-Dinitrotoluene	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
2,6-Dinitrotoluene	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
2-Chloronaphthalene	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2-Chlorophenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2-Methylnaphthalene	7.2	U	7.1	U	73	U	6.9	U	**1600**		7.7	U	**190000**		72	U	7.6	U	73	U	8.8	U	77	U	7.3	U	7.3	U	7.1	U
2-Methylphenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
2-Nitroaniline	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
2-Nitrophenol	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
3,3'-Dichlorobenzidine	180	U	180	U	1900	U	180	U	1900	U	200	U	47000	U	1800	U	190	U	1900	U	220	U	2000	U	190	U	180	U	180	U
3-Nitroaniline	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
4,6-Dinitro-2-methylphenol	180	U	180	UJ	1900	R	180	U	1900	R	200	U	47000	U	1800	R	190	U	1900	U	220	U	2000	U	190	U	180	U	180	U
4-Bromophenyl-phenylether	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
4-Chloro-3-methylphenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	UJ	43	UJ	380	UJ	36	UJ	36	UJ	35	UJ
4-Chloroaniline	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
4-Chlorophenyl-phenylether	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
4-Methylphenol	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
4-Nitroaniline	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	88	U	770	U	73	U	73	U	71	U
4-Nitrophenol	180	U	180	U	1900	U	180	U	1900	U	200	U	47000	U	1800	U	190	U	1900	U	220	U	2000	U	190	U	180	U	180	U
Acenaphthene	7.2	U	5.7	J	73	U	6.9	U	3300		7.7	U	10000		72	U	7.6	U	40	J	8.8	U	96		7.3	U	7.3	U	7.1	U
Acenaphthylene	7.2	U	13		73	U	6.9	U	760		7.7	U	1900	U	72	U	7.6	U	73	U	8.8	U	51	J	7.3	U	4.6	J	7.1	U
Acetophenone	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Anthracene	7.2	U	20		51	J	6.9	U	8600		7.7	U	11000		28	J	7.6	U	140		8.8	U	400		7.3	U	15		7.1	U
Atrazine	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Benzaldehyde	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-26		SB-29		SB-29		SB-29		SB-31		SB-31		SB-32		SB-33		SB-33		SB-35		SB-35		SB-44		SB-44		SB-45		SB-45	
	SB-26-05-07		SB-29-00-02		SB-929-00-02 SB-29-00-02		SB-29-08-10		SB-31-00-02		SB-31-08-10		SB-32-05-07		SB-33-00-02		SB-33-08-10		SB-35-00-02		SB-35-20-22		SB-44-00-02		SB-44-08-10		SB-45-00-02		SB-45-08-10	
	10/21/2015		10/20/2015		10/20/2015		10/20/2015		10/19/2015		10/19/2015		2/15/2016		10/20/2015		10/20/2015		10/27/2015		10/27/2015		10/28/2015		10/28/2015		10/28/2015		10/28/2015	
	5-7 feet		0-2 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet		5-7 feet		0-2 feet		8-10 feet		0-2 feet		20-22 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Semivolatile Organic Compounds (µg/kg) (cor																														
Benzo(a)anthracene	7.2	U	87		**200**		6.9	U	**13000**		7.7	U	**5700**		**160**		7.6	U	**370**		18		**2100**		7.3	U	130		7.1	U
Benzo(a)pyrene	7.2	U	**100**	J	**220**	J	6.9	U	**10000**	J	7.7	U	**3200**		**180**	J	7.6	U	**360**	J	**23**	J	**2000**	J	7.3	UJ	**130**	J	7.1	UJ
Benzo(b)fluoranthene	7.2	U	**170**		**340**		6.9	U	**12000**		7.7	U	**1500**	J	**240**		7.6	U	**530**		31		**2900**		7.3	U	**220**		7.1	U
Benzo(g,h,i)perylene	7.2	U	49	J	120		6.9	U	2900		7.7	U	1400	J	60	J	7.6	U	100		11		490		7.3	U	61		7.1	U
Benzo(k)fluoranthene	7.2	U	61	J	130	J	6.9	U	**6500**	J	7.7	U	1900	U	85	J	7.6	U	260	J	13	J	**1200**	J	7.3	UJ	68	J	7.1	UJ
Bis(2-chloroethoxy)methane	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Bis(2-chloroethyl)ether	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Bis(2-ethylhexyl)phthalate	14	J	460	J	790		56	J	910	J	16	J	**41000**		350	U	38	U	360	U	140	U	380	U	36	U	36	U	35	U
Butylbenzylphthalate	72	U	49	J	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	UJ	88	UJ	770	UJ	73	UJ	73	UJ	71	UJ
Caprolactam	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	UJ	43	UJ	380	UJ	36	UJ	36	UJ	35	UJ
Carbazole	35	U	35	U	360	U	34	U	1900		38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Chrysene	7.2	U	77		220		6.9	U	**14000**		7.7	U	**7300**		160		7.6	U	340		20		**2400**		7.3	U	150		7.1	U
Dibenzo(a,h)anthracene	7.2	U	7.1	U	73	U	6.9	U	76	U	7.7	U	**700**	J	72	U	7.6	U	73	U	8.8	U	77	U	7.3	U	7.3	U	7.1	U
Dibenzofuran	35	U	35	U	360	U	34	U	2000		38	U	4900	J	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Diethylphthalate	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Dimethylphthalate	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Di-n-butylphthalate	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Di-n-octylphthalate	72	U	71	U	730	U	69	U	760	U	77	U	19000	U	720	U	76	U	730	U	43	J	770	U	73	U	73	U	71	U
Fluoranthene	7.2	U	130		330		6.9	U	27000		7.7	U	2800		270		7.6	U	730		27		3300		7.3	U	200		7.1	U
Fluorene	7.2	U	6.3	J	73	U	6.9	U	5600		7.7	U	14000		72	U	7.6	U	48	J	8.8	U	100		7.3	U	7.3	U	7.1	U
Hexachlorobenzene	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Hexachlorobutadiene	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Hexachlorocyclopentadiene	180	U	180	R	1900	R	180	U	19000	R	200	U	47000	U	1800	R	190	U	1900	U	220	U	2000	U	190	U	180	U	180	U
Hexachloroethane	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Indeno(1,2,3-cd)pyrene	7.2	U	42		100		6.9	U	**2900**		7.7	U	**530**	J	65	J	7.6	U	95		10		**430**		7.3	U	53		7.1	U
Isophorone	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	UJ	43	UJ	380	UJ	36	UJ	36	UJ	35	UJ
Naphthalene	7.2	U	3.2	J	73	U	6.9	U	1300		7.7	U	**63000**		72	U	7.6	U	73	U	8.8	U	27	J	7.3	U	7.3	U	7.1	U
Nitrobenzene	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
N-Nitroso-di-n-propylamine	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
N-Nitrosodiphenylamine	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	UJ	43	UJ	380	UJ	36	UJ	36	UJ	35	UJ
Pentachlorophenol	180	U	180	U	1900	U	180	U	1900	U	200	U	47000	U	1800	U	190	U	1900	U	220	U	2000	U	190	U	180	U	180	U
Phenanthrene	7.2	U	67		190		6.9	U	37000		7.7	U	46000		100		7.6	U	560		13		2200		7.3	U	73		7.1	U
Phenol	35	U	35	U	360	U	34	U	370	U	38	U	9200	U	350	U	38	U	360	U	43	U	380	U	36	U	36	U	35	U
Pyrene	7.2	U	130		320		6.9	U	27000		7.7	U	14000		250		7.6	U	690		25		4700		7.3	U	230		7.1	U
Polychlorinated Biphenyls (µg/kg)																														
Aroclor 1016	11	U	10	U	11	U	9.7	U	220	U	11	U	54	UJ	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Aroclor 1221	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Aroclor 1232	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Aroclor 1242	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Aroclor 1248	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Aroclor 1254	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Aroclor 1260	11	UJ	62		70		9.7	U	**3000**	J+	11	U	31	J	140		11	UJ	38		13	U	15		11	U	**100000**	J+	4.3	J
Aroclor 1262	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

	SB-26		SB-29		SB-29		SB-29		SB-31		SB-31		SB-32		SB-33		SB-33		SB-35		SB-35		SB-44		SB-44		SB-45		SB-45	
	SB-26-05-07		SB-29-00-02		SB-929-00-02 SB-29-00-02		SB-29-08-10		SB-31-00-02		SB-31-08-10		SB-32-05-07		SB-33-00-02		SB-33-08-10		SB-35-00-02		SB-35-20-22		SB-44-00-02		SB-44-08-10		SB-45-00-02		SB-45-08-10	
	10/21/2015		10/20/2015		10/20/2015		10/20/2015		10/19/2015		10/19/2015		2/15/2016		10/20/2015		10/20/2015		10/27/2015		10/27/2015		10/28/2015		10/28/2015		10/28/2015		10/28/2015	
	5-7 feet		0-2 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet		5-7 feet		0-2 feet		8-10 feet		0-2 feet		20-22 feet		0-2 feet		8-10 feet		0-2 feet		8-10 feet	
Chemical	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Polychlorinated Biphenyls (µg/kg) (continued																														
Aroclor 1268	11	U	10	U	11	U	9.7	U	220	U	11	U	54	U	10	U	11	U	11	U	13	U	12	U	11	U	5500	U	11	U
Pesticides (µg/kg)																														
4,4'-DDD	1.1	U	21	U	20	U	0.97	U	30	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
4,4'-DDE	1.1	U	21	U	20	U	0.97	U	22	UJ	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
4,4'-DDT	1.1	UJ	21	UJ	7.7	J	0.97	U	340	J+	1.1	U	54	UJ	16		1.1	U	22	UJ	1.3	U	23	U	1.1	U	**6800**	J+	1	U
Aldrin	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
alpha-BHC	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
alpha-Chlordane	1.1	U	21	U	20	U	0.97	U	27	J+	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
beta-BHC	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
delta-BHC	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
Dieldrin	1.1	U	21	U	20	U	0.97	U	22	UJ	1.1	U	54	U	10	UJ	1.1	U	**40**		1.3	U	23	U	1.1	U	**800**	J	1	U
Endosulfan I	1.1	U	21	U	20	U	0.97	U	22	UJ	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
Endosulfan II	1.1	U	21	U	20	U	0.97	U	28	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
Endosulfan Sulfate	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1600	J	1	U
Endrin	1.1	U	21	U	20	U	0.97	U	130	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	UJ	1.1	U	1100	U	1	U
Endrin aldehyde	1.1	U	21	U	20	U	0.97	UJ	25	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	8.8	J	1.1	U	1100	UJ	1	U
Endrin Ketone	1.1	U	21	UJ	20	UJ	0.97	U	220	U	1.1	U	54	U	10	UJ	1.1	U	22	UJ	1.3	U	23	U	1.1	U	1100	UJ	1	U
gamma-BHC (Lindane)	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	0.39	J	23	U	1.1	U	1100	U	1	U
gamma-Chlordane	1.1	U	21	U	20	U	0.97	U	22	UJ	1.1	U	54	U	10	U	1.1	U	4.1	J	1.3	U	23	U	1.1	U	1100	U	1	U
Heptachlor	1.1	U	21	U	20	U	0.97	U	9.2	J+	1.1	U	54	U	10	U	1.1	U	22	U	1.3	UJ	23	U	1.1	U	1100	U	1	U
Heptachlor Epoxide	1.1	U	21	U	20	U	0.97	U	22	U	1.1	U	54	U	10	U	1.1	U	22	U	1.3	U	23	U	1.1	U	1100	U	1	U
Methoxychlor	4.2	U	7.9	J	7.9	J	3.9	U	490	J+	4.6	U	210	U	41	UJ	4.4	U	19	J	5.3	UJ	120		4.2	U	4400	U	4.1	U
Toxaphene	11	U	210	U	200	U	9.7	U	220	U	11	U	540	R	100	U	11	U	220	U	13	U	230	UJ	11	UJ	11000	UJ	10	UJ
Inorganics (µg/kg)																														
Aluminum	8800	J	6300	J	6500	J	4000	J	6100	J	13000	J	9000		7400	J	16000	J	8500	J	17000	J	12000	J	8400	J	7700	J	7600	J
Antimony	1.1	R	2	R	2.2	R	1	R	1.1	R	1.1	R	1.1	UJ	1	R	1.1	R	1	UJ	1.2	UJ	1.1	UJ	1.1	UJ	1	UJ	0.99	UJ
Arsenic	**1.6**	J	**2.2**	J	**2.9**	J	**1.6**	J	**14**	J	**3.1**	J	**1.7**	J	**3.3**	J	**1**	J	**3.1**		**3.3**		**24**		**1.9**		**5**		**2**	
Barium	46		94		110		23		240		30		43		140		76		37	J	54	J	150	J	43	J	42	J	33	J
Beryllium	0.16	J	0.25	U	0.27	U	0.062	J	0.28	U	0.13	J	0.27	J	0.16	J	0.3		0.16	J	0.31		0.28	U	0.16	J	0.3		0.11	J
Cadmium	0.048	J	0.13	J	0.31		0.051	J	0.93		0.26	U	0.079	J	0.08	J	0.28	U	0.11	J	0.066	J	0.77		0.27	U	0.066	J	0.025	J
Calcium	970	J+	6500	J+	8200	J+	1200	J+	17000	J+	900	J+	1400		1800	J+	830	J+	1600		2500		63000		950		9200		810	
Chromium	16		15		16		14		17		20		24	J	14		24		16	J	22	J	15	J	14	J	14	J	15	J
Cobalt	5.6	J	7	J	6.9	J	3.3	J	4.6	J	5.1	J	5.6		5.3	J	5.7	J	4.5		4.3		4.2		5.2		3.7		5.5	
Copper	15		22		28		8.5		80		13		14		27		17		17		26		49		13		24		14	
Iron	**14000**		**13000**		**15000**		**9600**		**14000**		**18000**		**15000**		**14000**		**15000**		**13000**	J	**9400**	J	**16000**	J	**12000**	J	**13000**	J	**12000**	J
Lead	4	J	21	J	41	J	2.2	J	230	J	5.4	J	5.2	J	26	J	6.8	J	33		120		**480**		4.9		140		3.8	
Magnesium	1800	J+	3600	J+	3500	J+	1500	J+	2700	J+	2200	J+	2500	J	2000	J+	2700	J+	1900		1700		2700		2000		1500		1900	
Manganese	340	J+	120	J+	130	J+	230	J+	160	J+	250	J+	400	J-	260	J+	230	J+	210	J-	100	J-	240	J-	360	J-	130	J-	300	J-
Mercury	0.083	U	0.22		0.47		0.084	U	**3.3**		0.09	U	0.0088	J	0.061	J	0.0093	J	0.064	J+	0.26	J+	**2.7**	J+	0.081	UJ	**110**	J+	0.085	UJ
Nickel	12		11		12		8.4		13		11		12	J	11		13		12		15		10		9.7		8.4		11	
Potassium	1200	J+	4000	J+	3900	J+	500	J+	1900	J+	920	J+	860		830	J+	1300	J+	690		890		1300		1100		810		1300	
Selenium	1.1	UJ	0.6	J	1.1	J	1	UJ	1.9	J	0.67	J	1.1	UJ	0.54	J	1.1	UJ	1	U	0.77	J	1.4		1.1	U	1	U	0.99	U
Silver	0.53	U	0.51	U	0.55	U	0.51	U	0.56	U	0.53	U	0.56	UJ	0.5	U	0.56	U	0.52	U	0.6	U	0.56	U	0.54	U	0.51	U	0.49	U

Table 6
Soil Chemical Analytical Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Chemical	SB-26 SB-26-05-07 10/21/2015 5-7 feet Result	Q	SB-29 SB-29-00-02 10/20/2015 0-2 feet Result	Q	SB-29 SB-929-00-02 SB-29-00-02 10/20/2015 0-2 feet Result	Q	SB-29 SB-29-08-10 10/20/2015 8-10 feet Result	Q	SB-31 SB-31-00-02 10/19/2015 0-2 feet Result	Q	SB-31 SB-31-08-10 10/19/2015 8-10 feet Result	Q	SB-32 SB-32-05-07 2/15/2016 5-7 feet Result	Q	SB-33 SB-33-00-02 10/20/2015 0-2 feet Result	Q	SB-33 SB-33-08-10 10/20/2015 8-10 feet Result	Q	SB-35 SB-35-00-02 10/27/2015 0-2 feet Result	Q	SB-35 SB-35-20-22 10/27/2015 20-22 feet Result	Q	SB-44 SB-44-00-02 10/28/2015 0-2 feet Result	Q	SB-44 SB-44-08-10 10/28/2015 8-10 feet Result	Q	SB-45 SB-45-00-02 10/28/2015 0-2 feet Result	Q	SB-45 SB-45-08-10 10/28/2015 8-10 feet Result	Q
Inorganics (µg/kg) (continued)																														
Sodium	96	J	100	J	110	J	160	J	130	J	81	J	87	J	110	J	94	J	180	J	430		1200		110	J	890		140	J
Thallium	2.7	U	2.5	U	2.7	U	2.5	U	2.8	U	2.6	U	2.8	UJ	2.5	U	2.8	U	2.6	U	3	U	2.8	U	2.7	U	2.6	U	2.5	U
Vanadium	30		21		22		15		32		32		28	J	22		34		32		29		22		22		18		22	
Zinc	23		60		83		15		330		23		22	J	40		33		150	J-	120	J-	550	J-	24	J-	48	J-	22	J-
Miscellaneous																														
Solids, Percent	92.6		94.6		91.4		95.9		88.1		86.5		88.8		93.4		87.8		91.8		75.7		86.6		91.4		91.3		93.1	

Notes:
ID - identification
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
Q - qualifier
J - estimated value
J- - estimated value, biased low
J+ - estimated value, biased high
U - not detected
R - rejected value
Highlighted cell and bold format indicates that conc

Table 7
Sewer Line Gamma Data Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Sewer Run (Manhole to Manhole Downstream)	Dates	Pipe Size (inch) and Material	Total Length between Manholes (feet)	Maximum Gamma Reading[1] (cpm)	Maximum Gamma Location[2]	Minimum Gamma Reading[1] (cpm)	Minimum Gamma Location[2]	Comments
C-1 to I-3	11/13/15	15" Clay	189	103,496	C1_DS_177	7,400	C1_DS_77	
C-2 to C-1	11/13/15	15" Clay	35	10,930	C1_US_2	3,300	C1_US_11	
C-3 to C-2	11/13/15	15" Clay	127	11,563	C2_US_87	4,700	C3_DS_7	
C-4 to C-3	11/13/15	15" Clay	136	6,262	C4_DS_97	3,700	C4_DS_136	
CO-2 to CO-1	11/23/15	15" di	178	1,800	CO2_DS_178	1,100	CO3_DS_130	
CO-3 to I-10	11/23/15	12" clay	37	4,700	CO3_DS_25	4,300	CO3_DS_10	
CO-4 to CO-3	11/23/15	12" clay	110	4,600	CO3_US_10	4,200	CO3_US_30	Run ended at 50 feet due to debris
D-1 to I-6	11/24/15	N/A	120	N/A	N/A	N/A	N/A	Sewer line full of water, likely due to a blockage. Could not perform survey.
H-1 to H-2	11/10/15	36" Concrete	156	28,000	H1_DS_97	5,000	H1_DS_107	
H-2 to H-3	11/17/15	36" concrete	429	8,000	H2_DS_168	1,500	H2_DS_157	Due to overall distance between H-2 and H-3 being over two times greater than the length of the 1x1 cable, there is a 67 feet length of sewer between the two manholes that could not be surveyed.
H-3 to W-1	11/17/15	36" concrete	68	69,000	H3_DS_17	28,000	H3_DS_37	
I-1 to I-2	11/16/15	12" Clay	N/A	386,598	I2_US_8	200,000	I2_US_5	Impassable debris in pipeline at 15 feet upstream from I-2 toward I-1. Manhole I-1 could not be located. May be paved over.
I-2 to I-3	11/16/15	12" Clay	20	N/A	N/A	N/A	N/A	There are two 12" clay pipelines between I-2 and I-3. Both are clogged with a greasy blockage.
I-3 to I-4	11/16/15	12" Clay	50	N/A	N/A	N/A	N/A	Could not perform downstream run from I-3 to I-4 due to hazardous location of I-3 in middle of busy intersection. Could not perform upstream run from I-4 to I-3 due to pipelines being full of water.
I-4 to I-5	11/16/15	24" Concrete	75	307,453	I5_US_12	120,000	I5_US_17	Unable to perform a downstream run from I-4 to I-5 due to pipeline at I-4 being full of water. Performed upstream run from I-5 to I-4, but encountered impassable debris at 21 feet.
I-5 to I-6	11/16/15	24" Concrete	130	184,733	I6_US_33	40,000	I6_US_52	Unable to perform a downstream run from I-5 to I-6 due to sediment build-up in sewer line. Performed upstream run from I-6 to I-5, but encountered impassable debris at 55 feet.
I-6 to I-7	11/16/15, 11/17/15	24" Concrete	129	125,908	I6_DS_67	10,000	I6_DS_75	Encountered impassable debris at 78 feet on downstream run from I-6 to I-7. Upstream run performed toward I-6 up to point of same debris.
I-7 to I-8	11/17/15	24" Concrete	130	190,390	I7_DS_50	38,000	I7_DS_17	
I-8 to I-9	11/9/15	24" Concrete	131	83,412	I9_US_39	28,000	I8_DS_7	Encountered impassable debris at 60 feet on downstream run from I-8 to I-9. Upstream run performed from I-9 to I-8 up to point of same debris.
I-9 to I-10	11/9/15	24" Concrete	130	121,000	I9_DS_47	13,000	I10_US_7	
I-10 to I-11	11/12/15	24" Concrete	130	77,000	I10_DS_45	12,000	I10_DS_57	
I-11 to I-12	11/17/15	24" Concrete	131	14,322	I12_US_94	3,000	I12_US_7	Due to difficulty accessing manhole I-11 for an extended period, data was collected by an upstream run from I-12 to I-11.
I-12 to I-13	11/10/15	36" Concrete	145	74,426	I12_DS_67	3,700	I13_US_19	
I-13 to H-1	11/10/15	36" Concrete	157	12,000	H1_US_0	2,000	I13_DS_77	
K-1 to K-2	11/5/15, 11/6/15	12" Clay	100	3,600	K2_US_2	1,600	K1_DS_77	
K-2 to K-3	11/6/15	12" Clay	100	4,600	K2_DS_39	3,700	K2_DS_77	
M-2 to M-3	11/5/15	10" Clay	132	6,013	M3_US_70	3,500	M2_DS_5	M2 is capped upstream at the invert. M-1 could not be located and is most likely paved over.
M-3 to M-4	11/5/15	12" Clay	151	5,500	M4_US_22	4,200	M3_DS_70	
M-4 to K-1	11/5/15	12" Clay	45	3,000	M4_DS_10	2,100	M4_DS_40	
S-1 to I-8	11/23/15	12" clay	125	4,500	I8_US_10	4,200	I8_US_20	Run ended at 37 feet due to debris
W-1 to W-2	11/17/15	48" concrete top and brick bottom	103	13,000	W1_DS_0	5,700	W1_DS_97	

Notes:

1 Gamma readings taken with Ludlum 2221 Meter and Ludlum 44-2 Probe .

2 Manhole ID_direction upstream (US) or downstream (DS)_distance (feet)

Acronyms:

bgs - below ground surface
cpm - counts per minute
DS - downstream
di - ductile iron
ID - identification
N/A - not applicable
US - upstream

Table 8
Sewer Manhole Data Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Manhole ID	Date	Depth (feet bgs)	Vault Material	Surface Exposure Rate[1] (µR/hr)	3 feet from Bottom Exposure Rate[1] (µR/hr)	Surface Gamma Reading[2] (cpm)	3 feet from Bottom Gamma Reading[2] (cpm)	Maximum Reading[2] (cpm)	Depth of Maximum (feet bgs)	Comments
C-1	11/13/15	9.7	Brick	8.8	N/A	2,696	7,574	7,574	6.7	
C-2	11/13/15	9.75	Brick	10	N/A	2,777	5,178	5,897	6	
C-3	11/13/15	9.75	Brick	11	N/A	2,296	4,985	4,985	8	
C-4	11/13/15	10.6	Brick	11.5	N/A	2,202	4,817	5,617	5.5	
CO-1	11/11/15	14.5	Concrete	8	N/A	1,898	2,330	2,330	11.5	
CO-2	11/23/15	10.8	Concrete	5.4	N/A	1,500	1,966	2,145	1.5	
CO-3	11/11/15	11.5	Brick	9.3	N/A	2,254	4,969	4,969	8.5	
H-1	11/10/15	16.7	Brick	10.5	N/A	2,100*	4,864	5,266	8	
H-2	11/17/15	18.3	Brick	18.5	N/A	1,360	6,429	25,296	18.3	Concrete invert
H-3	11/17/15	18	Brick	10	N/A	1,600	9,901	45,676	18	Brick invert
I-2	11/11/15	10	Brick	33	270	13,314	113,646	113,646	7	
I-3	11/11/15	10	Brick	40	N/A	13,567	160,977	164,987	7.5	
I-4	11/16/15	13.8	Brick	10	38	3,965	20,964	20,964	10.8	~ 2.5 feet of standing water in bottom. Two 10-inch incoming pipes are cast iron and eroded away on the bottom of each pipe.
I-5	11/16/15	13.1	Brick	39	310	9,578	193,333	482,397	13.1	Collected bag of fully saturated sediment. 342,585 cpm and 275 µR/hr on bag at street level. Not sampled, returned to manhole.
I-6	11/16/15	14.5	Brick	21	130	4,159	52,626	101,137	14.5	12-inch line flowing in from north Decatur St. ~600,000 cpm 3-inches above water in invert.
I-7	11/16/15	15.5	Brick	16	85	1,656	17,731	42,843	15.5	Counts are roughly double on the upstream side compared to downstream side. Counts highest on the inside floor of the upstream pipe.
I-8	11/9/15	17.5	Brick	22	50	1,700	14,878	14,878	14.5	Count rate gradually increases with depth. Counts are roughly double on the upstream side compared to downstream side. Counts highest on the inside floor of the upstream pipe.
I-9	11/9/15	16.7	Brick	15	N/A	1,400	7,964	7,964	13.7	Count rate gradually increases with depth
I-10	11/9/15	16.3	Brick	11	N/A	1,100	4,394	4,394	13.3	Count rate gradually increases with depth
I-11	11/19/15	16	Brick	8.1	N/A	2,777	16,540	69,884	16	Maximum reading taken on small sediment pile in invert
I-12	11/10/15	16	Brick	7.5	N/A	1,700	3,234	3,415	8	
I-13	11/10/15	17	Brick	5.7	N/A	2,500	4,420	5,491	6	
K-1	11/5/15	10.8	Brick	N/A	N/A	1,500	3,500	3,600	4	
K-2	11/5/15	11	Brick	5	N/A	1,700	4,300	4,300	8	
M-2	11/5/15	9	Brick	N/A	N/A	1,607	3,775	4,184	5.5	Upstream line capped at invert
M-3	11/5/15	9.5	Brick	N/A	N/A	2,057	4,686	4,590	4.5	
M-4	11/5/15	8.6	Brick	N/A	N/A	2,250	3,900	4,150	6	
W-1	11/19/15	18	Brick	7.6	N/A	2,007	9,196	11,714	18	Water covering invert
W-2	11/19/15	17.7	Brick	7.4	N/A	2,111	5,199	8,125	17.6	Brick invert

Notes:

[1]Dose rates taken with Ludlum Model 9DP. Dose rates were only taken 3 feet from the botton in manholes accessed for sewer material sampling.

[2]Gamma readings taken with Ludlum 2221 Meter and Ludlum 44-2 Probe. Readings are one minute counts unless otherwise noted.

Acronyms:

ID - identification
bgs - below ground surface
µR/hr - microrem per hour
cpm - counts per minute
N/A - not available

Table 9
Sediment Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Sediment Screening Criteria										**0.797**				**0.637**		
Sediment East Branch																
SED-EB01	9/28/2015	0	0.5		3.443	1.696	2.2	R	0.289	0.208	0.367	R	0.275	0.328	0.566	R
SED-EB01	9/28/2015	0.5	1		8.947	1.462	0.496		0.308	0.107	0.147		**0.857**	0.215	0.192	
SED-EB01	9/28/2015	1	2		6.885	1.279	1.03		0.375	0.168	0.152		**1.272**	0.208	0.289	
SED-EB01	9/28/2015	2	3		6.617	1.433	0.763		0.607	0.17	0.182		**1.782**	0.29	0.267	
SED-EB01	9/28/2015	3	4		6.598	1.528	1.5		**1.387**	0.305	0.393		**14.725**	1.293	0.412	
SED-EB01	9/28/2015	4	5		14.463	3.023	2.1	J	**3.645**	0.598	0.569	J	**45.317**	3.147	0.9	J
SED-EB01	9/28/2015	5	6		19.436	3.159	2.11	J	**2.293**	0.664	0.798	J	**70.211**	4.781	0.967	J
SED-EB01	9/28/2015	6	7		11.962	2.125	1.11		**1.837**	0.489	0.426		**22.945**	1.711	0.606	
SED-EB01	9/28/2015	7	8		14.044	1.838	0.628		0.748	0.164	0.133		**1.416**	0.254	0.197	
SED-EB01	9/28/2015	8	9		14.848	1.693	0.24		0.57	0.138	0.111		**1.33**	0.212	0.135	
SED-EB01	9/28/2015	8	9	SED-EB01-08-09	12.849	1.788	0.539		0.51	0.133	0.13		**0.814**	0.193	0.15	
SED-EB01	9/28/2015	9	10		11.095	1.457	0.882		0.443	0.107	0.127		**0.738**	0.187	0.124	
SED-EB02	9/28/2015	0	0.5		8.85	1.274	0.706		0.359	0.107	0.126		0.506	0.162	0.227	
SED-EB02	9/28/2015	0.5	1		9.959	1.308	0.238		0.458	0.116	0.091		**1.65**	0.286	0.148	
SED-EB02	9/28/2015	1	2		9.633	1.615	0.791		**0.828**	0.247	0.288		**9.157**	0.82	0.333	
SED-EB02	9/28/2015	2	3		5.486	1.474	1.54	J	**0.952**	0.243	0.3	J	**9.17**	0.875	0.303	J
SED-EB02	9/28/2015	3	4		12.365	1.556	0.264		**0.874**	0.209	0.181	J	**5.037**	0.534	0.119	J
SED-EB02	9/28/2015	3	4	SED-EB02-03-04	11.498	1.694	0.556		0.581	0.149	0.159	J	**2.55**	0.34	0.199	J
SED-EB02	9/28/2015	4	5		13.241	1.69	0.785		0.667	0.149	0.134		**0.983**	0.218	0.207	
SED-EB03	9/29/2015	0	0.5		9.362	1.383	0.794		0.225	0.094	0.137		**0.721**	0.16	0.147	
SED-EB03	9/29/2015	0.5	1		12.111	1.488	0.243		0.466	0.114	0.076		**0.856**	0.153	0.107	
SED-EB03	9/29/2015	1	2		7.575	1.538	1.17		0.346	0.142	0.199		**2.254**	0.345	0.283	
SED-EB03	9/29/2015	2	3		10.157	1.548	0.478		0.793	0.218	0.248		**8.868**	0.746	0.253	
SED-EB03	9/29/2015	3	4		6.943	1.238	0.348		**0.862**	0.275	0.277		**7.877**	0.798	0.261	
SED-EB03	9/29/2015	4	5		11.022	1.776	1.15		**1.858**	0.433	0.336		**16.022**	1.296	0.403	
SED-EB03	9/29/2015	5	6		10.328	1.682	0.634		0.761	0.197	0.234		**5.013**	0.563	0.225	
SED-EB03	9/29/2015	6	7		11.665	1.754	0.756		0.787	0.163	0.144		**1.165**	0.218	0.214	
SED-EB03	9/29/2015	7	8		14.014	1.867	0.527		0.619	0.147	0.167		**1.184**	0.222	0.146	
SED-EB03	9/29/2015	8	9		19.044	2.195	0.859		0.787	0.159	0.133		**1.292**	0.199	0.147	
SED-EB03	9/29/2015	9	10		15.228	1.962	0.524		0.596	0.142	0.154		**0.817**	0.169	0.18	
SED-EB04	9/29/2015	0	0.5		2.789	1.461	2.31	R	0.296	0.164	0.255	R	0.526	0.257	0.458	R
SED-EB04	9/29/2015	0.5	1		10.555	1.484	0.3		0.536	0.135	0.101		**0.793**	0.178	0.076	
SED-EB04	9/29/2015	1	2		9.758	1.543	0.559		0.437	0.122	0.148		**0.689**	0.151	0.207	
SED-EB04	9/29/2015	2	3		11.945	1.596	0.405		0.625	0.145	0.121		**0.669**	0.172	0.235	
SED-EB04	9/29/2015	2	3	SED-EB04-02-03	11.314	1.698	0.686		0.555	0.135	0.139		0.544	0.16	0.308	
SED-EB04	9/29/2015	3	4		13.4	1.778	0.329		0.744	0.163	0.114		**1.052**	0.221	0.191	
SED-EB04	9/29/2015	4	5		13.853	1.793	0.851		0.486	0.128	0.165		**0.9**	0.207	0.094	
SED-EB04	9/29/2015	5	6		11.552	1.815	0.651		0.582	0.155	0.14		**0.862**	0.229	0.243	
SED-EB04	9/29/2015	6	7		13.762	1.899	0.506		0.768	0.155	0.137		**0.685**	0.188	0.329	
SED-EB04	9/29/2015	7	8		14.574	2.103	0.841		0.779	0.176	0.152		**0.932**	0.185	0.223	
Sediment East Branch (continued)																
SED-EB05	9/28/2015	0	0.5		2.133	2.803	2.67	R	0.194	0.182	0.403	R	0.143	0.39	0.443	R
SED-EB05	9/28/2015	0.5	1		5.914	1.45	0.588	R	0.534	0.204	0.202	R	**0.75**	0.261	0.468	R
SED-EB05	9/28/2015	1	2		8.727	1.602	0.466	J	0.486	0.15	0.123	J	**1.333**	0.302	0.118	J
SED-EB05	9/28/2015	2	3		8.519	1.662	1.32	J	0.339	0.145	0.197	J	**0.901**	0.262	0.37	J
SED-EB05	9/28/2015	3	4		8.309	1.388	0.485		0.457	0.141	0.146		**1.05**	0.271	0.265	
SED-EB05	9/28/2015	4	5		9.202	1.468	0.941		0.751	0.173	0.142		**3.586**	0.443	0.15	
SED-EB05	9/28/2015	5	6		9.159	1.636	0.847		0.541	0.154	0.183		**1.87**	0.273	0.175	
SED-EB05	9/28/2015	6	7		10.328	1.52	0.329		**0.9**	0.165	0.09		**1.005**	0.191	0.146	
SED-EB05	9/28/2015	7	8		8.995	1.505	1.01		0.688	0.153	0.13		**0.646**	0.179	0.279	
SED-EB05	9/28/2015	8	9		7.439	1.613	0.869	J	0.721	0.179	0.177	J	**1.076**	0.221	0.238	J
SED-EB05	9/28/2015	9	10		6.031	1.317	0.875		0.653	0.17	0.189		**0.982**	0.211	0.217	
SED-EB06	9/29/2015	0	0.5		5.468	1.262	0.479	J	0.463	0.151	0.109	J	**0.692**	0.219	0.283	J
SED-EB06	9/29/2015	0.5	1		7.144	1.438	1		0.379	0.135	0.191		**0.805**	0.198	0.204	
SED-EB06	9/29/2015	1	2		8.644	1.261	0.712		0.338	0.102	0.127		**0.833**	0.203	0.141	
SED-EB06	9/29/2015	2	3		7.618	1.331	0.549		0.371	0.116	0.148		**0.696**	0.169	0.152	
SED-EB06	9/29/2015	3	4		6.218	1.297	0.866		0.443	0.141	0.181		**0.897**	0.2	0.214	
SED-EB06	9/29/2015	4	5		9.418	1.326	0.269		0.469	0.125	0.114		**1.129**	0.204	0.068	
SED-EB06	9/29/2015	5	6		9.244	1.903	0.957	J	0.447	0.174	0.263	J	**1.143**	0.26	0.265	J
SED-EB06	9/29/2015	6	7		8.171	1.554	1.21	J	0.474	0.156	0.176	J	**0.743**	0.214	0.334	J
SED-EB06	9/29/2015	6	7	SED-EB06-06-07	7.661	1.608	1.06	J	0.445	0.151	0.172	J	**0.838**	0.251	0.36	J
SED-EB06	9/29/2015	7	8		9.28	1.762	0.534	R	0.482	0.222	0.218	R	**1.163**	0.406	0.374	R
SED-EB06	9/29/2015	8	9		6.186	1.46	1.5	J	0.532	0.168	0.204	J	**1.439**	0.301	0.229	J
SED-EB06	9/29/2015	9	10		6.072	1.334	0.936		0.456	0.157	0.183		**1.252**	0.251	0.185	

Table 9
Sediment Radiological Gamma Spectroscopy Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Sample Date	Start Depth (feet)	End Depth (feet)	Parent Sample*	Potassium-40				Radium-226				Thorium-232			
					Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q	Result	CSU (+/-2 s)	MDA	Q
Sediment Screening Criteria										**0.797**				**0.637**		
SED-EB07	9/29/2015	0	0.5		8.536	1.404	0.924		0.385	0.119	0.148		**1.295**	0.236	0.102	
SED-EB07	9/29/2015	0.5	1		8.559	1.194	0.239		0.324	0.116	0.118		**1.505**	0.249	0.162	
SED-EB07	9/29/2015	1	2		8.718	1.463	0.573		0.215	0.101	0.158		**1.025**	0.257	0.219	
SED-EB07	9/29/2015	2	3		8.361	1.363	0.461		0.386	0.122	0.132		**1.094**	0.212	0.203	
SED-EB07	9/29/2015	3	4		11.351	1.444	0.25		0.495	0.133	0.132		**1.589**	0.21	0.063	
SED-EB07	9/29/2015	4	5		8.988	1.448	0.928		0.446	0.128	0.14		**1.251**	0.203	0.103	
SED-EB07	9/29/2015	5	6		7.079	1.556	0.842	J	0.47	0.164	0.207	J	**0.835**	0.225	0.362	J
SED-EB07	9/29/2015	6	7		5.568	1.363	1.07	J	0.583	0.17	0.188	J	**1.185**	0.237	0.3	J
SED-EB07	9/29/2015	7	8		5.397	1.529	1.42	J	0.398	0.17	0.245	J	**1.614**	0.346	0.255	J
SED-EB07	9/29/2015	8	9		5.216	1.346	0.882	J	0.403	0.182	0.262	J	**1.906**	0.386	0.342	J
SED-EB07	9/29/2015	9	10		7.982	1.724	1.52	R	0.65	0.198	0.233	R	**2.341**	0.457	0.168	R
SED-EB08	9/29/2015	0	0.5		8.231	1.556	0.707		0.324	0.132	0.174		0.62	0.19	0.327	
SED-EB08	9/29/2015	0.5	1		7.472	1.223	0.927		0.298	0.092	0.114		**0.638**	0.178	0.246	
SED-EB08	9/29/2015	1	2		9.728	1.486	0.46		0.359	0.126	0.143		**0.971**	0.196	0.176	
SED-EB08	9/29/2015	2	3		8.558	1.237	0.262		0.451	0.117	0.09		**1.049**	0.192	0.11	
SED-EB08	9/29/2015	3	4		6.208	1.116	0.89		0.315	0.097	0.128		**1.042**	0.188	0.085	
SED-EB08	9/29/2015	4	5		9.136	1.478	0.551		0.381	0.117	0.138		**1.281**	0.194	0.191	
Sediment East Branch (continued)																
SED-EB08	9/29/2015	5	6		8.411	1.388	0.477		0.394	0.12	0.156		**1.038**	0.199	0.134	
SED-EB08	9/29/2015	6	7		7.319	1.189	0.296		0.468	0.127	0.097		**1.071**	0.191	0.13	
SED-EB08	9/29/2015	7	8		5.022	1.304	1.46	J	0.372	0.138	0.176	J	**1.01**	0.263	0.13	J
SED-EB08	9/29/2015	8	9		7.302	1.385	0.633		0.332	0.118	0.179		**1.132**	0.221	0.175	
SED-EB08	9/29/2015	9	10		7.412	1.327	0.507		0.472	0.134	0.133		**0.875**	0.21	0.192	

Notes:

All units in picoCurie per gram (pCi/g).
CSU (+/- s) = combined standard uncertainty (2 sigma)
MDA - minimum detectable activity
Q - qualifier
U - not detected
J - estimated value
R - rejected
* Parent sample ID listed for duplicate samples.
Highlighted cell and bold format indicates that concentration exceeded screening criteria.

Table 10
Gamma Exposure Rate Locations and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Northing	Easting	3 Feet Above Ground Reading (µR/hr)					Ground Reading (µR/hr)					Comments
			1	2	3	4	Average	1	2	3	4	Average	
1	191133.4	1011206.5	7.9	9.3	8.9	9.4	**8.9**	12.4	10.9	11.2	7.5	**10.5**	Confirmatory
2	190856.8	1010985.4	7.1	6.7	9.4	9.7	**8.2**	9.5	12.1	13.2	10.8	**11.4**	Confirmatory
3	190618.2	1010808.4	9.4	8.2	6.3	7.0	**7.7**	7.1	8.6	8.4	9.5	**8.4**	Confirmatory
4	190323.6	1010574.3	14.0	18.7	17.0	14.7	**16.1**	20.0	18.7	19.0	22.1	**20.0**	Confirmatory
5	191903.6	1011823.3	6.2	7.2	6.6	5.2	**6.3**	8.1	6.9	4.9	6.4	**6.6**	Confirmatory
6	190454.7	1010405.7	12.6	13.7	13.5	13.2	**13.3**	17.4	19.8	20.5	18.5	**19.1**	Confirmatory
7	190696.9	1010577.9	8.5	6.8	7.8	7.0	**7.5**	7.4	8.9	8.5	9.7	**8.6**	Confirmatory
8	190955.8	1010780.8	6.7	7.7	10.7	8.5	**8.4**	11.1	10.8	11.1	12.5	**11.4**	Confirmatory
9	191688.9	1011076.2	47.2	50.1	53.1	45.8	**49.1**	213.0	205.0	193.0	210.0	**205.3**	Confirmatory
10	190399.4	1009336.9	12.1	11.1	7.4	7.2	**9.5**	8.9	6.0	6.8	11.8	**8.4**	Confirmatory
11	191299.9	1010390.7	11.3	9.7	10.0	10.8	**10.5**	7.5	8.5	10.1	11.8	**9.5**	Confirmatory
12	192582.1	1011005.8	11.5	9.1	9.3	7.4	**9.3**	9.5	12.6	9.3	7.9	**9.8**	Confirmatory
13	192324.6	1010823.3	8.3	7.9	7.9	5.7	**7.5**	6.2	5.6	6.5	7.8	**6.5**	Confirmatory
14	192321.6	1010167.8	10.4	12.5	10.3	11.3	**11.1**	9.8	7.6	13.0	10.5	**10.2**	Confirmatory
15	190356.7	1010612.5	23.4	12.9	14.5	15.2	**16.5**	23.3	23.9	23.2	24.7	**23.8**	On sidewalk by SCSB-03 location
18	191398.1	1011468.2	10.1	10.6	9.4	12.0	**10.5**	11.1	9.4	7.2	7.1	**8.7**	Confirmatory
19	191414.2	1011370.9	33.0	34.3	35.0	34.1	**34.1**	73.5	84.6	75.4	71.7	**76.3**	Confirmatory
20	191458.2	1011293.6	30.6	36.6	36.2	34.2	**34.4**	148.0	143.0	128.0	156.0	**143.8**	Confirmatory
21	191567.4	1011237.9	8.7	9.1	7.9	7.3	**8.3**	11.2	11.5	11.2	13.3	**11.8**	Confirmatory
22	191591.9	1011203.3	8.7	9.8	14.5	12.9	**11.5**	9.9	12.0	10.7	7.2	**10.0**	Confirmatory
23	191680.0	1011406.9	18.3	19.9	21.1	23.3	**20.7**	28.2	36.8	30.9	27.5	**30.9**	Confirmatory
24	191504.2	1011476.6	7.4	6.6	8.4	8.8	**7.8**	8.5	8.5	9.6	6.8	**8.4**	Confirmatory
25	Deli First Floor	Front	12.3	11.2	10.6	10.4	**11.1**	11.4	11.8	10.5	9.5	**10.8**	Store front entrance
26	Deli First Floor	Back	8.1	6.7	8.5	8.4	**7.9**	7.4	6.8	13.6	10.6	**9.6**	Back of store
27	Deli Basement	Front	53.1	50.8	50.6	51.1	**51.4**	23.5	23.8	20.9	22.5	**22.7**	At SB-43 location
28	Deli Basement	Back	20.8	18.5	19.4	31.5	**22.6**	68.9	71.5	66.2	74.3	**70.2**	Middle of basement floor at wooden cover
29	191435.3	1011430.1	40.1	45.7	42.7	47.9	**44.1**	171.0	180.0	163.0	174.0	**172.0**	Against bulding where garage door meets brick wall
30	191464.6	1011367.0	125.0	117.0	116.0	112.0	**117.5**	397.0	385.0	383.0	376.0	**385.3**	Edge of sidewalk/street
31	191488.9	1011327.5	325.0	351.0	343.0	331.0	**337.5**	580.0	620.0	580.0	610.0	**597.5**	Asphalt street
32	191498.5	1011295.3	229.0	206.0	227.0	219.0	**220.3**	398.0	387.0	382.0	399.0	**391.5**	Middle of street (Irving Ave.)
33	191522.1	1011285.1	129.0	133.0	140.0	115.0	**129.3**	208.0	177.0	215.0	173.0	**193.3**	Asphalt street in front of Lot 44
34	191541.8	1011283.3	16.2	17.6	19.6	15.8	**17.3**	14.2	11.2	9.5	13.1	**12.0**	Sidewalk just past where lead shielding ends
35	191503.0	1011330.4	19.4	22.7	23.8	20.1	**21.5**	18.0	16.1	18.6	15.0	**16.9**	Sidewalk on lead shielding
36	191481.1	1011367.0	61.0	71.8	66.5	63.1	**65.6**	124.0	125.0	130.0	118.0	**124.3**	Sidewalk just past where lead shielding ends
SB-50	191399.5	1011416.9	64.4	70.5	69.4	60.7	**66.3**	--	--	--	--	--	
SB-51	191271.5	1011344.6	48.8	46.1	46.5	46.6	**47.0**	--	--	--	--	--	
SB-52	191222.4	1011270.2	21.3	23.2	21.4	24	**22.5**	--	--	--	--	--	

Table 10
Gamma Exposure Rate Locations and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Northing	Easting	3 Feet Above Ground Reading (µR/hr)					Ground Reading (µR/hr)					Comments
			1	2	3	4	Average	1	2	3	4	Average	
SB-53	191051.9	1011140.9	15.5	16	16.1	13.6	**15.3**	--	--	--	--	--	
SB-54	190945.6	1011094.2	16.3	12.9	13.2	14.6	**14.3**	--	--	--	--	--	
SB-55	190933.8	1011039.2	11.2	8.4	10.3	9.4	**9.8**	--	--	--	--	--	
37	Lot 42	TerraNova	35.6	36.4	37.5	41.4	**37.7**	--	--	--	--	--	At sink/laundry station
38	Lot 42	TerraNova	18.1	16.7	14.2	13.7	**15.7**	--	--	--	--	--	
39	Lot 42	TerraNova	22.6	28.5	23.5	27.4	**25.5**	--	--	--	--	--	
40	Lot 42	TerraNova	16.3	22.1	24	20.8	**20.8**	--	--	--	--	--	
41	Lot 42	TerraNova	34	39.1	29.4	27.2	**32.4**	--	--	--	--	--	In office space
42	Lot 33	Room 33-4	28	29.8	27.6	26.7	**28.0**	--	--	--	--	--	
43	Lot 33	Room 33-4	28.5	29.6	30.6	22	**27.7**	--	--	--	--	--	
44	Lot 33	Room 33-4	17.2	17.9	19	16.7	**17.7**	--	--	--	--	--	
45	Lot 33	Room 33-4	14.3	14.6	11.6	12.5	**13.3**	--	--	--	--	--	
46	Lot 33	Room 33-4	15.3	22.4	21.1	19.2	**19.5**	--	--	--	--	--	
47	Lot 33	Room 33-3	22	21.4	20.8	20.6	**21.2**	--	--	--	--	--	
48	Lot 33	Room 33-3	9.9	10	12.8	16.3	**12.3**	--	--	--	--	--	
49	Lot 33	Room 33-3	18.1	19.3	19.7	19.3	**19.1**	--	--	--	--	--	
50	Lot 33	Room 33-3	16.8	16	11.8	15.1	**14.9**	--	--	--	--	--	
51	Lot 33	Room 33-3	12.7	14.5	17.2	16.9	**15.3**	--	--	--	--	--	
52	Lot 33	Room 33-2	13.3	8.7	10	10.4	**10.6**	--	--	--	--	--	
53	Lot 33	Room 33-2	20.7	19.9	21	23.4	**21.3**	--	--	--	--	--	
54	Lot 33	Room 33-1	50	45.3	45	58.2	**49.6**	--	--	--	--	--	SB-44 boring location
55	Lot 33	Room 33-1	22.4	23.7	28.1	25.5	**24.9**	--	--	--	--	--	
56	Lot 33	Room 33-1	19.9	16.5	17.8	15.5	**17.4**	--	--	--	--	--	
57	Lot 33	Room 33-1	15.6	12.7	14.3	16.6	**14.8**	--	--	--	--	--	
58	Lot 33	Room 33-1	9	8.4	10	9.7	**9.3**	--	--	--	--	--	
59	Lot 33	Room 33-1	13.7	13.7	16.1	21.2	**16.2**	--	--	--	--	--	
60	Lot 33	Room 33-1	20.4	13	18.9	16.3	**17.2**	--	--	--	--	--	
61	Lot 33	Room 33-1	15.2	14.5	11.5	10.8	**13.0**	--	--	--	--	--	
62	Lot 33	Room 33-1	12.3	10.2	14.8	9.6	**11.7**	--	--	--	--	--	
63	Lot 33	Room 33-1	37.3	41.1	35.8	35.5	**37.4**	--	--	--	--	--	
64	Lot 44	Primo Autobody	17.7	16.9	20	19.4	**18.5**	--	--	--	--	--	
65	Lot 44	Primo Autobody	45.9	33.9	45.7	43.9	**42.4**	--	--	--	--	--	
66	Lot 44	Primo Autobody	37	45.1	43.4	38.5	**41.0**	--	--	--	--	--	Car lift station
67	Lot 44	Primo Autobody	26.7	29.4	28.5	25.9	**27.6**	--	--	--	--	--	
68	Lot 44	Primo Autobody	16.1	16.8	16.7	20.7	**17.6**	--	--	--	--	--	
69	Lot 42	Primo Autobody	29.9	30.5	27.6	29.3	**29.3**	38.3	36	34.3	41.6	**37.6**	Break area bench
70	Lot 42	Primo Autobody	26.3	26.6	24.6	28.4	**26.5**	24	23.2	23.6	21.7	**23.1**	Car lift station

Table 10
Gamma Exposure Rate Locations and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Northing	Easting	3 Feet Above Ground Reading (µR/hr)					Ground Reading (µR/hr)					Comments
			1	2	3	4	Average	1	2	3	4	Average	
71	Lot 42	Primo Autobody	22.3	18.2	19.3	19.6	**19.9**	18.6	20.1	18.6	23	**20.1**	Car lift station
72	Lot 42	Primo Autobody	44.4	41.1	42.4	39	**41.7**	71	68	69.8	64.7	**68.4**	Hot spot just beyond where lead ends
73	Lot 42	Primo Autobody	20.4	27.4	20.3	22.4	**22.6**	29.7	34.6	39.9	29.7	**33.5**	Paint shop station
74	Lot 42	Primo Autobody	10.3	9.1	13.8	12.4	**11.4**	16.9	15.7	14.3	11.4	**14.6**	Storage area
75	Lot 46	Primo Flat Fix	7.9	9.7	7	7.7	**8.1**	--	--	--	--	--	Shop doorway
76	Lot 46	Primo Flat Fix	7.9	8.8	7.2	12	**9.0**	--	--	--	--	--	Tire changing station
77	Lot 46	Primo Flat Fix	11.4	13	12.9	12.6	**12.5**	18.1	17.1	16.4	18.4	**17.5**	Office doorway
78	Lot 48	K&M Auto	20.4	18.3	18.8	19.5	**19.3**	--	--	--	--	--	Car lift station
79	Lot 48	K&M Auto	24.7	21	22.3	22.4	**22.6**	51.4	49.7	47.7	52.1	**50.2**	Hotspot
80	Lot 48	K&M Auto	14.1	12.2	10.7	10.3	**11.8**	--	--	--	--	--	Office
81	School	Basement	6.3	6.2	6.0	--	**6.2**	--	--	--	--	--	Location B1
82	School	Basement	6.5	5.7	7.0	--	**6.4**	--	--	--	--	--	Location B3
83	School	Basement	7.3	6.4	6.1	--	**6.6**	--	--	--	--	--	Location B5
84	School	Basement	5.3	5.3	5.2	--	**5.3**	--	--	--	--	--	Location B7/B9
85	School	Basement	11.5	6.6	4.2	--	**7.4**	--	--	--	--	--	Location B11
86	School	Basement	7.2	8.2	7.0	--	**7.5**	--	--	--	--	--	Location B13
87	School	Basement	6.0	8.8	5.7	--	**6.8**	--	--	--	--	--	Location B15
88	School	Basement	6.7	8.3	7.7	--	**7.6**	--	--	--	--	--	Location B17
89	School	Basement	7.4	6.2	7.7	--	**7.1**	--	--	--	--	--	Location B19
90	School	Basement	5.3	6.0	5.4	--	**5.6**	--	--	--	--	--	End room
91	School	Basement	8.5	7.4	7.2	--	**7.7**	--	--	--	--	--	Hallway
92	School	Basement	7.4	5.8	6.4	--	**6.5**	--	--	--	--	--	Hallway
93	School	Basement	6.5	6.0	5.2	--	**5.9**	--	--	--	--	--	Hallway
94	School	Basement	6.1	7.1	7.0	--	**6.7**	--	--	--	--	--	Location B4
95	School	Basement	6.5	7.6	5.4	--	**6.5**	--	--	--	--	--	Boiler Room
96	School	Basement	4.6	4.8	5.3	--	**4.9**	--	--	--	--	--	Boiler Room
97	School	Basement	7.3	10.8	6.1	--	**8.1**	--	--	--	--	--	Boiler Room
98	School	Basement	6.3	7.5	6.4	--	**6.7**	--	--	--	--	--	Oil Tank Room
106	190628.1	1010698.5	6.2	6.7	5.9	--	**6.3**	--	--	--	--	--	School Courtyard - North
107	190644.8	1010675.7	5.8	9.8	7.8	--	**7.8**	--	--	--	--	--	School Courtyard - North
108	190661.2	1010652.4	9.2	6.4	8.2	--	**7.9**	--	--	--	--	--	School Courtyard - North
109	190636.9	1010633.4	7.3	5.1	8.8	--	**7.1**	--	--	--	--	--	School Courtyard - North
110	190617.9	1010654.5	8.5	8.3	6.0	--	**7.6**	--	--	--	--	--	School Courtyard - North
111	190598.1	1010684.5	6.6	7.3	7.1	--	**7.0**	--	--	--	--	--	School Courtyard - North
112	190594.6	1010664.7	8.1	9.1	7.4	--	**8.2**	--	--	--	--	--	School Courtyard - North
113	190603.8	1010649.1	8.5	8.2	8.3	--	**8.3**	--	--	--	--	--	School Courtyard - North
114	190617.7	1010623.2	7.0	7.1	8.1	--	**7.4**	--	--	--	--	--	School Courtyard - North

Table 10
Gamma Exposure Rate Locations and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Northing	Easting	3 Feet Above Ground Reading (µR/hr)					Ground Reading (µR/hr)					Comments
			1	2	3	4	Average	1	2	3	4	Average	
115	190525.6	1010552.1	5.8	5.7	8.1	--	**6.5**	--	--	--	--	--	School Courtyard - South
116	190500.6	1010582.7	7.5	6.2	7.1	--	**6.9**	--	--	--	--	--	School Courtyard - South
117	190471.9	1010570.8	7.2	5.9	9.0	--	**7.4**	--	--	--	--	--	School Courtyard - South
118	190487.7	1010550.3	9.0	9.3	9.9	--	**9.4**	--	--	--	--	--	School Courtyard - South
119	190505.3	1010523.9	5.7	8.3	10.1	--	**8.0**	--	--	--	--	--	School Courtyard - South
120	190474.6	1010519.1	7.5	8.3	5.9	--	**7.2**	--	--	--	--	--	School Courtyard - South
121	190453.0	1010549.2	8.6	7.7	8.4	--	**8.2**	--	--	--	--	--	School Courtyard - South
122	190439.9	1010630.6	8.3	9.5	11.6	--	**9.8**	--	--	--	--	--	School Kindergarten Play Area
123	190424.7	1010637.1	6.4	6.4	7.0	--	**6.6**	--	--	--	--	--	School Kindergarten Play Area
124	190416.6	1010594.5	10.3	7.8	9.9	--	**9.3**	--	--	--	--	--	School Kindergarten Play Area
125	190390.7	1010613.1	9.4	7.7	11.1	--	**9.4**	--	--	--	--	--	School Kindergarten Play Area
126	190498.4	1010460.9	6.6	7.0	9.3	--	**7.6**	--	--	--	--	--	School South Garden Area
127	190460.4	1010437.8	9.1	9.2	10.5	--	**9.6**	--	--	--	--	--	School South Garden Area
128	190436.0	1010456.5	10.3	8.8	9.0	--	**9.4**	--	--	--	--	--	School South Garden Area
129	190409.5	1010477.6	10.6	10.0	12.9	--	**11.2**	--	--	--	--	--	School South Garden Area
130	190401.9	1010506.9	10.6	9.1	10.3	--	**10.0**	--	--	--	--	--	School South Garden Area
131	190388.5	1010532.4	11.2	8.9	11.5	--	**10.5**	--	--	--	--	--	School South Garden Area
132	190370.2	1010557.6	9.2	8.1	8.8	--	**8.7**	--	--	--	--	--	School South Garden Area
133	190350.5	1010577.7	8.5	6.8	8.3	--	**7.9**	--	--	--	--	--	School South Garden Area
134	190376.4	1010594.4	8.4	10.5	10.2	--	**9.7**	--	--	--	--	--	School South Garden Area
135	190400.6	1010568.1	10.0	9.2	8.2	--	**9.1**	--	--	--	--	--	School South Garden Area
136	190793.5	1010691.0	6.2	7.9	6.6	--	**6.9**	--	--	--	--	--	School North Play Area
137	190776.6	1010713.6	7.5	7.7	12.1	--	**9.1**	--	--	--	--	--	School North Play Area
138	190756.8	1010738.0	6.7	8.5	6.9	--	**7.4**	--	--	--	--	--	School North Play Area
139	190737.4	1010761.9	7.1	7.6	8.0	--	**7.6**	--	--	--	--	--	School North Play Area
140	190712.6	1010790.9	7.6	5.9	5.1	--	**6.2**	--	--	--	--	--	School North Play Area
141	190695.8	1010817.3	10.1	9.6	6.4	--	**8.7**	--	--	--	--	--	School North Play Area
142	190723.8	1010830.4	6.1	8.7	6.5	--	**7.1**	--	--	--	--	--	School North Play Area
143	190741.9	1010808.1	7.2	6.5	6.6	--	**6.8**	--	--	--	--	--	School North Play Area
144	190760.4	1010785.0	6.8	5.8	6.5	--	**6.4**	--	--	--	--	--	School North Play Area
145	190778.6	1010760.4	8.0	6.7	7.7	--	**7.5**	--	--	--	--	--	School North Play Area
146	190798.4	1010733.7	9.4	5.9	7.4	--	**7.6**	--	--	--	--	--	School North Play Area
147	190815.9	1010711.0	7.6	7.5	8.4	--	**7.8**	--	--	--	--	--	School North Play Area
148	190843.8	1010734.4	7.3	9.6	8.6	--	**8.5**	--	--	--	--	--	School North Play Area
149	190822.8	1010758.7	7.9	11.5	6.5	--	**8.6**	--	--	--	--	--	School North Play Area
150	190805.6	1010784.8	6.4	7.3	7.9	--	**7.2**	--	--	--	--	--	School North Play Area
151	190786.3	1010808.9	7.1	9.7	8.7	--	**8.5**	--	--	--	--	--	School North Play Area

Table 10
Gamma Exposure Rate Locations and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Northing	Easting	3 Feet Above Ground Reading (μR/hr)					Ground Reading (μR/hr)					Comments
			1	2	3	4	Average	1	2	3	4	Average	
152	190767.2	1010833.0	8.8	9.2	6.5	--	**8.2**	--	--	--	--	--	School North Play Area
153	190749.6	1010861.9	8.5	9.1	7.3	--	**8.3**	--	--	--	--	--	School North Play Area
154	190765.8	1010871.8	8.1	6.2	7.6	--	**7.3**	--	--	--	--	--	School North Play Area
155	190791.8	1010849.6	7.6	7.6	7.9	--	**7.7**	--	--	--	--	--	School North Play Area
156	190811.6	1010824.9	8.3	6.4	9.1	--	**7.9**	--	--	--	--	--	School North Play Area
157	190833.1	1010798.0	7.6	6.3	6.9	--	**6.9**	--	--	--	--	--	School North Play Area
158	190852.9	1010773.3	8.1	7.1	8.5	--	**7.9**	--	--	--	--	--	School North Play Area
159	190870.5	1010753.7	6.6	8.1	8.5	--	**7.7**	--	--	--	--	--	School North Play Area
160	190898.6	1010777.6	8.6	6.0	7.2	--	**7.3**	--	--	--	--	--	School North Play Area
161	190879.6	1010796.2	8.4	9.3	7.5	--	**8.4**	--	--	--	--	--	School North Play Area
162	190859.5	1010821.1	7.3	7.6	7.9	--	**7.6**	--	--	--	--	--	School North Play Area
163	190839.3	1010848.3	7.5	7.3	7.0	--	**7.3**	--	--	--	--	--	School North Play Area
164	190818.6	1010873.8	9.0	6.5	7.3	--	**7.6**	--	--	--	--	--	School North Play Area
165	190798.6	1010893.4	7.8	7.9	7.7	--	**7.8**	--	--	--	--	--	School North Play Area
166	190845.1	1010887.5	6.6	11.4	7.8	--	**8.6**	--	--	--	--	--	School North Play Area
167	190867.8	1010863.8	6.9	11.6	9.9	--	**9.5**	--	--	--	--	--	School North Play Area
168	190886.7	1010836.8	9.4	6.6	7.4	--	**7.8**	--	--	--	--	--	School North Play Area
169	190903.9	1010810.0	7.0	6.8	6.3	--	**6.7**	--	--	--	--	--	School North Play Area
170	190921.7	1010789.9	9.6	9.8	7.2	--	**8.9**	--	--	--	--	--	School North Play Area
171	190836.6	1010921.5	12.2	11.3	9.6		**11.0**	--	--	--	--	--	School North Play Area
99	Daycare	Basement	13.6	13.1	13.8	12.1	**13.2**	--	--	--	--	--	Storage Room
100	Daycare	Basement	13.5	14.5	10.4	14.9	**13.3**	--	--	--	--	--	Storage Room
101	Daycare	Basement	11.7	11.9	10.5	14.7	**12.2**	--	--	--	--	--	Men's Restroom
102	Daycare	Basement	10.9	11.7	12.6	10.4	**11.4**	--	--	--	--	--	Women's Restroom
103	Daycare	Basement	10.2	12.8	8.7	8.9	**10.2**	--	--	--	--	--	Boiler Room
104	Daycare	Basement	12.1	11.7	12.2	12.5	**12.1**	--	--	--	--	--	Storage Room
105	Daycare	Basement	11.6	16.4	11.2	12.3	**12.9**	--	--	--	--	--	Storage Room
106	Daycare	Basement	9.4	10.9	14.2	11.6	**11.5**	--	--	--	--	--	Hallway
172	190447.4	1010763.9	8.1	8.6	11.3	8.5	**9.1**	--	--	--	--	--	Daycare Exterior Play Area
173	190422.3	1010743.6	7.7	11.8	9.5	8.7	**9.4**	--	--	--	--	--	Daycare Exterior Play Area
174	190396.0	1010723.3	12.3	12.3	9.8	12.6	**11.8**	--	--	--	--	--	Daycare Exterior Play Area
175	190377.4	1010736.8	10.1	10.3	11.3	9.2	**10.2**	--	--	--	--	--	Daycare Exterior Play Area
176	190397.2	1010752.1	9.5	10.0	10.2	9.1	**9.7**	--	--	--	--	--	Daycare Exterior Play Area
177	190418.0	1010767.6	13.2	11.1	11.1	10.8	**11.6**	--	--	--	--	--	Daycare Exterior Play Area
178	190440.3	1010782.9	9.1	9.8	14.6	12.9	**11.6**	--	--	--	--	--	Daycare Exterior Play Area
179	190428.0	1010799.4	6.1	8.1	10.2	7.8	**8.1**	--	--	--	--	--	Daycare Exterior Play Area
180	190407.2	1010784.6	8.9	8.6	8.3	9.9	**8.9**	--	--	--	--	--	Daycare Exterior Play Area

Table 10
Gamma Exposure Rate Locations and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Northing	Easting	3 Feet Above Ground Reading (µR/hr)					Ground Reading (µR/hr)					Comments
			1	2	3	4	Average	1	2	3	4	Average	
181	190390.8	1010774.6	11.5	7.4	10.5	13.0	**10.6**	--	--	--	--	--	Daycare Exterior Play Area
182	190370.4	1010760.8	10.2	11.2	10.2	9.0	**10.2**	--	--	--	--	--	Daycare Exterior Play Area
183	190354.8	1010778.4	10.4	9.5	10.0	7.6	**9.4**	--	--	--	--	--	Daycare Exterior Play Area
184	190380.3	1010799.6	9.6	10.0	10.3	12.7	**10.7**	--	--	--	--	--	Daycare Exterior Play Area
185	190405.2	1010820.5	9.6	8.6	10.9	11.2	**10.1**	--	--	--	--	--	Daycare Exterior Play Area

Notes:

µR/hr - microRem per hour

-- - data was not collected

Table 11
Short-term Radon Sample Location and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Canister Number	First Floor Room No.	Start Date	Start Time	End Date	End Time	Radon Results (pCi/L)	Error (pCi/L)	Comments
Audrey Johnson Daycare Center								
2425085	6	10/9/2015	15:35	10/13/2015	6:46	0.4	± 0.2	
2425088	7	10/9/2015	15:36	10/13/2015	6:45	0.4	± 0.2	
2425093	5	10/9/2015	15:40	10/13/2015	6:48	0.3	± 0.2	
2425126	Teachers Ed.	10/9/2015	15:40	10/13/2015	6:52	0.4	± 0.2	
2425141	Mult. Purp. Room	10/9/2015	15:39	10/13/2015	6:47	0.2	± 0.2	
2425147	Mult. Purp. Room	10/9/2015	15:39	10/13/2015	6:47	0.3	± 0.2	Field Duplicate
2425153	8	10/9/2015	15:42	10/13/2015	6:49	0.4	± 0.2	
2425172	Asst. Dir. Office	10/9/2015	15:53	10/13/2015	6:50	0.2	± 0.2	
2425178	3	10/9/2015	15:45	10/13/2015	6:59	0.5	± 0.2	
2425180	3	10/9/2015	15:45	10/13/2015	6:59	0.3	± 0.2	Field Duplicate
2425182	4	10/9/2015	15:50	10/13/2015	6:58	0.7	± 0.2	
2425990	Play Room #2	10/9/2015	15:47	10/13/2015	6:57	0.5	± 0.2	
2426000	9	10/9/2015	15:49	10/13/2015	6:57	0.6	± 0.2	
2426018	2	10/9/2015	15:44	10/13/2015	6:56	0.4	± 0.2	
2426020	Board of Dir.	10/9/2015	15:45	10/13/2015	6:54	0.4	± 0.2	
2426022	1	10/9/2015	15:46	10/13/2015	6:55	0.5	± 0.2	
2426028	Comp. Library	10/9/2015	15:51	10/13/2015	7:00	0.4	± 0.2	
PS/IS 384 - Frances E. Carter School								
2425079	126	10/9/2015	19:29	10/12/2015	18:56	0.1	± 0.3	
2425080	101B	10/9/2015	19:38	10/12/2015	18:17	0.1	± 0.8	
2425086	165	10/9/2015	19:13	10/12/2015	18:31	0.2	± 0.2	
2425091	116B	10/9/2015	19:30	10/12/2015	18:35	0.1	± 0.2	
2425092	161	10/9/2015	19:10	10/12/2015	18:29	0.2	± 0.2	
2425103	121	10/9/2015	19:18	10/12/2015	18:41	0.2	± 0.2	
2425121	102	10/9/2015	19:09	10/12/2015	18:26	0.2	± 0.3	

Table 11
Short-term Radon Sample Location and Results Summary
Wolff-Alport Chemical Company Site
Ridgewood, NY

Canister Number	First Floor Room No.	Start Date	Start Time	End Date	End Time	Radon Results (pCi/L)	Error (pCi/L)	Comments
2425122	130	10/9/2015	19:12	10/12/2015	18:52	0.1	± 0.2	Location A
2425155	130	10/9/2015	19:12	10/12/2015	18:52	0.1	± 0.2	Field Duplicate of 2425122
2425127	169	10/9/2015	19:16	10/12/2015	18:32	0.3	± 0.3	
2425139	101C	10/9/2015	19:38	10/12/2015	18:18	0.3	± 0.3	
2425145	112A	10/9/2015	19:25	10/12/2015	18:46	0.2	0.3	
2425148	167	10/9/2015	19:15	10/12/2015	18:31	0.1	± 0.6	
2426023	167	10/9/2015	19:15	10/12/2015	18:31	0.2	± 0.3	Field Duplicate of 2425148
2425150	115	10/9/2015	19:17	10/12/2015	18:33	0.1	± 0.2	
2425151	114	10/9/2015	19:31	10/12/2015	18:45	0.1	± 0.5	
2425152	157	10/9/2015	19:07	10/12/2015	18:25	0.3	± 0.2	
2425154	149	10/9/2015	19:40	10/12/2015	18:14	0.1	± 0.2	
2425156	130	10/9/2015	19:30	10/12/2015	18:53	0.1	± 0.5	Location B
2425160	122	10/9/2015	19:21	10/12/2015	18:40	0.1	± 0.2	
2425165	123	10/9/2015	19:20	10/12/2015	18:43	0.1	± 0.4	
2425176	119	10/9/2015	19:30	10/12/2015	18:37	0.3	± 0.3	
2425177	101A	10/9/2015	19:38	10/12/2015	18:16	0.1	± 0.6	
2425986	150	10/9/2015	19:13	10/12/2015	18:23	0.4	± 0.3	
2425992	103	10/9/2015	19:37	10/12/2015	18:19	0.1	± 0.4	
2425995	112B	10/9/2015	19:35	10/12/2015	18:46	0.1	± 0.5	
2425998	111	10/9/2015	19:32	10/12/2015	18:50	0.1	± 0.5	
2426003	130	10/9/2015	19:35	10/12/2015	18:54	0.1	± 0.6	Blank
2426010	105	10/9/2015	19:37	10/12/2015	18:20	0.2	± 0.2	
2426012	163	10/9/2015	19:11	10/12/2015	18:30	0.3	± 0.3	
2426025	101	10/9/2015	19:06	10/12/2015	18:24	0.3	± 0.3	
2426029	104	10/9/2015	19:36	10/12/2015	18:21	0.1	± 0.6	

Acronyms:

pCi/L - picocuries per liter

Table 12
Six Month Radon and Thoron Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Detector Number	Detector Type	Room Number	Description of Sample Location	Sample Type	Lab Reported Radon Concentration (pCi/L)		Calculated Thoron Concentration (pCi/L)	
					Results	Uncertainty (±1S)	Results	Uncertainty (±1S)
5510784	DRNT	B-Hallway	School basement hallway	N	**1.3**	0.07	-0.2	0.10
5506549	DRN				1.1	0.07		
5510783	DRNT	B-Hallway	School basement hallway	FD	1.2	0.07	0.2	0.10
5506526	DRN				**1.4**	0.07		
5508077	DRNT	B-7	School basement room B-7	N	**1.3**	0.07	-0.1	0.10
5510264	DRN				1.2	0.07		
5508096	DRNT	105	School first floor room 105	N	0.2	0.02	0	0.03
5506582	DRN				0.2	0.02		
5508090	DRNT	101A	School first floor room 101A	N	0.2	0.02	0	0.03
5510266	DRN				0.2	0.02		
5510780	DRNT	169	School first floor room 169	N	0.2	0.02	0.1	0.04
5510265	DRN				0.3	0.03		

Notes:

DRN - standard radon detector

DRNT - radon detector fitted with thoron filter

N - normal sample

FD - field duplicate

pCi/L - picoCuries per liter

1S - one standard deviation

Thoron Results = DRN - DRNT

Thoron Uncertainty = Square Root ((DRN)^2 + (DRNT)^2)

Highlighted cell and bold format indicates concentration exceeds the screening criteria.

Table 13
One Year Radon and Thoron Results
Wolff-Alport Chemical Company Site
Ridgewood, NY

Detector Number	Detector Type	Room Number	Description of Sample Location	Sample Type	Lab Reported Radon Concentration (pCi/L)		Calculated Thoron Concentration (pCi/L)	
					Results	Uncertainty (±1S)	Results	Uncertainty (±1S)
5508081	DRNT	B-Hallway	School basement hallway	N	1	0.05	0	0.07
5506548	DRN				1	0.05		
5508079	DRNT	B-Hallway	School basement hallway	FD	1	0.04	-0.2	0.06
5506556	DRN				0.8	0.04		
5508083	DRNT	B-7	School basement room B-7	N	1.2	0.05	-0.1	0.07
5510268	DRN				1.1	0.05		
5508084	DRNT	105	School first floor room 105	N	0.1	0.01	0	0.01
5506564	DRN				0.1	0.01		
5508069	DRNT	101A	School first floor room 101A	N	0.1	0.01	0	0.01
5506571	DRN				0.1	0.01		
5510782	DRNT	169	School first floor room 169	N	0.1	0.01	0.1	0.01
5510267	DRN				0.2	0.01		

Notes:

DRN - standard radon detector

DRNT - radon detector fitted with thoron filter

N - normal sample

FD - field duplicate

pCi/L - picoCuries per liter

1S - one standard deviation

Thoron Results = DRN - DRNT

Thoron Uncertainty = Square Root ((DRN)^2 + (DRNT)^2)

Table 14
Radon and Thoron Measurements - 2017
Wolff-Alport Chemical Company Site
Ridgewood, NY

Location	Radon (pCi/L)	Thoron (pCi/L)	Test Duration (minutes)
School Basement/Crawlspace			
Crawlspace Ambient Air	0.659 ± 0.09	0.659 ± 0.1.3	16
SCSB-11	3.41 ± 1.8	0.00 ± 0.0	33
SCSB-12	1.30 ± 0.6	0.157 ± 0.31	93
SCSB-13	2.99 ± 1.8	0.282 ± 1.6	33
SCSB-14	10.9 ± 3.0	3.19 ± 2.8	35
SCSB-15	1.30 ± 1.3	1.62 ± 2.2	33
Daycare Basement			
SCSB-16	0.394 ± 1	3.56 ± 2.9	34
SCSB-17	0.646 ± 1.0	3.22 ± 2.8	32
Daycare - Thoron Test Mode		0.236 ± 0.036	5 days, 3 hours, 49 minutes
Daycare - Radon Test Mode	0.265 ± 0.023		6 days, 15 hours, 54 minutes

Notes:

The radon test mode is not optimized for thoron which requires a Drystik lab drying unit to keep the humidity from the larger amount of air pulled into the detector during thoron test mode from overwhelming the limited capacity of the dessicant in the Durridge RAD-7. As such, the thoron results are not presented for equipment in radon test mode and the radon results are not presented equipment in thoron test mode.

TABLE 15
SUMMARY OF CANCER RISK AND NONCANCER HEALTH HAZARD
S Former Wolff-Alport Chemical Company Site
Ridgewood, Queens, County, New York

Time Frame	Receptor	Exposure Medium		Cancer Risk [1]				Noncancer Hazard Index [2]			
				RME	Risk Driver	CTE	Risk Driver	RME	Organ/Effect (Risk Driver)	CTE	Organ/Effect (Risk Driver)
Current	Commercial Indoor Worker	Soil	Radionuclide	**1E-03**	Th-232, total risk, non-radon related	--	--	--	--	--	--
				2E-03	Ra-226, Radon Related Risk						
			Total	**3E-03**							
	Industrial Worker	Soil	Radionuclide	**3E-03**	Th-232, total risk is non-radon related	--	--	--	--	--	--
				2E-03	Ra-226, Radon Related Risk						
			Total	**5E-03**							
Future	Commercial Indoor Worker	Soil	Radionuclide	**1E-03**	Th-232, total risk is non-radon related	--	--	--	--	--	--
				2E-03	Ra-226, Radon Related Risk						
		Groundwater	Chemical	**1E-04**	PCE (2×10^{-5}), chromium (2×10^{-5})	--	--	**3**	Liver (PCE HI=2)	--	--
			Radionuclide	--	Potassium-40 (breakthrough at 600 yr)- naturally occurring	--	--	**--**	--	--	--
			Total	**4E-03**				**3**			
	Industrial Worker	Soil	Chemical	**1E-04**	Aroclor 1260 (9×10^{-5})	3E-05	--	**6**	Eye / Finger Nail / Immune System (Aroclor 1260)	4	Eye / Finger Nail / Immune System (Aroclor 1260)
			Radionuclide	**3E-03**	Th-232, total risk, non-radon related	--	--	--	--	--	--
				3E-03	Ra-226, Radon Related Risk						
			Total	**6E-03**		3E-05		**6**		**4**	

TABLE 15
SUMMARY OF CANCER RISK AND NONCANCER HEALTH HAZARDS

Former Wolff-Alport Chemical Company Site
Ridgewood, Queens, County, New York

Time Frame	Receptor	Exposure Medium		Cancer Risk [1]				Noncancer Hazard Index [2]			
				RME	**Risk Driver**	**CTE**	**Risk Driver**	**RME**	**Organ/Effect (Risk Driver)**	**CTE**	**Organ/Effect (Risk Driver)**
Future	Resident [3]	Soil	Chemical	**9E-04**	benzo(a)pyrene (4×10^{-4}), aroclor 1260 (2×10^{-4})	**3E-04**	benzo(a)pyrene (2×10^{-4}), aroclor 1260 (8×10^{-5})	**55**	Eye / Finger Nail / Immune System (Aroclor 1260)	**23**	Eye / Finger Nail / Immune System (Aroclor 1260)
			Radionuclide	**5E-03**	Th-232, total risk, non-radon related	--	--	--	--	--	--
				8E-03	Ra-226, Radon Related Risk						
				1E-02	Th-232,Consumption of produce	--	--				
		Groundwater	Chemical	**3E-04**	chromium [4] (2×10^{-4})	9E-05	--	**15**	Liver (PCE HI=11), Kidney (TCE HI=2)	**8**	Liver (PCE HI=6), Kidney (TCE HI=1)
			Radionuclide	--	Potassium-40 (breakthrough at 600 yr)- naturally occurring	--	--	--	--	--	--
		Total		**3E-02**		**4E-04**		**69**		**31**	
	Construction/Utility Worker	Soil	Chemical	2E-06	Aroclor 1260 (1×10^{-6})	--	--	**2**	Eye / Finger Nail / Immune System (Aroclor 1260)	--	--
			Radionuclide	5E-05	Th-232	--	--	--	--	--	--
		Sewer Sediment	Radionuclide	**2E-04**	Th-232	--	--	--	--	--	--
		Total		**2E-04**		--		**2**		--	

FWACC = Former Wolff-Alport Chemical Company
RME = reasonable maximum exposure
CTE = central tendency exposure
PCE = tetrachloroethene
TCE = trichloroethene
Th-232 = thorium-232
-- = Not Evaluated
[1] Bolded values exceed EPA's target range of $1x10^{-6}$ to $1x10^{-4}$
[2] Bolded values exceed EPA's threshold of unity (1)
[3]Cancer risk is based on age-adjusted scenario and noncancer hazard index is based on child exposure scenario
[4] Cancer risk is based on the assumption that a fraction of the total chromium measured in groundwater is hexavalent chromium. See uncertainty discussion.

Table 16
Summary of Chemicals of Concern (COCs) and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
surface soil	benzo(a)pyrene	9J	10,000J	ug/kg	19/19	6200	ug/kg	99% UCL
	Aroclor-1260	3.6J	100,000J+	ug/kg	16/19	58,042	ug/kg	99% UCL
	selenium	0.5J	1100	mg/kg	13/19	644	mg/kg	99% UCL

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
surface/subsurface soil	Aroclor-1260	3.6J	100,000J+	ug/kg	18/30	24,530	ug/kg	97.5% UCL

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
tap water	chromium	0.0038J	0.14	mg/L	10/10	0.01	mg/L	95% UCL
	tetrachloroethylene	150	930	ug/L	10/10	548	ug/L	95% UCL
	trichloroethylene	1.9	7.7J	ug/L	10/10	5.477	ug/L	95% UCL

Table 16
Summary of Radionuclides of Concern (ROCs) and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
surface soil	Thorium-232	0.66J	221.8	pCi/g	37/37	53	pCi/g	95% UCL

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
surface/subsurface soil (external radiation)	Radium-226+D	0.206	57.11	pCi/g	64/65	6.3	pCi/g	95% UCL
	Radium-228+D	0.292J	505.2	pCi/g	62/65	53	pCi/g	95% UCL
	Thorium-232	0.292J	505.2	pCi/g	62/65	53	pCi/g	95% UCL

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sewer Sediment

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
sewer sediment	Radium-226	0.27	27.4	pCi/g	7/7	27.4	pCi/g	MAX
	Thorium-232	1.92	1460	pCi/g	7/7	1460	pCi/g	MAX

Notes
Exposure to indoor air radon resulted in an unacceptable risk. Modeled radon concentrations were estimated from soil concentrations. Radon samples were property-specific.
Ingestion of homegrown produce also resulted in unacceptable risk. Plant uptake to evaluate this pathway was estimated from soil and irrigation water concentrations.

Key
ug/kg = microgram per kilogram
mg/kg = milligram per kilogram
mg/L = milligram per liter
ug/L = microgram per liter
pCi/g = picoCurie per gram

Table 17
Selection of 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 Pathway
Current	Soil	Surface Soil	Surface Soil	Commercial Indoor Worker	Adult	Dermal	NE	Currently the majority of the FWACC is covered by buildings, cement, or asphalt. Commercial indoor workers are not expected to contact contaminants in surface soil; therefore, these pathways are considered incomplete and not evaluated
						Ingestion	NE	
			Particulates in Ambient Air			Inhalation	NE	
		Surface/ Subsurface Soil	Surface/ Subsurface Soil			External Radiation	Quant	Indoor workers(e.g., deli workers) may be exposed to ionizing radiation while at work
		Air	Indoor Air			Inhalation	Quant	Indoor workers (e.g., deli workers) may inhale radon and thoron (1) while at work
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Commercial indoor workers may be exposed to ionizing radiation from outdoor surfaces while at work. Surfaces include sidewalks, streets, and buildings.
	Interior Building Surfaces	Air	Indoor Air			External Radiation	Qual	Indoor workers may be exposed to ionizing radiation from building materials while at work
	Groundwater	Indoor Air	Indoor Air			Inhalation	Qual	Workers may be exposed to contaminants in indoor air via vapor intrusion from groundwater. Groundwater concentrations are screened against EPA Vapor Intrusion Screening Levels in the risk assessment.
Current	Soil	Surface Soil	Surface Soil	Industrial Worker	Adult	Dermal	NE	Currently the majority of the FWACC is covered by buildings, cement, or asphalt. Current industrial workers are not expected to contact contaminants in surface soil in most areas; therefore, these pathways are considered incomplete and not evaluated.
						Ingestion	NE	
			Particulates in Ambient Air			Inhalation	NE	
			Surface Soil, Former Rail Road Spur			External Radiation	Quant	Although uses of this area change rather frequently, the former rail spur area is currently used for parking vehicles. Because the area is covered with 1 foot of gravel in areas, industrial workers (e.g., auto body workers) are not expected to be significantly exposed to ionizing radiation in shielded areas or to chemical contamination in surface soil during their brief activities in the abandoned rail area. However external radiation is evaluated.
		Surface/ Subsurface Soil	Surface/ Subsurface Soil			External Radiation	Quant	Workers may be exposed to ionizing radiation while at work in areas where there is limited shielding both indoors and outdoors.
		Air	Indoor Air			Inhalation	Quant	Workers may inhale radon and thoron (1) while at work.
	Interior Building Surfaces	Air	Air			External Radiation	Qual	Industrial workers may be exposed to ionizing radiation from building materials while at work.
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Industrial workers may be exposed to ionizing radiation from outdoor surfaces while at work. Surfaces include sidewalks, streets, and buildings.
	Groundwater	Indoor Air	Indoor Air			Inhalation	Qual	Workers may be exposed to contaminants in indoor air via vapor intrusion from groundwater. Groundwater concentrations are screened against EPA Vapor Intrusion Screening Levels in the risk assessment.
Current	Soil	Surface Soil	Surface Soil, Former Rail Road Spur	Trespasser	Adult/Adolescent	Dermal	NE	Although the abandoned rail spur area has been used by people for camping in the past, trespassing in this area is not expected to occur on a frequent basis, currently or in the future. The area is fenced and locked and covered with one foot of gravel in some areas. Therefore, possible exposure to site contaminants while trespassing is considered insignificant; however, exposure to ionizing radiation is evaluated qualitatively by comparison with exposures to workers who use the area.
						Ingestion	NE	
						Inhalation	NE	
			Surface/ Subsurface Soil			External Radiation	Qual	
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Exposure to ionizing radiation from outdoor surfaces is evaluated qualitatively by comparison with exposures to workers who use the area.

Table 17
Selection of 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 Pathway
Current	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Public	Adult/Child	External Radiation	Qual	The public may be exposed to ionizing radiation while at the site or in the vicinity of the site. The general public includes people who may pass through the site on a frequent basis (e.g. pedestrians, bicyclists, commuters, etc.) or live or work near the site.
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	The general public may be exposed to ionizing radiation while in the neighborhood. Due to the uncertainty associated with exposure times, these receptors are evaluated qualitatively. Surfaces include sidewalks, streets, buildings
	Interior Building Surfaces	Air	Air			External Radiation	Qual	The general public may be exposed to ionizing radiation when at onsite businesses. Due to the uncertainty associated with exposure times, these receptors are evaluated qualitatively.
Current	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Off Property Receptors	Adult/Child	External Radiation	Qual	Nearby residents and workers may be exposed to ionizing radiation
		Air	Indoor Air			Inhalation	Qual	Nearby residents and workers may inhale radon or thoron [(1)]
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Nearby offsite receptors (residents and workers may be exposed to ionizing radiation.)
	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil		Offsite School Children	External Radiation	Qual	School children may be exposed to ionizing radiation while attending school near the site; however, exposure is likely at background levels.
		Air	Indoor Air			Inhalation	Qual	School children may be inhale radon or thoron while at school near the site
Future	Soil	Surface Soil	Surface Soil	Resident	Adult and Child (birth to <6 yrs)	Dermal	Quant	If the site is redeveloped for noncommercial/industrial purposes future residents may come into contact with contaminants in surface soil and/or inhale fugitive dust and volatile chemicals and/or radionuclides while at their residence. Exposure to residents can generally be assumed to be protective of other receptors (e.g., trespassers).
						Inhalation	Quant	
		Surface/ Subsurface Soil	Indoor Air			Inhalation	Quant	Future residents may inhale radon or thoron [(1)] in their residence.
		Air	Air			External Radiation	Quant	Residents may be exposed to ionizing radiation while at their residence or in the neighborhood.
		Homegrown Produce	Homegrown Produce			Ingestion	Quant	Residents may be exposed to radionuclides via ingestion of homegrown produce, assuming fruits and vegetables are grown in contaminated soil. This pathway is evaluated quantitatively although it is unlikely residents could grow a substantial portion of their diet in gardens in this densely populated urban area.
	Interior Building Surfaces	Air	Indoor Air			External Radiation	Qual	Residents may be exposed to ionizing radiation from building materials assuming residents utilize current construction.
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Residents may be exposed to ionizing radiation from outdoor hard
	Groundwater	Groundwater	Tap water			Dermal	Quant	Residents who use groundwater for domestic purposes may ingest and contact contaminants in groundwater. Residents may also inhale volatiles during groundwater use (e.g., bathing, showering). However, future use of shallow groundwater as drinking water is unlikely in this area.
						Ingestion	Quant	
						Inhalation	Quant	
			Indoor Air			Inhalation	Qual	Residents may be exposed to contaminants in indoor air via vapor intrusion pathway from groundwater. Maximum detected concentrations of volatile organic chemicals are screened against the EPA Vapor Intrusion Screening Levels in the risk assessment.
Future	Soil	Surface Soil	Surface Soil	Commercial Indoor Worker	Adult	Dermal	NE	Commercial indoor workers are not expected to spend a significant time outdoors; therefore, these pathways considered insignificant and not evaluated.
						Ingestion	NE	
			Particulates in Ambient Air			Inhalation	NE	
		Surface/ Subsurface Soil	Surface/ Subsurface Soil			External Radiation	Quant	Indoor workers may be exposed to ionizing radiation while at work
			Indoor Air			Inhalation	Quant	Indoor workers may inhale radon and thoron [(1)] while at work
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Commercial workers may be exposed to ionizing radiation from outdoor hard surfaces while at work.
	Interior Building Surfaces	Air	Indoor Air			External Radiation	Qual	Indoor workers may be exposed to ionizing radiation from building
	Groundwater	Groundwater	Tap water			Dermal	Quant	Workers who use groundwater for drinking water may ingest contaminants in groundwater. Workers may also contact contaminants and inhale volatiles during hand washing.
						Ingestion	Quant	
						Inhalation	Quant	
		Indoor Air	Indoor Air			Inhalation	Qual	Commercial Indoor Workers may be exposed to contaminants in indoor air via vapor intrusion pathway from groundwater. Groundwater concentrations are screened against the EPA Vapor Intrusion Screening Levels in the risk assessment.

Table 17
Selection of 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 Pathway
Future	Soil	Surface Soil	Surface Soil	Industrial Worker	Adult	Dermal	Quant	If the site is redeveloped for future industrial purposes, future industrial workers may come into contact with contaminants in surface soil and/or inhale fugitive dust and volatile chemicals and/or radionuclides while at work.
						Ingestion	Quant	
						Inhalation	Quant	
		Surface/ Subsurface Soil	Surface/ Subsurface Soil			External Radiation	Quant	Workers may be exposed to ionizing radiation while at work
			Indoor Air			Inhalation	Quant	Workers may inhale radon and thoron [1] while indoors at work
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Industrial workers may be exposed to ionizing radiation from outdoor hard surfaces (e.g., sidewalks, roadways, building surfaces) while at work.
	Interior Building Surfaces	Air	Indoor Air			External Radiation	Qual	Industrial workers may be exposed to ionizing radiation from interior building materials while at work.
	Groundwater	Indoor Air	Indoor Air			Inhalation	Qual	Industrial Workers may be exposed to contaminants in indoor air via vapor intrusion pathway from groundwater. Groundwater concentrations are screened against the EPA Vapor Intrusion Screening Levels in the risk assessment.
Future	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Construction / Utility Worker	Adult	Dermal	Quant	Future utility/construction workers may come into contact with contaminants in surface soil and subsurface soil and/or inhale fugitive dust and volatile chemicals during various activities at work.
						Ingestion	Quant	
						Inhalation	Quant	
		Air	Air			External Radiation	Qual	Utility workers may be exposed to ionizing radiation while at work.
	Groundwater	Groundwater	Groundwater			Direct Contact and Inhalation	NE	Due to the depth to groundwater, construction/utility workers are not
	Sediment	Sediment	Sediment in Sewers			Ingestion	Quant	Utility workers or construction workers may be exposed to radionuclides present in sewer sediment. Workers may be exposed to ionizing radiation while at work, and incidentally ingest sediment.
						External Radiation	Quant	
						Inhalation	Quant	Inhalation of ambient air
						Dermal	NE	Dermal contact to radionuclides is not evaluated
Future	Soil	Soil	Surface Soil	Trespasser	Adult/Child	Dermal	Qual	Trespassing is not expected to occur on a frequent basis; therefore; possible exposure to site contaminants while trespassing is considered insignificant. However, exposures to trespassers are evaluated qualitatively by comparison to onsite industrial workers.
						Ingestion	Qual	
						Inhalation	Qual	
			Surface/ Subsurface Soil			External Radiation	Qual	
Future	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Public	Adult/Child	Dermal	Qual	If the site is redeveloped exposing soil, the public may come into contact with contaminants in surface soil and/or inhale fugitive dust and volatile chemicals while at the site; these pathways are evaluated qualitatively. The general public includes people who may pass through the site on a frequent basis (e.g. pedestrians, bicyclists, commuters, etc.) or live or work near the site.
						Ingestion	Qual	
						Inhalation	Qual	
						External Radiation	Qual	The public may be exposed to ionizing radiation while at the site or in the vicinity of the site.
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	The general public may be exposed to ionizing radiation while in the neighborhood. Due to the uncertainty associated with exposure times, these receptors are evaluated qualitatively. Surfaces include sidewalks, streets, buildings
	Interior Building Surfaces	Air	Indoor Air			External Radiation	Qual	The general public may be exposed to ionizing radiation when at onsite businesses. Due to the uncertainty associated with exposure times, these receptors are evaluated qualitatively.
Future	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Off Property Receptors	Adult/Child	External Radiation	Qual	Nearby residents and workers may be exposed to ionizing radiation
		Air	Indoor Air			Inhalation	Qual	Nearby residents and workers may inhale radon or thoron [1]
	Outdoor Hard Surfaces	Air	Air			External Radiation	Qual	Nearby offsite receptors (residents and workers) may be exposed to ionizing radiation.
	Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil		Offsite School Children	External Radiation	Qual	School children may be exposed to ionizing radiation while attending school near the site; however, exposure is likely at background levels.
		Air	Indoor Air			Inhalation	Qual	School children may be inhale radon or thoron [2] while at school near the site

Notes:
[1] Concentrations of daughter products from primary radionuclides are estimated in RESRAD software, developed by Argonne National Laboratory [ANL 2016]
Quant = Quantitative risk analysis performed
Qual = Qualitative risk analysis performed
NE = Not evaluated

Table 18
Non-Cancer Toxicity Data Summary

Pathway: Ingestion/Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorp. Efficiency (Dermal)	Adjusted RfD (Dermal)	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD
Aroclor 1260 (1)	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	Eye/Finger Nail/Immune System	(1)	(1)	(1)
selenium	Chronic	NA	NA	1	-	-	CNS, Blood, Skin	3	IRIS	9/9/2016
tetrachloroethene	Chronic	6.0E-03	mg/kg-day	1	6.0E-03	mg/kg-day	Liver	1,000	IRIS	9/9/2016

Pathway: Inhalation

Chemicals of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Inhalation RfD (If available)	Inhalation RfD Units (If available)	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfC
tetrachloroethene	Chronic	NA	mg/m^3	Liver	-	-	1,000	IRIS	9/9/2016
trichloroethene	Chronic	0.002	mg/m^3	Heart / Immunological	-	-	10 to 100	IRIS	9/9/2016

Key
- : no available data
(1) based on Aroclor 1254

Table 19
Cancer Toxicity Data Summary (COCs)

Pathway: Ingestion/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline	Source	Date
benzo(a)pyrene	7.3	(mg/kg-day)-1	7.3	(mg/kg-day)-1	B2	IRIS	9/9/2016
Aroclor-1260	2	(mg/kg-day)-1	2	(mg/kg-day)-1	B2	IRIS	9/9/2016
chromium(1)	5.0E-01	(mg/kg-day)-1	0.0125	(mg/kg-day)-1	likely to be carcinogenic to humans	NJDEP	4/8/2009

Table 19
Cancer Toxicity Data Summary (ROCs)

Pathway: Ingestion/ Dermal

Radionuclide of Concern(2)	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal) (3)	Slope Factor Units	WHO IARC Cancer Classification Evidence/ Cancer Guideline	Source	Date
thorium-232	1.33E-10	1/pCI/g	-	-	Group 1	IARC	9/19/2017

Pathway: Inhalation (radon)

Radionuclide of Concern(2)	Unit Risk	Units	Inhalation Cancer Slope Factor	Slope Factor Units	WHO IARC Cancer Classification Evidence/ Cancer Guideline	Source	Date
radium-226+D (radon-222 indoor)	-	-	388	1/pCI/g	Group 1	IARC	9/19/2017

Pathway: External Radiation

Radionuclide of Concern(2)	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal) (3)	Slope Factor Units	WHO IARC Cancer Classification Evidence/ Cancer Guideline	Source	Date
radium-226+D	8.37E-06	1/yr per (pCI/g)	-	-	Group 1	IARC	9/19/2017
radium-228+D	4.04E-06	1/yr per (pCI/g)	-	-	Group 1	IARC	9/19/2017
thorium-232	3.58E-10	1/yr per (pCI/g)	-	-	Group 1	IARC	9/19/2017

Pathway: Food ingestion (homegrown produce)

Radionuclide of Concern(2)	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal) (3)	Slope Factor Units	WHO IARC Cancer Classification Evidence/ Cancer Guideline	Source	Date
potassium-40	3.42E-11	1/pCI/g	-	-	-	-	-
lead-210+D	3.44E-09	1/pCI/g	-	-	-	-	-
radium-226+D	5.15E-10	1/pCI/g	-	-	Group 1	IARC	9/19/2017
radium-228+D	1.43E-09	1/pCI/g	-	-	Group 1	IARC	9/19/2017
thorium-232	1.33E-10	1/pCI/g	-	-	Group 1	IARC	9/19/2017

Pathway: External Radiation (Sewer Sediment)

Radionuclide of Concern(2)	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal) (3)	Slope Factor Units	WHO IARC Cancer Classification Evidence/ Cancer Guideline	Source	Date
radium-226+D					Group 1	IARC	9/19/2017
radium-228+D					Group 1	IARC	9/19/2017

Note:
For radionuclides, slope factors and intakes vary over time and additional fate and transport factors are included in the risk estimate, so that the intake times the slope factor does not equal the risk

Key
- : no available data
IRIS: Integrated Risk Information System
NJDEP: New Jersey Department of Environmental Protection
WHO IARC: World Health Organization, International Agency for Research on Cancer

(1) based on chromium (VI)
(2) Cancer toxicity and risk for radionuclides was evaluated using RESRAD software developed by Argonne National Laboratory [ANL 2016]
(3) There are no dermal slope factors, thus RESRAD does not include a dermal component

Weight of Evidence definitions:

A: Human carcinogen
B1: Probable human carcinogen - Indicates that limited human data are available
B2: Probable human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans
C: Possible human carcinogen
D: Not classifiable as a human carcinogen
E: Evidence of noncarcinogenicity

Table 20
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
soil	surface soil	surface soil	Aroclor-1260	Eye/Finger Nail/Immune System	4E+01	1E+01	-	5E+01
			selenium	CNS, Blood, Skin	2E+00	-	2E-04	2E+00

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
groundwater	groundwater	tap water	tetrachlorethene	Liver	5E+00	2E+00	5E+00	1E+01
			trichloroethene	Heart / Immunological	5E-01	6E-02	1E+00	2E+00

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
surface soil	surface soils	site soil	Aroclor-1260	Eye/Finger Nail/Immune System	2E+00	4E+00	-	6E+00

Scenario Timeframe: Future
Receptor Population: Commercial/Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
groundwater	groundwater	tap water	tetrachloroethene	Liver	2E+00	6E-10	4E-05	2E+00

Scenario Timeframe: Future
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
soil	soil	surface/subsurface soil	Aroclor-1260	Eye/Finger Nail/Immune System	1E+00	6E-01	-	2E+00

Key
- : no available data

Table 21
Risk Characterization Summary - Carcinogens (COCs)

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
soil	surface soil	surface soil	benzo(a)pyrene	3E-04	1E-04	9E-09	4E-04
			Aroclor-1260	2E-04	7E-05	9E-08	2E-04

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
groundwater	groundwater	tap water	chromium	2E-04	5E-10	NA	2E-04

Table 21
Risk Characterization Summary - Carcinogens (ROCs)

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk Calculation, For Initially Existent Radionuclides at Year 10 (Maximum Risk) (1)
soil	surface soil	surface soil	thorium-232	1.E-04

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk Calculation, For Initially Existent Radionuclides at Year 10 (Maximum Risk) (1)
soil	surface soil	surface/subsurface soil (external radiation)	radium-226+D	4.E-04
			radium-228+D	6.E-04
			thorium-232	4.E-03

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk Calculation, For Initially Existent Radionuclides at Year 10 (Maximum Risk) (1)
soil	homegrown produce	homegrown produce	potassium-40	3.E-04
			lead-210+D	3.E-04
			radium-226+D	7.E-04
			radium-228+D	9.E-04
			thorium-232	9.E-03

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk Calculation, For Initially Existent Radionuclides at Year 10 (Maximum Risk) (1)
soil	air	air (radon)	radium-226+D	7E-03

Scenario Timeframe: Future
Receptor Population: Construction/Utility Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk Calculation, For Initially Existent Radionuclides at Year 10 (Maximum Risk) (1)
sediment	sewer sediment	sewer sediment	thorium-232	2.E-04

Key
(1) Risk calculated in RESRAD as they were more conservative than the EPA PRG calculator; PRGs were developed based on both
- : no available data

Table 22
Comparison of Sediment Results to Biota Concentration Guidelines
Wolff-Alport Chemical Company Site

Radionuclide	BCG (pCi/g)	Maximum Concentration in Sediment (pCi/g)	Ratio	Mean Concentration in Sediment (pCi/g)	Ratio
East Branch, Newtown Creek - Surface Sediment (0 to 2 feet)					
Radium-226	101	0.828	0.0082	0.395	0.0039
Thorium-228	795	11.922	0.0150	1.195	0.0015
Thorium-230	10,400	1.574	0.0002	0.406	0.00004
Thorium-232	1,220	9.595	0.0079	0.962	0.0008
Uranium-234	5,270	0.952	0.0002	0.410	0.0001
Uranium-235	3,730	0.144	0.00004	0.068	0.00002
Uranium-238	2,490	0.961	0.0004	0.373	0.0001
		Sum of Fractions	0.032		0.006
East Branch, Newtown Creek - Subsurface Sediment (Greater than 2 feet to 10 feet)					
Radium-226	101	3.645	0.036	0.748	0.0074
Thorium-228	795	77.485	0.097	5.064	0.0064
Thorium-230	10,400	7.207	0.001	0.826	0.0001
Thorium-232	1,220	56.355	0.046	3.910	0.0032
Uranium-234	5,270	3.867	0.001	0.674	0.0001
Uranium-235	3,730	0.215	0.0001	0.054	0.00001
Uranium-238	2,490	6.729	0.003	0.693	0.0003
		Sum of Fractions	0.184		0.017
Coney Island Creek - Surface Sediment (0 to 2 feet)					
Radium-226	101	0.539	0.0053	0.398	0.0039
Thorium-228	795	0.747	0.0009	0.455	0.0006
Thorium-230	10,400	0.708	0.0001	0.448	0.00004
Thorium-232	1,220	0.612	0.0005	0.396	0.0003
Uranium-234	5,270	1.299	0.0002	0.745	0.0001
Uranium-235	3,730	0.165	0.00004	0.141	0.00004
Uranium-238	2,490	1.039	0.0004	0.614	0.0002
		Sum of Fractions	0.008		0.005
Coney Island Creek - Subsurface Sediment (Greater than 2 feet to 10 feet)					
Radium-226	101	0.878	0.0087	0.510	0.0050
Thorium-228	795	0.625	0.0008	0.464	0.0006
Thorium-230	10,400	0.601	0.0001	0.429	0.00004
Thorium-232	1,220	0.645	0.0005	0.433	0.0004
Uranium-234	5,270	3.497	0.0007	0.761	0.0001
Uranium-235	3,730	ND	ND	ND	ND
Uranium-238	2,490	1.061	0.0004	0.476	0.0002
		Sum of Fractions	0.011		0.006

Notes:

pCi/g = picocuries per gram

BCG = Biota Concentration Guide

ND = not detected

Table 23
Remediation Goals

Contaminants of Concern	Remediation Goal	Specifically Applied Principles
Solids		
PCBs	1 mg/kg	
Benzo(a)pyrene	1 mg/kg	
Ra-226[1]	1 pCi/g[2]	ALARA
Th-232	4 pCi/g[2]	ALARA
Indoor Air		
Combined Radon-222 and Radon-220 measured indoors	4 pCi/L[2]	ALARA
Combined decay products of Radon-222 and Radon-220 measured indoors	0.02 working level [2,3]	ALARA

[1] Ra-226 is used to indicate U-238 levels.
[2] Including natural background.
[3] Some devices measure radiation from radon decay products, rather than radiation coming directly from radon. Measurements from these devices are often expressed as "Working Level."

Table 24
Cost Estimate for Alternative 4
Wolff-Alport Chemical Company Site
Ridgewood, Queens, New York

No.	Description	Cost
	Remedial Action	
01	Permanent relocation	$1,112,500
02	General requirements	$3,457,000
03	Site preparation/site work	$395,000
04	Demolition and segregation	$223,000
05	Excavation and segregation	$2,354,266
06	Post-excavation sampling	$63,000
07	Sewer line excavation, removal, and replacement	$5,037,000
08	Other impacted buildings excavation and restoration	$44,000
09a	Transportation and disposal costs	$16,227,000
09b	Transportation and disposal labor	$108,000
10	Restoration and Final Status Survey	$1,247,000
	Subtotal for Construction Activities	*$12,929,000*
	Subtotal for Transportation and Disposal	*$16,227,000*
	Contingency on Construction Activities (20%)	$2,586,000
	Contingency on Transportation and Disposal (20%)	$3,246,000
	Subtotal for Construction Activities	*$15,515,000*
	Subtotal for Transportation and Disposal	*$19,473,000*
	General Contractor Bond and Insurance - Construction Activities (5%)	$776,000
	General Contractor Bond and Insurance - Transportation and Disposal (5%)	$974,000
	Subtotal for Construction Activities	*$16,291,000*
	Subtotal for Transportation and Disposal	*$20,447,000*
	General Contractor Markup - Construction Activities (10%)	$1,630,000
	General Contractor Markup - Transportation and Disposal (2%)	$409,000
	Subtotal of Remedial Action Construction Activities	$17,921,000
	Subtotal of Remedial Action Transportation and Disposal	$20,856,000
	Subtotal of Relocation	$1,112,500
	PRESENT WORTH	
	Total Capital Cost (including relocation)	**$39,889,500**
	Total O&M Cost	**$0**
	Total Present Worth	**$39,889,500**

Note: The project cost presented herein represents only feasibility study level, and is thus, subject to change pending the results of the pre-design investigation, which is intended to collect sufficient data to assist in the development of remedial design and associated detailed cost estimate. Expected accurant range of the cost estimate is -30% to +50% ($27,922,650 to $59,834,250).

The estimate is prepared solely to facilitate relative comparisons between feasibility study alternatives for evaluation.

The costs do not include costs for project management and construction management, remedial design, or pre-design investigation.

Reference: EPA. A Guide to Developing Cost Estimates During the Feasibility Study. 540-R-00-002. July 2000.

Table 25: ARARs and Other Environmental Criteria

A Citizen's Guide to Radon (EPA402/K-12/002)
Area of Contamination (55FR 8758-8760, March 8, 1990)
Clean Air Act (CAA)—National Ambient Air Quality Standards (NAAQs) (40 CFR 50)
Corrective Action Management Units (Subpart S of 40 CFR 264.552)
Department of Transportation (DOT) Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171, 172, 173, 177 to 179)
Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities (6 NYCRR Part 372)
Endangered Species Act (16 U.S.C. §§ 1531 et seq.; 40 CFR 400)
Federal Water Pollution Control Act (33 U.S.C. §1251, et seq., as amended by the Clean Water Act) and Implementing Regulations (40 CFR Part 131)
Land Disposal Restrictions (6 NYCRR Part 376)
Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)
National Emission Standards for Hazardous Air Pollutants (40 CFR 61)
New York Air Quality Standards (6 NYCRR Part 257)
New York General Prohibitions (6 NYCRR Part 211)
New York Permits and Regulations (6 NYCRR Part 201)
New York Standards for Universal Waste (6 NYCRR Part 374-3)
New York Technical Guidance for Site Investigation and Remediation
New York Uniform Construction Code (19 NYCRR)
New York Hazardous Waste Management Regulations - Identification and Listing of Hazardous Waste (6 NYCRR Part 371)
New York State Pollutant Discharge Elimination System (6 NYCRR Part 750-757)
New York State Standards and Specifications for Erosion and Sediment Control (Blue Book)
Nuclear Waste Policy Act of 1982
NYSDEC Subpart 375-6: Table 375-6.8(b): Restricted Residential Use Soil Cleanup Objectives
NYSDEC (DAR-1) Air Guide 1, Guidelines for the Control of Ambient Air Contaminants
OSWER Directive 9200.1-33P, Headquarters Consultation for Radioactively Contaminated Sites
OWSER Directive 9200.4-18, Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination.
OSWER Directive 9200.4-25, Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA Sites

OSWER Directive 9285.6-20, Radiation Risk Assessment at CERCLA Sites: Q&A
Protection of the General Population from Releases of Radioactivity (10 CFR Part 61.41)
Radiological criteria for unrestricted use (10 CFR 20.1402)
Resource Conservation and Recovery Act (RCRA) Identification and Listing of Hazardous Wastes (40 CFR 261)
RCRA Standards Applicable to Generators of Hazardous Wastes (40 CFR 262)
RCRA Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – General Facility Standards (40 CFR 264.10–264.19)
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Preparedness and Prevention (40 CFR 264.30–264.37)
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Contingency Plan and Emergency Procedures (40 CFR 264.50–264.56)
RCRA Land Disposal Restrictions (40 CFR 268)
RCRA Hazardous Waste Permit Program (40 CFR 270)
Standards of Performance for New Stationary Sources (40 CFR 60)
Toxic Substance Control Act (TSCA) (40 CFR Part 761.61)
TSCA Disposal of PCB Bulk Product Waste (40 CFR Part 761.62)
Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally-Assisted Programs (49 CFR 24)
Uranium Mill Tailings Radiation Control Act (UMTRCA) (40 CFR 192)
Waste Transporter Permit Program (6 NYCRR Part 374)

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX III

ADMINISTRATIVE RECORD INDEX

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/27/2017

REGION ID: 02

Site Name: WOLFF-ALPORT CHEMICAL COMPANY
CERCLIS ID: NYC200400810
OUID: 01
SSID: A282
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
510508	7/27/2017	ADMINISTRATIVE RECORD INDEX FOR OU1 FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	5	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
212818	12/12/2013	HAZARD RANKING SYSTEM (HRS) PACKAGE, VOLUME 1 OF 2 - TEXT AND REFERENCE 1 TO 15 FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	971	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS)
212819	12/12/2013	HAZARD RANKING SYSTEM (HRS) PACKAGE, VOLUME 2 OF 2 - REFERENCE 16 TO 33 FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	1640	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS)
319529	11/10/2014	FINAL REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN VOLUME I FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	80	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
319535	04/24/2015	FINAL HEALTH AND SAFETY PLAN FOR THE REMEDIAL INVESTIGATION / FEASIBILITY STUDY FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	328	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
319533	06/15/2015	FINAL QUALITY ASSURANCE PROJECT PLAN FOR REMEDIAL INVESTIGATION / FEASIBILITY STUDY FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	289	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
458623	06/14/2016	CDM RESPONSE TO EPA COMMENTS ON THE REMEDIAL INVESTIGATION SCREENING CRITERIA TABLE RECEIVED 05/18/2016 FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	20	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	RAHMANI,MUZAFFAR (CDM FEDERAL PROGRAMS CORPORATION)

528285

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/27/2017

REGION ID: 02

Site Name: WOLFF-ALPORT CHEMICAL COMPANY
CERCLIS ID: NYC200400810
OUID: 01
SSID: A282
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
436291	08/19/2016	NYC COMMENTS REGARDING THE DRAFT ECOLOGICAL SCREENING EVALUATION TECHNICAL MEMORANDUM FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	3	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	STEIN,HALEY (NYC LAW DEPARTMENT)
458624	10/13/2016	INVESTIGATION DATA PRESENTATION FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	68	Report		(CDM SMITH)
458625	12/02/2016	CITY OF NEW YORK COMMENTS ON THE DRAFT HUMAN HEALTH RISK ASSESSMENT REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	4	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	STEIN,HALEY (NYC LAW DEPARTMENT)
458627	12/19/2016	AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) COMMENTS ON THE REMEDIAL INVESTIGATION REPORT, SPECIFICALLY CHAPTERS 5, 6 AND 7 FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	54	Email	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	CHARP,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
458626	12/22/2016	DEPARTMENT OF ENERGY COMMENTS ON THE REMEDIAL INVESTIGATION FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	1	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	CASTILLO,DARINA (DEPARTMENT OF ENERGY)
458630	12/28/2016	NYS DOH COMMENTS ON THE REMEDIAL INVESTIGATION REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	3	Email	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	COLLINS,JERRY (NONE)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/27/2017

REGION ID: 02

Site Name: WOLFF-ALPORT CHEMICAL COMPANY
CERCLIS ID: NYC200400810
OUID: 01
SSID: A282
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
458644	12/28/2016	CITY OF NEW YORK COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	3	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	STEIN,HALEY (CITY OF NEW YORK)
503954	03/14/2017	RESPONSES TO COMMENTS FROM EPA, ATSDR, NYSDOH, AND THE CITY OF NEW YORK ON THE DRAFT REMEDIAL INVESTIGATION REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	25	Report	MONGELLI,THOMAS (US ENVIRONMENTAL PROTECTION AGENCY)	RAHMANI,MUZAFFAR (CDM FEDERAL PROGRAMS CORPORATION)
472850	04/21/2017	NYS DOH BUREAU OF ENVIRONMENTAL RADIATION PROTECTION COMMENTS ON THE FEASIBILITY STUDY FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	2	Email	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	COLLINS,JERRY (NYS Department of Health)
472857	04/25/2017	DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC) COMMENTS ON THE FEASIBILITY STUDY FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	1	Email	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	ABUNAW,JOHN (NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
473279	05/19/2017	CITY OF NEW YORK COMMENTS ON THE DRAFT FEASIBILITY STUDY FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	7	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	STEIN,HALEY (CITY OF NEW YORK)
503643	06/13/2017	FINAL HUMAN HEALTH RISK ASSESSMENT REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	1345	Report		(CDM SMITH)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/27/2017

REGION ID: 02

Site Name: WOLFF-ALPORT CHEMICAL COMPANY
CERCLIS ID: NYC200400810
OUID: 01
SSID: A282
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
503967	06/14/2017	REQUEST FOR CONCURRENCE ON RECOMMENDATION THAT A NATIONAL REMEDY REVIEW BOARD REVIEW IS NOT WARRANTED FOR THE PROPOSED REMEDY AND REQUEST FOR APPROVAL OF PERMANENT RELOCATION OF TENANTS FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	10	Memorandum	WOOLFORD,JAMES (US ENVIRONMENTAL PROTECTION AGENCY)	PRINCE,JOHN (US ENVIRONMENTAL PROTECTION AGENCY)
503673	06/16/2017	NYS DOH COMMENTS REGARDING THE DRAFT PROPOSED PLAN FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	2	Email	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	COLLINS,JERRY (NYS Department of Health)
503682	06/19/2017	FINAL ECOLOGICAL SCREENING EVALUATION TECHNICAL MEMORANDUM, REVISION 1 FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	59	Report		(CDM SMITH)
503677	06/20/2017	CITY OF NEW YORK COMMENTS REGARDING THE DRAFT FEASIBILITY STUDY AND DRAFT PROPOSED PLAN FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	7	Letter	SINGERMAN,JOEL (US ENVIRONMENTAL PROTECTION AGENCY)	STEIN,HALEY (CITY OF NEW YORK)
503726	07/03/2017	TRANSMITTAL OF THE FINAL REMEDIAL INVESTIGATION REPORT FOR THE WOLFF-ALPORT CHEMICAL CORPORATION SITE	1	Letter	MONGELLI,THOMAS (US ENVIRONMENTAL PROTECTION AGENCY)	RAHMANI,MUZAFFAR (CDM SMITH)
503724	07/03/2017	FINAL REMEDIAL INVESTIGATION REPORT - TEXT, TABLES, FIGURES (PART 1 OF 2) FOR THE WOLFF-ALPORT CHEMICAL CORPORATION SITE	310	Report		

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/27/2017

REGION ID: 02

Site Name: WOLFF-ALPORT CHEMICAL COMPANY
CERCLIS ID: NYC200400810
OUID: 01
SSID: A282
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
503725	07/03/2017	FINAL REMEDIAL INVESTIGATION REPORT - APPENDICES (PART 2 OF 2) FOR THE WOLFF-ALPORT CHEMICAL CORPORATION SITE	5113	Report		
503956	07/10/2017	RESPONSES TO COMMENTS FROM THE CITY OF NEW YORK ON THE RESPONSE TO COMMENTS ON THE DRAFT FEASIBILITY STUDY REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	8	Report	MONGELLI,THOMAS (US ENVIRONMENTAL PROTECTION AGENCY)	RAHMANI,MUZAFFAR (CDM FEDERAL PROGRAMS CORPORATION)
503969	07/20/2017	FINAL FEASIBILITY STUDY REPORT FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	291	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
503974	07/21/2017	NYSDEC CONCURRENCE OF THE PROPOSED PLAN FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	2	Email	PRINCE,JOHN (US ENVIRONMENTAL PROTECTION AGENCY)	SCHICK,ROBERT (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
503978	07/25/2017	US EPA NATIONAL REMEDY REVIEW BOARD CONCURRENCE ON REGIONAL REMEDY REVIEW TEAM RECOMMENDATION FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	13	Memorandum	WOOLFORD,JAMES (US ENVIRONMENTAL PROTECTION AGENCY)	LEGARE,AMY,R (US ENVIRONMENTAL PROTECTION AGENCY)
503973	07/26/2017	PROPOSED PLAN FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	19	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
503981	10/1/2014	RELOCATION - YOUR RIGHTS AND BENEFITS AS A DISPLACED PERSON UNDER THE FEDERAL RELOCATION ASSISTANCE PROGRAM FOR THE WOLFF-ALPORT CHEMICAL COMPANY SITE	38	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX IV

STATE LETTER OF CONCURRENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 I F: (518) 402-9020
www.dec.ny.gov

Mr. John Prince, Acting Director
Emergency and Remedial Response Division
USEPA-Region 2
290 Broadway
New York, NY 10007-1866

SEP 21 2017

Re: Record of Decision
Site Name: Wolff-Alport Chemical Company
NYSDEC Site No. 241180
Ridgewood, Queens County

Dear Mr. Prince:

The New York State of Environmental Conservation (DEC) and the New York State Department of Health (DOH) have reviewed the Record of Decision, dated September 2017, for the referenced site. We understand the selected remedy addresses both on-site and off-site radiological contaminated soils and contaminated sewer removal and cleaning. The remedy includes:

- The use of site-specific cleanup criteria of 4.0 pCi/g for Th-232 and 1.0 pCi/g for Ra-226. The United States Environmental Protection Agency (EPA) will also apply the principles of "As Low As Reasonably Achievable" (ALARA) during the remedial activities. This enables EPA to take additional measures during the remedial activities that go beyond simply remediating to the specific cleanup criteria.

- Tenants will be permanently relocated and demolition of all on-site the buildings.

- Excavation and off-site disposal of all soils exceeding the site specific criteria, including highly contaminated soils that extend down to approximately 28 feet below ground surface, and soil beneath the roadway and sidewalks along Irving Avenue and Moffat Street.

- Excavation (and replacement) and off-site disposal of the sewer line along Irving Avenue to approximately 50 feet beyond the intersection of Cooper Avenue. Bedding material will be sampled and excavated if it exceeds the cleanup criteria.

- The sewer line down to Wyckoff Avenue and Halsey Street (approximately 2,150 feet) will be cleaned using high-pressure water nozzles to flush out dirt, sediment/sludge from the sewer line.

- Confirmatory sampling will be conducted to ensure that the cleanup criteria are met prior to the restoration of the site.

- Site restoration including backfilling and reconstruction of impacted roadways and sidewalks.

- Since EPA will be applying both the site-specific cleanup criteria and ALARA principles this alternative, it will leave no contaminants on the site above unrestricted use levels, therefore five year reviews will not be necessary.

Based on the information provided by EPA, DEC and DOH concur with the Record of Decision and believe that it is protective of human health and the environment. If you have any questions, please contact the DEC project manager for this site, Mr. John Abunaw at (518) 402-8776.

Sincerely,

Robert W. Schick, P. E.
Director
Division of Environmental Remediation

ec: Doug Garbarini, EPA (garbarini.doug@epa.gov))
Joel Singerman, EPA (singerman.joel@epa.gov)
J. Deming, DOH
S. Gavit/ C. Costello/J. Collins, DOH BERP
Michael Ryan, DEC
Eric Obrecht, DEC
Tim Rice, DEC
John Abunaw, DEC
J. O'Connell, DEC Region 2

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FOR THE
RECORD OF DECISION
WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RIDGEWOOD, QUEENS COUNTY, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of citizens' comments and concerns received during the public comment period related to the Wolff-Alport Chemical Company (WACC) Superfund site (Site) Proposed Plan and provides the U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. All comments summarized in this document have been considered in EPA's final decision in the selection of a remedy to address the contamination at the Site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

EPA conducted field investigations at the Site from September 2015 through March 2017, which culminated in the completion of remedial investigation and feasibility study (RI/FS)[1] reports in July 2017. EPA's preferred remedy and the basis for that preference were identified in a Proposed Plan.[2] The RI/FS report and Proposed Plan were released to the public for comment on July 27, 2017. These documents were made available to the public at information repositories maintained at the Washington Irving Library located at 360 Irving Avenue, Brooklyn, New York and the EPA Region II Office in New York City. A notice of availability for the above-referenced documents was published in the *Ridgewood Times* on July 27, 2017 and in *El Correo*, a local Spanish-language newspaper, on July 28, 2017. The public comment period ran from July 28, 2017 to August 28, 2017. On August 16, 2017, EPA conducted a public meeting at the Audrey Johnson Learning Center to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Site, including the preferred remedy, and to respond to questions and comments from the approximately 50 attendees including residents, the media, local business people, and local government officials. On the basis of comments received during the public comment period, the public generally supports the selected remedy.

[1] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks, and an FS identifies and evaluates remedial alternatives to address the contamination.

[2] A Proposed Plan describes the remedial alternatives considered for a site, identifies the preferred remedy with the rationale for the preference, and solicits public comment for a period set forth in the Plan.

SUMMARY OF COMMENTS AND RESPONSES

Comments were received at the public meeting and in writing. Written comments were received from:

- Angela Butch via an August 2, 2017 e-mail and an August 3, 2017 e-mail
- Joseph Kleinmann via an August 3, 2017 e-mail and an August 4, 2017 e-mail
- Aaron Gershonowitz, on behalf of LPL Properties, Inc., via an August 28, 2017 e-mail
- New York City Council Member Elizabeth Crowley via an August 28, 2017 e-mail
- Haley Stein, on behalf of the City of New York, via an August 28, 2017 e-mail
- Annett Uebel via an August 29, 2017 e-mail

The transcript from the public meeting can be found in Attachment D.

The written comments submitted during the public comment period can be found in Attachment E.

A summary of the comments provided at the public meeting and in writing, as well as EPA's responses to them, are provided below. The comments and responses are grouped into categories by subject matter

Risk Assessment

Comment #1: The City of New York commented that health risks for utility workers are overestimated by EPA and utility workers are unlikely to come into contact with the contaminated sewer sediments, except during sewer removal and replacement activities.

Response #1: EPA's Human Health Risk Assessment (HHRA) examined the risk posed to future construction/utility workers exposed to contaminated sediment in the sewers and found the cancer risk for those receptors to be $2x10^{-4}$. EPA's target cancer risk range is $1x10^{-6}$ to $1x10^{-4}$. This risk assessment assumes utility workers to be exposed to contaminated soils and sediments for eight hours per day for five months, or 100 workdays. This duration is similar to the amount of time identified for the remedy's sewer removal and replacement as discussed in the City's comment letter. It is reasonable to assume that the sewer will need to be repaired or replaced at some point in the future while the contamination is still present because of the extremely long half-life of the radionuclides present at the Site. Additional information about EPA's risk calculations can be found in the *Final Human Health Risk Assessment Report*, dated June 13, 2017.

Comment #2: A commenter indicated a belief that the risks posed by the contamination at the Site do not justify the proposed alternative because of the shielding previously installed by EPA and because no individuals are reported to have suffered harm.

Response #2: The HHRA identifies several groups of current and future receptors who are, or would be, exposed to unacceptable health risks. Among these groups are current on-Site commercial indoor and industrial workers and future on-Site residents, commercial indoor workers, industrial workers, and construction/utility workers. Unacceptable noncancer health hazards have also been documented for future residents and commercial indoor, industrial, and construction/utility workers. While it is extremely difficult to correlate radiological contamination to specific illnesses in specific individuals, the fact that such a correlation is difficult to establish does not eliminate the potential risks associated with exposure to the Site contamination.

While the shielding installed by EPA has reduced exposure to the current on-Site workers to levels below New York State regulatory limits, it has not eliminated the risks posed by the Site. It is possible that the shielding could be removed or otherwise compromised in the future so as to no longer provide the protection that it is currently providing. Furthermore, EPA has identified the contaminated soil at the Site as a principal threat waste. The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or will present a significant risk to human health or the environment should exposure occur. Therefore, EPA has determined that it is appropriate to remove all of the contaminated building materials, soils, and sewer sediments as part of the selected remedial action taken at the Site.

Extent of Contamination

Comment #3: A commenter asked if the surrounding community has been tested for contamination.

Response #3: In 2013, EPA, along with the New York State Department of Health and New York City Department of Health and Mental Hygiene, completed an investigation that looked at gamma radiation levels and radon and thoron air concentrations within a half-mile radius of the Site. In the investigation, which is summarized in the *Multi-Agency Former Wolff-Alport Chemical Company Neighborhood Radiological Assessment,* March 2014, it was determined that there were no impacts to the surrounding community from the radiological contamination. These results were confirmed during the RI, where only natural background levels of gamma radiation, radon, and thoron were detected outside of the immediate vicinity of the former WACC property.

Comment #4: A commenter asked why the sewer line along Moffat Street was not sampled.

Response #4: The sewer line along Moffat Street begins several hundred feet from the intersection of Moffat Street and Irving Avenue where the former WACC property is located. The sewer line along Moffat Street was in fact sampled from its starting point and elevated radiation levels were not observed, indicating that elevated levels downstream of that location were not likely.

Comment #5: A commenter asked whether a nearby subway tunnel was investigated.

Response #5: Soil sampling conducted during the RI revealed contamination to exist primarily in the shallow surface soils (*i.e.,* less than four feet below the ground surface) with the exception of the area around Lot 42 on the former WACC property and beneath the pavement on Irving Avenue between Moffat Street and Cooper Street. It is unlikely that WACC's operations would have affected the nearby subway tunnel. However, further delineation of the soil contamination will be performed during the remedial design phase.

Sewer System and Right-of-Way

Comment #6: The City of New York recommended that sewer sections identified for removal first undergo jet washing using high-pressure water nozzles or other exposure reduction methods.

Response #6: The selected remedy includes jet washing the majority (approximately 2,150 feet) of the contaminated sewer line in order to flush out, collect, and dispose of any dirt, sediments/sludge, and other matter from the sewer pipeline. Following the jet washing of the sewer lines, a gamma survey will be performed within the flushed sewer to determine if high gamma counts are still present. Any portions of the sewer line with elevated gamma counts will undergo further investigation, including the sewer pipe material and its bedding, to determine the source of the radiological contamination. Those portions of the sewer line, along with any bedding material that exceed the cleanup objectives, will be removed and replaced.

The selected remedy also includes the removal of a short section (approximately 120 feet) of clay sewer pipe immediately adjacent to the former WACC property because very high levels of contamination were found in this area during the RI. Sewer material sampling in this area found the sewer pipe and manholes to be contaminated up to a maximum concentration of 2,536.2 picocuries per gram (pCi/g) and 163.1 pCi/g of thorium-232 and radium-226, respectively. Site-specific remedial goals for these contaminants are 4 pCi/g and 1 pCi/g, respectively. Additional information can be found in the *Final Remedial Investigation Report*, dated July 3, 2017.

Comment #7: The City of New York commented that excavation should be limited to approximately eight to 12 feet below the ground surface in areas requiring removal and replacement of the sewers and five feet in all other areas within the right-of-way.

Response #7: As is noted in Response #2, above, EPA considers former process tailing residues remaining on the Site to be principal threat wastes because this material has the potential to act as a source for further off-site contamination if uncovered. As discussed previously, no proven and cost-effective treatment technology is currently available to treat radioactive wastes. The selected remedy will address source materials constituting principal threats by excavating and removing the radiologically contaminated soil, sediments, and building materials for proper off-site disposal.

School and Daycare Center

Comment #8: A commenter asked why EPA was not taking any further action at the P.S./I.S. 384 Frances E Carter school as part of the selected remedy

Response #8: As part of EPA's RI field work, soil samples, as well as short-term and long-term indoor air samples, were collected from P.S./I.S. 384 Frances E Carter school and the Audrey Johnson Learning Center. Air sampling results were found to be below EPA's action level for radon, and soil sample results were below the RI screening criteria for all Site-related contaminants. Gamma radiation exposure rates were also found to be at or below normal background levels for the surrounding neighborhood. These results indicate that neither the school nor the daycare center have been impacted by Site-related contamination and do not warrant any further investigation or action.

Comment #9: A commenter asked if children would be safe walking past the former WACC property on their way to and from school during construction.

Response #9: Prior to the start of any construction, plans will be developed to protect the health and safety of the workers implementing the remedy, as well as the surrounding general community. It is unlikely that children would be able to walk past the former WACC property during construction because the streets and sidewalks will need to be excavated in order to remove the underlying contaminated soils. Prior to construction, the amount of time it will take to walk past the former WACC property, coupled with the existing shielding in place at portions of the property at that location, present conditions that would not be expected to lead to any significant exposure to Site-related contamination, either for children or any other member of the community.

Impacts to Current Former WACC Property Tenants

Comment #10: Several commenters expressed concern about the disruption of their businesses that will be caused by having to permanently relocate.

Response #10: While there are certain inherent difficulties associated with relocating businesses, it is a necessary component of the selected remedy. Contamination from WACC's monazite sand processing exists both in the building materials themselves and in the soil underlying the former WACC property buildings. Therefore, the buildings must be demolished and the soil must be excavated in order to remove this contamination. EPA has successfully relocated businesses in the past and is able to provide assistance to the relocated businesses before, during, and after they are moved.

Comment #11: Several commenters asked for more detail regarding how much time tenants would be given prior to relocation and what type of compensation they will be given.

Response #11: The selected remedy includes the permanent relocation of all of the tenants in the buildings on the former WACC property. EPA is committed to working closely with all of the former WACC property tenants, both commercial and residential, during the relocation process to keep them informed, to minimize disruptions, and to allow as much advance notice as possible before any relocations occurs. The U.S. Army Corps of Engineers (USACE) will assist EPA in the relocation effort. The USACE and EPA will contact each tenant and collect information from them regarding their individual needs and requirements for a replacement location and to determine what type of financial assistance for which they are eligible under the U.S. Department of Transportation regulations regarding relocation. Additional information can be found in an October 2014 U.S. Department of Transportation publication entitled "Your Rights and Benefits as a Displaced Person under the Federal Relocation Assistance Program".

Impacts to Former WACC Property Owners

Comment #12: An owner of one of the former WACC properties expressed concern about the financial burden on the current owners of the former WACC property as a result of the loss of rental income following the permanent relocation of the tenants.

Response #12: EPA understands that the implementation of the selected remedy will result in the loss of rental income and that the property owners will have to make difficult decisions regarding rebuilding after the remediation is completed. While shielding was installed in certain areas of the buildings to be protective in the short-term, because of the continued exposure of the tenants to radiation, EPA believes the tenants should be relocated as soon as possible. It is EPA's intention to complete the remediation of the former WACC property as expeditiously as possible to minimize the impact on the property owners.

Comment #13: A commenter asked if the current property owners will once again take ownership of the properties after the remediation is completed. A property owner expressed concern about the taking of the property from current owners and suggested that EPA offer fair market value to purchase the properties.

Response #13: Potentially responsible parties at Superfund sites include current property owners. The current owners of the former WACC properties have been notified by EPA of their potential CERCLA liability with regard to the Site. At the conclusion of the response action, these properties will be remediated.

The question of purchasing contaminated property is situation-specific, and involves factors including the potential CERCLA liability of the owner, and whether EPA's actions will be abating a nuisance. In this situation, EPA does not currently intend to purchase or otherwise take ownership of any of the private properties impacted by Site contamination. Consequently, EPA will not compensate property owners.

Impacts to Community During Construction

Comment #14: Several commenters expressed concern about the impact to neighboring businesses as a consequence of multiple factors, including truck traffic, street closures, structural integrity of nearby buildings, and dust or radiation emissions during construction.

Response #14: EPA is committed to implementing the selected remedy in a manner that protects the health and safety of both the workers at the former WACC property workers and the members of the general community, including neighboring businesses. The remedial design will address the impacts to the community stemming from the implementation of the selected remedy. This will include a community air monitoring plan, a traffic control plan, and a health and safety plan. The remedial design will also provide for proper precautions to ensure the structural integrity of buildings that are adjacent to areas of excavation. If the remediation requires a nearby business to temporarily close, EPA will work with that business to ensure it is notified in advance and experience as little disruption as possible.

Comment #15: A commenter asked about the construction timeline.

Response #15: Following the design of the selected remedy and the selection of a contractor, it is estimated that 17 months of construction time will be required to implement the selected remedy. The actual timeline for initiation and duration of construction will be developed during the remedial design.

Disposal of Contaminated Material

Comment #16: A commenter asked where contaminated material will be disposed.

Response #16: The contaminated soil, sediment, and building materials will be disposed of at an approved, licensed facility. The location of the facility will be determined during the remedial design.

Future Redevelopment and Use of the Site

Comment #17: A commenter expressed concern that a private developer might perform the selected remedy in a way that may adversely affect the community.

Response #17: The former WACC property is comprised of six separate parcels of land, currently with six different owners. If one or more of the current property owners, or a potentially new property owner, offers to perform or pay for all or a portion of the cleanup, EPA would consider entering into an agreement with those owner(s) to remediate the Site. Regardless of whether there is private owner involvement, EPA would ensure that the work is implemented in accordance with the selected remedy and all applicable federal, state, and local cleanup standards. As discussed above, EPA approved mitigation plans will be put in place to ensure that short-term impacts are appropriately addressed and that the community is not adversely affected during implementation.

Comment #18: Several commenters expressed interest in potential redevelopment plans for the former WACC property following the implementation of the selected remedy.

Response #18: EPA is not aware of any redevelopment plans for the property. The current land use of the property is commercial/industrial. The future use of the individual properties will be determined by the individual property owners and any local government restrictions.

Comment #19: A commenter opined that the remediation is being undertaken as a result of favorable real estate conditions in the area.

Response #19: The Site was placed on the National Priorities List (NPL) in 2014 based on meeting standard criteria for potentially significant hazardous substance releases. When a site is placed on the NPL, EPA is required to investigate contamination present at that site and identify unacceptable risks that may be posed by contamination at the site. If unacceptable risks are present EPA must evaluate alternatives and then select an alternative that addresses unacceptable risks, followed by the design and implementation of that remedy. Remediation is being undertaken at the former WACC property because EPA concluded in the HHRA that unacceptable risks exist for current and future receptors from exposure to external gamma radiation and inhalation of radon. In this process, EPA does not take current real estate market conditions into consideration.

EPA's Ability to Fund the Remedy

Comment #20: The City of New York indicated its belief that the cost and feasibility of implementing the selected remedy, as well as costs associated with community disruptions and utility relocations, have been underestimated by EPA.

Response #20: The cost estimate for EPA's selected remedy is $39.9 million. This estimate takes into account many of the costs previously identified by the City. Costs associated with community disruptions would be difficult to quantify with any degree of accuracy and costs associated with utility relocations have not been included because of a lack of available information. It should be noted that the cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

Comment #21: A commenter asked why WACC was not paying for the cleanup.

Response #21: WACC ceased operations in 1954. EPA continues to search for successor companies. Currently, it appears that the majority of the funding for the cleanup at this Site may need to come from the Superfund budget.

Comment #22: Several commenters inquired into the status of EPA's Superfund budget and EPA's ability to implement the selected remedy given that the project is expected to be financed by Superfund.

Response #22: The first step in the implementation of the selected remedy will be the completion of a remedial design, which EPA has the ability to initially fund immediately.

The remedial design is followed by the actual implementation of the remedy, or the remedial action. Because EPA's budget is generally not sufficient to implement all remedial actions in the country, funding priorities for all new cleanup construction projects in the Superfund program are determined by EPA's National Risk Based Priority Panel. The panel consists of program experts from EPA offices across the country that evaluate the risk at NPL sites with respect to human health and the environment. This national approach is intended to ensure that scarce resources are allocated to the projects posing the most risk to human health and the environment. While EPA intends to seek funding for the design of the remedy shortly after the remedy is selected, funding for the implementation of the remedial action is dependent upon the outcome of the priority panel evaluation.

Comment #23: A commenter asked if funding would be available to finish the project once it is started.

Response #23: While there is no legal requirement for EPA to continue funding a remedial action project after it has started, it is EPA's policy to complete a remedial action project once it has begun, wherever possible. The selected remedy consists of several distinct steps (*e.g.,* tenant relocation, building demolition, sewer excavation, soil excavation) which have the potential to be funded in succession.

Support for the Preferred Alternative

Comment #24: Several commenters and one elected official, New York City Council Member Elizabeth Crowley, expressed their support for EPA's selected remedy.

Response #24: EPA acknowledges receipt of these comments and considered them in the final remedy selection.

Other Comments

Comment #25: A commenter noted that she had seen black boxes in the neighborhood and wondered what their purpose was.

Response #25: EPA has not used any type of sampling device matching the description given by the commenter either during the RI or during the prior shielding installation. The devices are not related to the investigation of the Site.

Comment #26: A commenter asked if a list of Superfund sites around the country is available to the public.

Response #26: A list of all Superfund sites can be found on EPA's website at https://www.epa.gov/superfund/search-superfund-sites-where-you-live

Comment #27: A commenter indicated that it was difficult for many residents to attend the public meeting because it was held in August; another commenter stated she only heard about the public meeting through the media and asked to be kept informed about the Site in the future.

Response #27: While EPA regrets any difficulty members of the public may have experienced in attending the public meeting because it was held in August, EPA hopes that those members took advantage of other opportunities to provide comments and obtaining Site information. The community outreach conducted by EPA for the public meeting included distribution of fliers to the former WACC property businesses, nearby businesses, the nearby public school and day care center, and to the Site mailing list of approximately 300 homes. Notices were also placed in two local newspapers, one of which was in Spanish. In addition to notifying the public of EPA's intent to select a remedy for the Site, and make the community aware of the public meeting, the notices and fliers identified where interested parties could obtain additional information about the project and opportunities for public comment. It was noted that information about Site could be found at the EPA web page for the Site and in Site repositories established at the Washington Irving Library, located at 360 Irving Avenue, Brooklyn, New York, and at the EPA Region 2 office, located at 290 Broadway, New York, New York.

Comments were solicited for submission at the public meeting or in writing. The public comment period was from July 28, 2017 to August 28, 2017. With respect to keeping residents informed about the Site in the future, all of the meeting attendees will be added to the Site mailing list if they provided their contact information. In addition, the EPA web page for the Site is regularly updated and important documents are posted there for public view.

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX V
RESPONSIVENESS SUMMARY

ATTACHMENT A

PROPOSED PLAN

Superfund Proposed Plan

Wolff-Alport Chemical Company Superfund Site

Queens County, New York

July 2017

PURPOSE OF THIS DOCUMENT

This document describes the remedial alternatives considered for the Wolff-Alport Chemical Company (WACC) Superfund site (Site) and identifies the preferred remedy with the rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC) and other federal, state, and local governmental stakeholders. EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination at the Site and the remedial alternatives summarized in this Proposed Plan are described in the July 2017 remedial investigation (RI) and feasibility study (FS) reports, respectively. EPA encourages the public to review these documents to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at the Site.

This Proposed Plan is being provided as a supplement to the RI/FS reports to inform the public of EPA's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred alternative. The preferred remedy consists of permanent relocation of the tenants, demolition of the former WACC buildings, contaminated soil excavation, contaminated sewer removal/cleaning, and off-Site disposal of the contaminated soils and debris.

The remedy described in this Proposed Plan is the preferred remedy for the Site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis section of the RI/FS report because EPA may ultimately select a remedy other than the preferred remedy.

MARK YOUR CALENDAR

***July 28, 2017 – August 28, 2017**: Public comment period related to this Proposed Plan.*

***August 16 at 7:00 P.M.:** Public meeting at Audrey Johnson Day Care Center, 272 Moffat Street, Brooklyn, NY.*

Copies of supporting documentation are available at the following information repositories:

Washington Irving Library
360 Irving Avenue (at Woodbine St.)
Brooklyn, NY 11237
718-628-8378
and
EPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
212-637-4308

EPA relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy at Superfund sites. To this end, the RI and FS reports and this Proposed Plan have been made available to the public for a public comment period that begins on July 28, 2017 and concludes on August 28, 2017.

A public meeting will be held (see the date and location in the textbox, above) to present the conclusions of the RI/FS, elaborate further on the reasons for recommending the preferred remedy, and receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the latter being the document that formalizes the selection of a remedy.

COMMUNITY ROLE IN SELECTION PROCESS

Written comments on the Proposed Plan should be addressed to:

Thomas Mongelli
Remedial Project Manager
Central New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
telephone: (212) 637-4256
fax: (212) 637-3966
e-mail: mongelli.thomas@epa.gov

SCOPE AND ROLE OF ACTION

The primary objectives of this action are to address the soil, sewer, and building material contamination, and minimize the migration of contaminants through surface runoff, dust migration, and sewer discharge.

SITE BACKGROUND

Site Description

The Site comprises an area of radiological contamination at 1127 Irving Avenue in Ridgewood, Queens, New York on the border of Bushwick, Brooklyn. The Site includes the former WACC property, a roughly triangular area of approximately 0.75 acres that is now subdivided into several commercial properties, as well as adjacent areas including streets, sidewalks, commercial and residential properties, and the sewer system where contaminants have migrated, or have the potential to migrate, in the future. A Site location map is provided as Figure 1. Figure 2 shows the general area, including the sewers.

The former WACC property is bound by Irving Avenue to the southwest, Cooper Avenue to the northwest, and a commercial property to the east. At present, the property is covered with contiguous structures, except along its eastern edge in an area which was formerly used as a rail spur. The neighborhoods surrounding the former WACC property contain light industry, commercial businesses, residences, a school, and a daycare center. An active rail line passes within 125 feet to the southeast of the property.

The on-Site commercial properties include a gravel-covered former rail spur used to store automobiles (Lot 31), a one-story dilapidated warehouse, which is currently unoccupied (Lot 33), a subdivided one-story building primarily used for storage and occupied by a construction company and an auto body shop with an adjoining office (Lot 42), a one-story building occupied by a motorcycle repair shop (Lot 44), a two-story building housing a delicatessen, office space, and three unoccupied residential apartments, as well as an attached one-story building housing a tire shop (Lot 46), and a one-story building housing an auto repair shop and office space (Lot 48).

Site History

WACC operated at the property from the 1920s until 1954, importing monazite sand via rail and extracting rare earth metals from the material. Monazite sand contains approximately 6-8% or more of thorium and 0.1-0.3% of uranium. The acid treatment process used by WACC converted the phosphate and metal component of the monazite to aqueous species, rendering the rare earth materials extractable while dissolving the thorium and uranium in an acid, such as sulfuric and nitric acid, generating waste process-liquors and tailings. This process concentrated thorium-232 (Th-232) and uranium-238 (U-238), both of which are radioactive, in the process liquors.

During its operation, WACC occupied three structures which currently comprise Lots 42 and 44. WACC's operation included two yard areas--one between the buildings on Lot 42 and the other on the eastern end of the property at the northern end of Moffat Street. These areas were reportedly used as staging areas for monazite sands or waste tailings containing Th-232 and U-238. The waste tailings were likely spread or buried on the property. WACC disposed of the liquid process wastes into the sewer. According to the U.S. Department of Energy, the Atomic Energy Commission (AEC) ordered WACC to halt sewer disposal of thorium waste in the fall of 1947. Thereafter, thorium was precipitated as thorium oxalate sludge and sold to the AEC.

Initial scoping-level radiological surveys performed by NYSDEC, New York City Department of Health and Mental Hygiene (NYCDOHMH), and EPA in 2007 found radiological impacts throughout the WACC property and the nearby sewer. Follow-up investigations by the New York City Department of Design and Construction (NYCDDC) in 2009-2010 found waste tailings consisting of black or gray ash-like material in a contaminated soil layer beneath the WACC property buildings, sidewalks, and asphalt surfaces of Irving Avenue and Moffat Street, and in the surface soils of the former rail spur. Elevated Th-232 concentrations were found in soil samples containing tailings. During the NYCDDC investigation, elevated levels of thoron and radon gas were detected in the deli basement.

In February 2012, the Agency for Toxic Substances and Disease Registry (ATSDR) issued a Health Consultation which noted that exposure to the residual radioactive contamination at the Site may pose a health threat under certain long-term exposure scenarios. Based on the ATSDR document, EPA prepared a Removal Site Evaluation for the Site in August 2012 to determine whether an immediate response action (*i.e.,* a removal action) was necessary. In September 2012, EPA collected gamma radiation exposure rate measurements and thoron and radon concentration measurements on and around the perimeter of the suspected source area and at background locations. The gamma radiation exposure rate measurements identified hot spots along the former rail spur and in the sidewalks and streets adjacent to the former facility and elevated radon concentrations in two of the on-site businesses.

Based upon this evaluation, EPA conducted a removal action between October 2012 and April 2014 which consisted of a gamma radiation[1] assessment and radon sampling at the Site, the installation of a radon mitigation system in one on-Site building where radon concentrations exceeded EPA's guidance level of 4 picocuries per liter (pCi/L), and the installation of lead, steel, and concrete shielding in certain areas of the Site, based on recommendations collaboratively developed by EPA and NYCDOHMH. Gamma exposure rates were observed to have been reduced between 60-95% based on a comparison of pre-shielding and post-shielding gamma radiation surveys but not below the regulatory dose rate limit promulgated in 40 CFR Part 192.12 (b)(2).

In July 2013, EPA, New York State Department of Health (NYSDOH), and NYCDOHMH conducted a radiological assessment of the neighborhood within a half-mile radius of the Site. The data collected during this assessment indicated that there is no exposure to the surrounding community from radiological contaminants located on-Site.

The Site was included on the National Priorities List on May 12, 2014.

Site Geology

The Site is at an elevation of approximately 70 feet above mean sea level (msl), and the ground surface in the area generally slopes gently to the southwest. The eastern edge of the Site is adjacent to an elevated rail line that runs parallel to Moffat Street. The ground surface rises sharply toward the rail line and continues to rise to a cemetery, east of the Site, to elevations as high as 160 feet above msl.

While drilling at the Site, EPA encountered two types of unconsolidated material--fill and Upper Glacial Aquifer deposits (till and outwash). Fill near the former WACC property is typically 5-15 feet thick and is generally characterized by the presence of man-made materials (bricks, coal, various building materials) intermixed with silt, sands, and gravels. Much of the upper layers of the fill in borings at the former WACC property, as well as some borings to the south on Moffat Street, consisted of a black, gray, and/or white cinder or ash-like material. This material, which is likely waste tailings, was found between 0-4 feet below ground surface (bgs) near the former WACC property and between 0-6 feet bgs along Moffat Street.

Upper Glacial Aquifer deposits were encountered from the bottom of fill (0-15 feet bgs) to the base of the borings installed at the Site (75 feet bgs). The upper portion of the glacial deposits (down to approximately 25-37 feet bgs) is made up of glacial till, which is yellowish brown dense silty sand and gravel. The material underlying the glacial till is glacial outwash, slightly more uniform and coarse in texture than the till, and it extends from the bottom of the till to at least 75 feet bgs (*i.e.,* the total depth of investigation at the Site).

Depth to groundwater at the Site is about 60 feet bgs, and the direction of groundwater flow is generally to the south. Based on the available geologic literature, the base of the Upper Glacial Aquifer in this area is assumed to be the Gardiners Clay, which is present at an elevation of 100 feet below msl at the Site, or about 170 feet bgs.

NATURE AND EXTENT OF CONTAMINATION

Remedial Investigation Activities

RI field work was conducted from September 2015 to March 2017. Environmental media investigated during the RI included soil, sediment, groundwater, air, and building/sewer materials. Samples were, primarily, collected to delineate the extent of media contaminated by radioactive waste; however, samples were also analyzed to determine the presence of non-radiological contamination.

Specifically, the investigation included building material gamma surveys, building material sampling, wipe sampling, a hazardous material building survey, soil investigations, including gamma walkover surveys and soil sampling, groundwater sampling, water level measurements, hydraulic conductivity assessments, sewer investigations, including fiberscope mapping with in-sewer gamma count and gamma exposure rate

[1] Gamma radiation arises from the radioactive decay of atomic nuclei.

surveys, sewer material sampling, soil borings in the vicinity of the sewer, sediment sampling in Newtown Creek where the combined sewer overflow (CSO) discharges,[2] gamma exposure rate confirmation surveys, and school/daycare investigations, including soil sampling, gamma exposure rate surveys, and radon and thoron evaluations.

Remedial Investigation Results

The primary contaminants of concern at the Site are the radioactive isotopes Th-232, U-238, and radium-226 (Ra-226).[3] Th-232 in combination with Ra-226 were used to determine the nature and extent of contamination associated with the Site. For risk analysis and screening purposes, the U-238 concentrations are assumed to be that of the Ra-226 progeny. This is a conservative assumption in that the acid used as the agent for solubilizing the monazite ores in the rare-earth extraction process would preferentially concentrate the Ra-226 in the waste sludge. During the RI, samples were collected from building materials, air, soils,[4] sewers, and groundwater. In addition, gamma exposure rate confirmation surveys were conducted. The results of the RI are summarized below.

Building Materials

Radiological contamination remains in the building structures at the former WACC property, primarily, in the buildings that previously contained the kiln/vat in which monazite sands processing took place (Lots 42 and 44), in the basement of the deli (Lot 46), and, to a lesser extent, in the warehouse on Lot 33 constructed above the former yard area. Contaminants are primarily embedded in the building structure with the highest concentration of Th-232 at 415.2 picocuries per gram (pCi/g)[5] and Ra-226 at 44.2 pCi/g from a sample of brick from Lot 44. The Th-232 and Ra-226 RI screening criteria (determined from background[6] levels) for the building materials are 1.2 pCi/g and 0.9 pCi/g, respectively.

Asbestos-containing material, lead-based paint, and other hazardous materials were found in the WACC building structures, which would be expected for an industrial building of its age.

Air

Previous investigations found concentrations of radon and thoron above the screening criteria and EPA's guidance level of 4 pCi/L in indoor air at the former WACC property. Air sampling conducted prior to radiation mitigation activities in 2013 found the highest levels of air contamination in the buildings on Lots 42 and 44 (where the majority of WACC processing activities took place). Following the mitigation activities, the radon levels, as measured when the mitigation system was turned on, dropped to below EPA's guidance level.

Soils

Under the former WACC buildings, the highest concentrations of radiological contamination were encountered with a maximum concentration of 760 pCi/g found in a sample 10 to 12 feet bgs. Contamination extends to a depth of 28 feet bgs under the building on Lot 44, the former kiln/vat building, with a Th-232 concentration of 4.3 pCi/g[7] from 26 to 28 feet bgs; and to 24 feet bgs under Lot 42, the former yard where the monazite sands were loaded into the kiln/vat building for processing, with a Th-232 concentrations of 2.6 pCi/g from 22 to 24 feet bgs. The Th-232 and Ra-226 RI screening criteria for soil are 1.2 pCi/g and 0.9 pCi/g, respectively.

Surficial contamination was detected in the former rail spur area, at the intersection of Irving Avenue and Moffat Street, the northern portion of Moffat Street, the eastern portion of Irving Avenue, and in the southeastern corner of Lot 31/northern part of 350 Moffat (area adjacent to the Moffat Street/Irving Avenue intersection). The surficial contamination appears to have been, primarily, due to filling in the area with process tailings, as observed in soil borings. Other surficial contamination was likely caused by stockpiling of the monazite sands and tailings in the former storage yards, allowing rainwater to transport contamination to lower topographic areas. This also would have allowed wind to transport the particulate matter through the air, likely depositing near the former WACC property.

Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) were detected at the former WACC

[2] Combined sewers receive both sewage and stormwater flows and discharge to surface water when the sewer system's capacity is exceeded, *i.e.,* in significant storm events.

[3] Because the minimum detectable activity using gamma spectroscopy for U-238 is high, gamma spectroscopy results are not used as a first line indicator for U-238. Therefore, Ra-226, the decay progeny of U-238, is used to indicate U-238 levels.

[4] Soil samples were collected at three intervals—surficial (0-2 feet); shallow (2-10 feet); and deep (27-75 feet).

[5] The term provides an expression of how many radioactive decays are occurring per unit of time. Soils in New York State have background concentrations of Th-232 that range from 0.5 to 2 pCi/g.

[6] Background refers to substances or locations that are not influenced by the releases from a site and, therefore, can be used as a point of comparison.

[7] Background Th-232 concentrations ranged from 0.487 pCi/g to 1.132 pCi/g.

property as deep as 7 feet bgs; they may be related to former underground storage tanks (USTs). Elevated concentrations of PAHs found throughout the surficial soils at the former WACC property may be attributable to the handling of the contents of on-site USTs and/or the current use of the area to store demolished cars. A 2010 report by the New York City Department of Design and Construction identified two on-Site USTs whose contents were not reported. The same report indicates that a filling station with gasoline USTs previously operated at the property. Similar PAH concentrations were also found at nearby 308 Cooper Street.

Elevated concentrations of polychlorinated biphenyls (PCBs) were found in three surficial soil locations, with a maximum concentration of 100 milligrams per kilogram (mg/kg). PCBs in the shallow soils may be related to the USTs or a sump located below the building on Lot 33. While arsenic and iron concentrations exceeding the screening criteria were found in all samples at all depths, because these contaminants were also found at similar concentrations off-property, it is likely that they are associated with urban fill.

<u>Soils Underlying Streets</u>

Soil samples collected from a soil boring advanced in the middle of the intersection of Irving Avenue and Moffat Street revealed 209.93 pCi/g of Th-232 and 38.65 pCi/g of Ra-226 in the top 1 foot of soil. Contaminant concentration in soils under Moffat Street generally decreased moving south away from the WACC property, with elevated concentrations of Th-232 and Ra-226 observed in mostly surficial samples. Two soil borings located in gamma reading hotspots had elevated surficial Th-232 at 28.55 pCi/g and 59.35 pCi/g and Ra-226 at 5.55 pCi/g and 11.13 pCi/g, respectively. Visual observations of the soils at these locations indicated potential waste tailings in the top foot of soil. Approximately 40 feet south from the hotspot on Moffat Street, gamma readings drop to just above or within background levels.

<u>Sewers and Associated Soils</u>

The sewer investigation found significant radionuclide contamination present in the sewer system originating at the former WACC property. Gamma count measurements were significantly elevated in the manholes south of the former WACC buildings on Irving Avenue where process-liquors containing thorium were likely discharged. The elevated gamma counts (>20 times background) continue in the sewer line and manholes on Irving Avenue for approximately two blocks. Radionuclide contamination within the pipes and manholes is present in sediments and structural materials of the sewer manholes near the former WACC property.

The maximum radionuclide concentrations in sewer structural materials were found in the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue, with Th-232 at 2,536.2 pCi/g and Ra-226 at 163.1 pCi/g. The maximum Th-232 concentration in sewer sediments was observed in the manhole located south of the former WACC property on Irving Avenue, with Th-232 at 1,218.1 pCi/g and Ra-226 at 45.9 pCi/g.

Irving Avenue east of the Irving Avenue/Moffat Street intersection likely contains deep contamination associated with disposal of contaminated process-liquors in the sewer line in this area that may have leaked to the surrounding soils. One soil sample collected during the RI had a Th-232 concentration of 5 pCi/g and a Ra-226 concentration of 1.15 pCi/g. Contamination down to 8 feet bgs was observed at the intersection and the northern portion of Moffat Street at a concentration of 3.31 pCi/g of Th-232 and 2.31 pCi/g of Ra-226.

The Irving Avenue/Moffat Street intersection had the highest gamma scan readings outside of the WACC property. Gamma scan levels generally dropped to four times background at the intersection of Irving Avenue and Schaeffer Street and dropped to background levels at the intersection of Irving Avenue and Eldert Street, with sporadic occurrences of gamma levels above four times background continuing in the sewer along Halsey Street to Wyckoff Avenue.

While soil borings collected adjacent to the sewer lines found only limited radionuclide contamination, a fiberscope survey identified breaks in the pipeline along Irving Avenue in the vicinity of Cooper Street. Therefore, it is likely that the bedding material below the sewer in this area is contaminated.

Elevated Th-232 concentrations were detected in sediments in Newtown Creek in the area immediately adjacent to the sewer outfall. The maximum Th-232 concentration in these sediments was 70.2 pCi/g from 5 to 6 feet bgs.

<u>Groundwater</u>

Four rounds of groundwater sampling were conducted as part of the RI. While Th-232 concentrations slightly exceeded the screening criterion in one groundwater sample collected during the second sampling event, subsequent sample results indicated that radionuclide concentrations in the groundwater are all below the screening criteria.

Volatile organic compounds (VOCs) exceeded the standards in on-Site groundwater. There were, however, no known VOC uses at the WACC facility, VOCs were not detected in on-Site soil samples, and an upgradient groundwater sample showed elevated VOC concentrations. Therefore, it was concluded that the on-Site VOC concentrations were due to a non-site-related upgradient source.

Gamma Exposure Rate Confirmation Surveys

Gamma exposure rate surveys confirmed the results from the previous gamma exposure rate surveys conducted within the former WACC buildings and on sidewalks and streets near the former WACC property. Exposure rates remain above background levels throughout each of these areas, but they were within the background range a few blocks from the former WACC property. The maximum gamma exposure rates observed were collected on Irving Avenue south of the former WACC property at 220 microRoentgens per hour (μR/hr)[8] near the sidewalk curb and 338 μR/hr in the middle of the street. These readings were taken at waist height or approximately three feet above the ground surface.

School/Daycare Center Investigation

Soil samples collected from around the nearby school only slightly exceeded the screening criteria. Soil samples collected from beneath the school and from around and beneath the nearby daycare center did not contain radiological contamination. Short-term radon levels collected in the daycare center and school and long-term radon and thoron levels collected in the school were below or equal to the screening criteria for indoor air, ranging from 0.1 pCi/L to 0.4 pCi/L. Gamma exposure rates collected from within the school and daycare center were all within or below the background observed for the neighborhood.

RISK SUMMARY

Based upon the results of the RI, a baseline human health risk assessment (HHRA) was conducted to estimate current and future effects of contaminants on human health. A baseline HHRA is an analysis of the potential adverse human health effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases under current and future land and groundwater uses.

A four-step human health risk assessment process was used to assess Site-related excess lifetime cancer risks and noncancer health hazards. The four-step process is comprised of Hazard Identification of Chemicals of Potential Concern (COPCs) and Radionuclides of Potential Concern (ROPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization (see the text box below, "What is Risk and How is It Calculated?" for more details on the risk assessment process).

The excess lifetime cancer risk and non-cancer health hazard estimates in the HHRA are based on current reasonable maximum exposure scenarios and were developed by taking into account various health protective estimates about the frequency and duration of an individual's exposure to chemicals selected as COPCs and ROPCs, as well as the toxicity of these contaminants.

Excess lifetime cancer risks and non-cancer hazard indices (HIs) are summarized below.

The Site is in a mixed industrial/commercial area with no environmentally-sensitive areas and limited habitat for ecological receptors. Therefore, a focused screening level ecological risk assessment (SLERA) was conducted in lieu of a full SLERA to assess the risk posed to ecological receptors based on sewer discharges into Newtown Creek.

Human Health Risk Assessment

While the Site is located in a mixed industrial/commercial area, there are residences located on-Site and within a few hundred feet of the Site. The predominant land use in the area surrounding the former facility is residential (attached houses and apartment buildings), and the neighborhood is near areas of Brooklyn that have been under intense redevelopment (primarily residential) over the past 10 years.

Due to the developed nature of the Site, direct exposure to COPCs in the soil (*i.e.,* direct contact with contaminated soil, as opposed to exposure to radiation emanating from the soil, which is discussed under complete exposure pathways, below) is limited for current receptors. In addition, groundwater is not currently used for any purpose at or near the Site; therefore, direct exposure to contaminants in groundwater was not evaluated for current receptors.

While it is expected that the future land and groundwater use in this area will remain the same, a change in land use to residential was considered in the risk assessment, as is discussed in more detail below.

COPCs and ROPCs were selected primarily through comparison to risk-based screening levels. COPCs were identified for surface and subsurface soil and groundwater by comparison of maximum detected

[8] μR/hr is a measurement of energy produced by radiation in a cubic centimeter of air.

concentrations in site media to EPA regional screening levels for residential soil and tap water. Maximum detections of radionuclides in Site media were compared to EPA preliminary remediation goals for residential soil and tap water to select ROPCs.

The HHRA evaluated health effects that could result from external radiation exposure from surface and subsurface soils and outdoor and interior surfaces, direct contact (*i.e.,* ingestion and inhalation) with radionuclides and other chemicals in surface soils, subsurface soils, and sewer sediments, inhalation of radon and thoron in indoor air, direct contact with chemicals in the groundwater, and inhalation of vapors from groundwater.

Based on the current use and anticipated future use, the HHRA focused on a variety of possible receptors, including on-Site workers, public users of the property and surrounding areas, nearby and on-Site residents, construction/utility workers, trespassers, and school children.

A more detailed discussion of the exposure pathways and estimates of risk can be found in the *Final Human Health Risk Assessment.*

Human Health Risk Assessment Summary

In general, EPA recommends a target cancer risk range of 1×10^{-6} to 1×10^{-4} and a HI value of 1 as threshold values for human health impacts.

Non-radiological excess cancer risk exceeds EPA's target threshold for future residents and is at the upper end of EPA's target range for industrial workers. The primary COPC cancer risk drivers are PCB Aroclors and the PAH benzo(a)pyrene present in surface soil. Hot spots for these COPCs are present on the former WACC property. Noncancer health hazards associated with exposure to surface soil for future residents exceed the target threshold due to exposure to PCBs and selenium. Noncancer health hazards associated with exposure to surface soil for future industrial workers also exceed the target threshold due to exposure to PCBs. Excess cancer risk for future construction/utility workers exposed to COPCs in surface/subsurface soil is within EPA's target range. Noncancer health hazards associated with exposure to surface/subsurface soil for future construction/utility workers exceed the target threshold established for exposure to PCBs.

Complete exposure pathways for current, commercial receptors to radionuclides of potential concern include external gamma radiation from soil, external gamma radiation from outdoor and indoor surfaces, and inhalation of radon and thoron in indoor air.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the COPCs at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential excess lifetime risk of developing cancer, additional to baseline, and the potential for non-cancer health hazards.

The likelihood of an individual developing excess cancer is expressed as a probability. For example, a 10^{-4} excess lifetime cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, an HI is calculated. The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for excess cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} excess cancer risk or an HI of 1 are typically those that will require remedial action at the site.

Excess cancer risks were estimated for radiological/non-radiological cancer risks, and then the radiological cancer risks were estimated for non-radon-related cancer risks and radon-related cancer risks.[9] Non-radon-related excess cancer risk for current, commercial indoor workers (1 x 10^{-3}) and industrial workers (3 x 10^{-3}) exceed EPA's target cancer risk range, primarily, related to external gamma radiation exposure from Th-232 and its associated decay products (over 90 percent), with the majority of the remaining fraction associated with Ra-226. Inhalation of dust particles and soil ingestion pathways make negligible contribution to risk. Cancer risk related to exposure to radon gas, produced by the decay of radioactive material on-Site, was estimated to be significantly higher than exposure to external gamma radiation. The excess cancer risk from radon was 2×10^{-3} for the current and future commercial indoor worker, as well as the future industrial worker (or double the Th-232 risk). The excess radiological cancer risk was estimated at 3×10^{-3} for both radon and non-radon risk for the future industrial worker.

As noted above, as part of a 2013 removal action which was intended to reduce potential radiation exposure to workers over the short term, EPA installed shielding in most of the work areas and radon mitigation systems in some areas on the former WACC property. Shielding was shown to be effective in reducing annual exposure to current workers below public dose limits.

Total radiological excess cancer risk for future on-property residents, excluding radon, is approximately 5×10^{-3}. For residential consumption of home grown produce, the risk was 1×10^{-2}. Radiological excess cancer risk was dominated by external exposure, which accounts for 80 to 90 percent of estimated risk. Th-232 and its associated decay products was responsible for most (greater than 90 percent) of the risk due to external exposure. The total radiological excess cancer risk estimate, including radon but excluding produce, is 8×10^{-3}. The total radiological excess cancer risk estimate for all exposure pathways is 2×10^{-2}.

Radiological risks for both future indoor and industrial workers are anticipated to be much the same as risks for current workers. Any future commercial or industrial construction is likely to have a substantial on-slab foundation, which should provide much the same shielding as the shielding previously put in place. Total cancer risk for future workers considering shielding from a foundation and, excluding radon, is 2×10^{-3} and 3×10^{-3} including radon. Excess cancer risks for future workers assuming no cover of the contaminated zone range as high as 4×10^{-3}. For future industrial workers with shielding and excluding radon, the cancer risk is 3×10^{-3} and including radon, it is 5×10^{-3}. With no cover, the cancer risk is 5×10^{-3}.

Future development of the Site would require construction workers to be on-Site without benefit of shielding for up 100 work days. Excess cancer risk for construction workers would be about 5×10^{-5}. For utility workers exposed to sewer sediment, excess cancer risk would be about 2×10^{-4}or at the upper end of the acceptable risk range. Future risks for the general public and for off-Site receptors are assumed to be similar to current risks for these receptors. High risk estimates (above 1×10^{-4}) for workers suggest some potential for the general public to experience exposure above regulatory thresholds.

Groundwater is not currently used as drinking water, and it is unlikely to be used as such in the foreseeable future; however, drinking water scenarios were evaluated for future residents and future commercial indoor workers. Chemical risk drivers in groundwater at the Site include tetrachloroethylene (PCE), trichloroethylene (TCE), and hexavalent chromium. PCE and TCE contaminant plumes appear to originate from upgradient sources and are not deemed to be Site-related. The risk associated with exposure to hexavalent chromium in groundwater is most likely overestimated because the HHRA assumes that hexavalent chromium is present as a fraction of the total chromium concentration.

The total HI under the reasonable maximum exposure (exposure above about the 90th percentile of the population distribution) scenario for future residents exposed to COPCs in surface soil is 55. The majority of the HI is due to ingestion of PCBs.

Screening Level Ecological Risk Assessment Summary

Due to the extremely limited habitat, a full SLERA was not conducted; instead a focused screening evaluation was conducted. The purpose of the focused SLERA was to describe the likelihood, nature, and extent of adverse effects in ecological receptors exposed to Site-related radionuclides as a result of releases to the environment from past processing activities at the Site. Because the CSO discharges may contain thorium waste from

[9] Cancer slope factors provided in the RESidual RADioactivity, Department of Energy computer model (RESRAD) Onsite Version 7.2 model and in the online EPA PRG Calculator for Radionuclides were used by EPA's contractor, CDM Smith, for radionuclides. CDM Smith also completed a risk and dose assessment using the Preliminary Remediation Goal (PRG) calculator and RESRAD 7.2. Both methods were used to estimate cancer risk from radionuclides and the results from both methods support the need to take action under CERCLA.

monazite sand processing, this evaluation focused on risks to ecological receptors exposed to the Site-related CSO discharges in Newtown Creek (approximately 1.9 miles to the northwest). Newtown Creek is a tidal arm of the New York-New Jersey Harbor Estuary.

Maximum and mean radionuclide concentrations measured in sediment were compared to biota concentration guides (BCGs) for riparian animals in the aquatic ecosystem. The results of the screening evaluation verify that radionuclide concentrations in sediment in the East Branch of Newtown Creek are significantly less than BCGs and that dose to receptors is below biota dose limits. The bulk of measured radioactivity in sediment is likely due to natural background of radionuclides except for the thorium isotopes (*i.e.,* Th-228, Th-230, and Th-232) and their progeny. Further supporting conclusions of low or insignificant risk to ecological receptors are observations that the Site and nearby areas provide only limited ecological habitat.

Risk Assessment Conclusions

The results of the HHRA indicate that radiation from surface and subsurface soils, the inhalation of radon in indoor air, and incidental ingestion of PCBs and benzo(a)pyrene in surface soil present unacceptable exposure risks. Based on the results of the RI and the risk assessment, EPA has determined that the actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a threat to human health or welfare or the environment. It is EPA's current judgment that the preferred remedial alternative identified in this Proposed Plan is necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance, and Site-specific risk-based levels.

The following RAOs have been established for the Site:

- Reduce or eliminate human exposure via inhalation of radon and thoron, incidental ingestion, dermal adsorption, and external exposure to radiological contamination (Ra-226 and Th-232) present within the on-Site buildings to levels protective of current and anticipated future use by preventing exposure to contaminant levels above preliminary remediation goals (PRGs);[10]
- Reduce or eliminate the human exposure threat via inhalation, incidental ingestion, dermal adsorption, and external exposure to contaminated Site soils and solids (*i.e.,* sewer pipe and sediments/sludge in sewers) to levels protective of current and anticipated future land use by preventing exposure to benzo(a)pyrene, Aroclor-1260, Ra-226 and Th-232 to concentrations above PRGs; and
- Prevent/minimize the migration of Site contaminants off-Site through surface runoff, dust particulate migration, and CSO discharge.

In achieving the RAOs for the Site, EPA will also rely on "As Low As Reasonably Achievable" (ALARA) (10 CFR 20.1003). ALARA, which has been used at other radiologically-contaminated sites in EPA Region 2, means taking additional measures during implementation of the remedial action beyond those required to meet a specified cleanup goal to assure protectiveness. An ALARA approach will be used because of the long-lived nature of radionuclides, the difficulty in eliminating routes of exposure, and limitations of the analytical equipment to detect radionuclides at levels approaching natural background levels. Applying PRGs with ALARA principles at other EPA Region 2 sites has resulted in exposure levels that are lower than the levels that would result from using the PRGs alone.

Preliminary Remediation Goals

The PRGs for this Site are summarized in the table, below.

Contaminants of Concern	Preliminary Remediation Goal	Specifically Applied Principles
Solids		
PCBs	1 mg/kg	
Benzo(a)pyrene	1 mg/kg	
Ra-226[11]	1 pCi/g	ALARA
Th-232	4 pCi/g	ALARA

[10] Because there are no promulgated standards or criteria that apply to radiological-contaminated soils and building material, PRGs were developed. PRGs are used to define the extent of cleanup needed to achieve the RAOs.

[11] Ra-226 is used to indicate U-238 levels.

Contaminants of Concern	Preliminary Remediation Goal	Specifically Applied Principles
Indoor Air		
Combined Radon-222 and Radon-220 measured indoors	4 pCi/L[12]	ALARA
Combined decay products of Radon-222 and Radon-220 measured indoors	0.02 working level [12,13]	ALARA

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA 121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA 121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA 121(d)(4), 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives considered for addressing the contaminated building material, sewer pipe, and manholes, and surface and subsurface soil contamination can be found in the *Final Feasibility Study Report* for the Site.

The time required to construct or implement the remedy under each alternative are estimates based on construction activity production rates. Actual durations may be longer. The estimates do not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

The remedial alternatives are:

Alternative 1: No Further Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the contamination at the property.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated materials.

Alternative 2: Temporary Relocation of Tenants, Targeted Building Demolition, Installation of Additional Shielding, Shallow Soil Excavation, Soil Cover Over Remaining Contamination, Sewer Removal/Cleaning, Off-Site Disposal, and Institutional Controls

Capital Cost:	$34,400,000
Annual O&M Cost:	$109,000
Present-Worth Cost:	$36,200,000
Construction Time:	1 year 3 months

Under this alternative, the five tenants of the buildings on Lots 42, 44, and 46 would be temporarily relocated while on-Site construction occurs. The construction would begin with the demolition of the currently unoccupied warehouse located on Lot 33.

After the building demolition is completed, contaminated soil would be excavated to a maximum depth of approximately 4 feet bgs on the portions of the Site where no buildings are present and beneath the roadway and sidewalks along Irving Avenue and Moffat Street and on the 308 Cooper Street and 350 Moffat Street properties.

In accordance with ALARA principles, the clay pipe sewer line beginning at the manhole located on Irving Avenue southwest of the former WACC property and extending northwest to the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue would be excavated and replaced (approximately

[12] Including natural background.
[13] Some devices measure radiation from radon decay products, rather than radiation coming directly from radon. Measurements from these devices are often expressed as “Working Level.”

150 feet of pipe). After the removal of the sewer line, bedding material samples would be collected from the open excavation to determine if the bedding material is contaminated. Any bedding material that exceeds the PRGs would also be removed and replaced.

The remaining portion of the sewer line down to the intersection of Wyckoff Avenue and Halsey Street (approximately 1,950 feet) and a portion of the pipe line on Cooper Avenue branching with the Irving Avenue sewer line approximately 200 feet northeast of the Cooper Avenue and Irving Avenue intersections (approximately 200 feet) would undergo jet cleaning using high-pressure water nozzles to flush out dirt, sediments/sludge, and any other matter from the sewer pipeline. The jetting would be performed in combination with vacuuming to collect the jetted waste for off-Site disposal. Following completion of sewer jet cleaning, a gamma survey would be performed within the flushed sewer to determine if high gamma counts are still present. Any portions of the sewer line with elevated gamma counts would undergo further investigation, including the sewer material and bedding, to determine the source of the radiological contamination. Those portions of the sewer line, along with any bedding material that exceeds PRGs, would be removed and replaced.

In order to maintain uninterrupted sewer service during the sewer line replacement, upgradient sewage flow would need to temporarily bypass the portion of sewer line under construction to the downgradient sewer line. To do this, a temporary bypass system with the design flow capacity of the upgradient sewer line would be installed in the upgradient manhole to the downgradient manhole. Temporary plugs would be set in place between these points to allow the sewer pipe to be removed.

Final status surveys (gamma scan and post-excavation sampling) would be performed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)[14] to ensure that the PRGs are met prior to Site restoration. In areas where contaminated soil is determined to be present greater than 4 feet bgs, the excavation would only be increased horizontally based on sidewall sampling results in excess of PRGs. The Site restoration would include backfill of excavated areas with clean fill, placement of a geofabric layer to delineate clean fill from contaminated soil, and replacement of portions of the sidewalk and roadway that were removed during excavation.

Additional radiation shielding would be installed on top of the existing shielding in the buildings on Lots 42 and 44 and the basement side wall on Lot 46 along its boundary with Lot 44.

Under this alternative, it is estimated that approximately 18,800 cubic yards (cy) of contaminated soil, sewer sediment, and debris would be excavated and disposed of off-Site. The materials would be disposed of as Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)[15] waste in a permitted landfill. It is estimated that approximately 5,900 cy of building debris would be disposed of off-Site in a non-hazardous waste landfill.

An environmental easement would be recorded for Lots 42, 44, 46, and Irving Avenue and Moffat Street, and the 350 Moffat Street property, which would limit intrusive activity and allow access for monitoring. The easement would also require the installation of a radon mitigation system for future construction.

A long-term monitoring plan would be put in place to monitor radon and thoron levels in the buildings that would remain at the former WACC property. Maintenance of the existing radon system would continue, annual inspections of the soil cover would be performed to monitor erosion and ensure continued protection of human health, and maintenance would be conducted as necessary, and groundwater samples would be collected periodically to monitor if contaminants are leaching from the soil over time.

While a remediation time frame of 30 years is used for estimating the costs associated with the operation and maintenance (O&M) activities, due to the extremely long half-life of the radioactive isotopes present at the Site, it is understood that under this alternative, O&M would continue in perpetuity.

Annual inspections of the soil cover would be performed to monitor erosion and ensure continued protection of human health and maintenance would be conducted as necessary. Groundwater samples would be collected periodically to monitor if contaminants are leaching from the soil over time.

Although not part of the alternative, because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and

[14] This document provides guidance on how to demonstrate that a site is in compliance with a radiation dose- or risk-based regulation.

[15] Naturally-occurring radioactive materials that have been concentrated or exposed to the accessible environment as a result of human activities, such as manufacturing, mineral extraction, or water processing.

unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

Alternative 3: Permanent Relocation of Tenants, Demolition of WACC Buildings, Shallow Soil Excavation, Soil Cover of Remaining Contamination, Sewer Removal/Cleaning, Off-Site Disposal, and Institutional Controls

Capital Cost:	$33,500,000
Annual O&M Cost:	$60,000
Present-Worth Cost:	$34,200,000
Construction Time:	1 year 4 months

Under this alternative, the five tenants of the buildings on Lots 42, 44, 46, and 48 would be permanently relocated. Subsequently, all of the on-Site buildings would be demolished.

Following the demolition of the buildings, soil excavation would extend to a maximum depth of approximately 4 feet bgs over the entire former WACC property,[16] as well as beneath the roadway and sidewalks along Irving Avenue and Moffat Street and on the 308 Cooper Street and 350 Moffat Street properties.

The contaminated sewer would be addressed as described in Alternative 2.

Final status survey and Site restoration would be addressed as described in Alternative 2.

Under this alternative, an estimated 19,400 cy of contaminated soil, sewer sediment, and debris would be excavated and disposed of off-Site as TENORM waste in a permitted landfill. Approximately, 6,400 cy of building debris would be disposed of off-Site in a non-hazardous waste landfill.

To limit intrusive activity and allow access for monitoring, an environmental easement would be recorded for the portions of the former WACC property and Irving Avenue and Moffat Street, and the 350 Moffat Street property where contamination would remain at depth. The easement would also require the installation of a radon mitigation system for future construction.

Annual inspections of the soil cover would be performed to monitor erosion and ensure continued protection of human health and maintenance would be conducted as necessary. Groundwater samples would be collected periodically to monitor if contaminants are leaching from the soil over time.

Although not part of the alternative, because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

Alternative 4: Permanent Relocation of Tenants, Demolition of WACC Buildings, Soil Excavation, Sewer Removal/Cleaning, and Off-Site Disposal

Capital Cost:	$39,400,000
Annual O&M Cost:	$0
Present-Worth Cost:	$39,400,000
Construction Time:	1 year 5 months

Under this remedial alternative, as in Alternative 3, the five tenants of the buildings on Lots 42, 44, 46, and 48 would be permanently relocated, and all of the on-Site buildings would be subsequently demolished.

Following the demolition of the buildings, all soils exceeding the PRGs would be excavated from the former WACC property, including those highly contaminated soils that extend down to approximately 28 feet bgs beneath Lots 42 and 44, as well as those beneath the roadway and sidewalks along Irving Avenue and Moffat Street and on the 308 Cooper Street and 350 Moffat Street properties.

The contaminated sewer line would be addressed as described in Alternative 2.

Final status surveys would be performed to ensure that PRGs are met prior to Site restoration in accordance with MARSSIM.

Site restoration would include backfilling areas of the excavated areas with clean fill followed by resurfacing of roadways and sidewalks impacted by the construction. The top layer of the clean fill would consist of soil suitable to support vegetation.

Under this alternative, an estimated 24,300 cy of contaminated soil, sewer sediment, and debris would be excavated and disposed of off-Site as TENORM waste in a permitted landfill. Approximately 6,400 cy of building

[16] Contaminated soil beneath Lots 42 and 44 extends to a depth of approximately 28 feet bgs. Risk calculations indicate that if a building is constructed at the property in the future, the four-foot clean soil cover and installation of a radon mitigation system would reduce the risk to within EPA's acceptable risk range.

debris would be disposed of in a non-hazardous waste landfill.

Because this alternative would not result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, five-year reviews would not be necessary.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria set forth in federal regulation, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance.

The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.
- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and O&M costs, and net present-worth costs.
- State acceptance indicates if, based on its review of the RI/FS and this Proposed Plan, the state concurs with the preferred remedy at the present time.
- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in this Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Alternative 1 would not be protective of human health and the environment, since it would not actively address the contaminated soil, building materials, and sewer line.

Alternative 2 would achieve the RAOs and protection of human health through the installation of additional shielding, excavation and off-Site disposal of contaminated surface soil and backfill with clean fill, and sewer removal/cleaning, in combination with the installation of a radon mitigation system for future construction, long-term management, and institutional controls. The protectiveness of this alternative would be dependent on the adherence to institutional controls and the O&M of the implemented remedy.

Alternative 3 would achieve RAOs and protection to human health by excavation and off-Site disposal of contaminated surface soil and backfill with clean fill, sewer removal/cleaning, long-term management, installation of a radon mitigation system for future construction, and institutional controls. The protectiveness of this alternative is dependent on adherence to institutional controls and O&M of the implemented remedy.

Alternative 4 would achieve RAOs and protection of human health and the environment by sewer removal/cleaning and excavating contaminated soil and building materials above the PRGs from the Site. The residual risks would be within EPA's acceptable risk range and, therefore, institutional controls would not be required.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Because there are no federal or state promulgated standards or criteria that apply to radiological-contaminated soils and building material, PRGs were developed to define the extent of the cleanup needed to achieve the RAOs.

Because the contaminated soils, building material, and sewer would not be addressed under Alternative 1, this alternative would not achieve the cleanup objectives.

Alternative 2 would meet the PRGs through the installation of additional shielding, the excavation and off-Site disposal of contaminated surface soil and backfill with clean fill, sewer removal/cleaning, and the use of radon mitigation systems in future construction.

Alternative 3 would meet the PRGs through a combination of excavation and off-Site disposal of contaminated surface soil and backfill with clean fill, and sewer removal/cleaning.

Alternative 4 would meet the PRGs through sewer removal/cleaning and removing contaminated soil and building materials.

Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants.

The additional shielding, excavation and off-Site disposal of contaminated surface soil and backfilling with clean fill, and sewer removal/cleaning under Alternative 2 would provide long-term effectiveness and permanence for the buildings that would remain in place. Long-term effectiveness and permanence would rely on the maintenance of the soil covering the contamination left in place, future monitoring, and implementation of institutional controls to require the use of radon mitigation systems if buildings are constructed on the former WACC property in the future.

Alternative 3 would provide a slightly greater degree of long-term effectiveness and permanence than Alternative 2 in that it would leave no WACC buildings in place and would employ shallow excavation and backfill with clean fill in the excavation areas; however, it would still require institutional controls to limit intrusive activity and allow access for monitoring.

Due to the extremely long half-life of the radioactive isotopes present at the Site, under Alternatives 2 and 3, O&M would be necessary in perpetuity.

Alternative 4 would provide the highest degree of long-term protectiveness and permanence by sewer removal/cleaning and removing contaminated soil and building materials above the PRGs from the Site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 1 would provide no reduction in toxicity, mobility or volume.

Alternatives 2, 3 and 4 would reduce the mobility of contaminants to varying extents by removing varying amounts of contaminated soil and debris from the Site. As Alternative 4 would remove the greatest amount of contaminated soil and debris, it would result in the greatest reduction in the mobility of contaminants, followed by Alternative 3 and the Alternative 2.

Alternatives 2 through 4 would not reduce the toxicity or volume of contaminants and would not meet the statutory preference for treatment as a principal element of the remedial action. However, no proven and cost-effective treatment technology is currently available to treat radioactive wastes.

Short-Term Effectiveness

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to remediation workers or the community as a result of its implementation.

Alternatives 2-4 involve the same extent of sewer removal and cleaning, and would, therefore, similarly adversely impact local traffic through street closures.

Under Alternative 2, only the warehouse on Lot 33 would be demolished and would only involve shallow soil excavation; therefore, of the action alternatives, this alternative would present the least impact to the community and workers due to the demolition and excavation work.

Alternative 3 would present a slightly greater impact to the community and workers than Alternative 2 due to demolition of all of the buildings and the excavation of a greater volume of soil.

Because Alternative 4 would involve the greatest amount of soil excavation, it would cause the greatest level of short-term impacts to the community and potential impact to workers due to the need to safely manage and conduct these operations in limited space and constrained areas. These impacts could, however, be mitigated as discussed below.

For Alternatives 2-4, there is a potential for increased stormwater runoff and erosion during construction and excavation activities that would have to be properly managed to prevent or minimize any adverse impacts.

For these alternatives, appropriate measures would have to be taken during the building demolition and excavation activities to prevent the transport of fugitive dust and exposure of workers and the community.

Alternatives 2-4 might present some limited risk to remediation workers through exposure to radiologically-contaminated materials through the building demolition and soil excavation activities. The risks to on-Site workers could, however, be minimized by utilizing proper protective equipment.

Noise from the demolition and excavation work associated with Alternatives 2-4 could present some limited adverse impacts to remediation workers and nearby residents. Following appropriate health and safety protocols and exercising sound engineering practices would protect the remediation workers and community.

Alternatives 2-4 would require the off-Site transport of contaminated soil and material (ranging from approximately 920 truckloads for Alternative 2 to 1,240 truckloads for Alternative 4), which would potentially adversely affect local traffic. However, a traffic control plan would be developed to mitigate adverse impacts to traffic.

The temporary relocation of the five tenants under Alternative 2 would physically disrupt the businesses twice. Permanently relocating the businesses under Alternatives 3 and 4 would, on the other hand, cause less physical disruption in that the tenants would only have to move once. Depending upon the location to which the tenants are relocated, both temporary and permanent relocation could cause the loss of customers.

Because no actions would be performed under Alternative 1, there would be no implementation time. It is estimated that Alternatives 2-4 would require one year five months, one year six months, and one year seven months, respectively, to implement.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake.

Although the total volume of material to be excavated under Alternative 2 is less than the other alternatives, the targeted demolition and excavation of Lot 33, coupled with the placement of shielding in the other former WACC property buildings, would likely make Alternative 2 more difficult to implement. This is due to the structural condition of the buildings on the lots adjacent to Lot 33 and the physical constraints present in the area. The demolition of all of the former WACC buildings that would occur under Alternatives 3 and 4 would make the demolition and excavation components of those alternatives easier to implement than the demolition component of Alternative 2. Given the volume of contaminated soil to be excavated, the excavation component of Alternative 4 would likely be more difficult to implement than the excavation components of Alternatives 2 and 3.

Alternatives 2-4 would employ technologies known to be reliable and that can be readily implemented. Equipment, services, and materials needed for these alternatives are readily available, and the actions would be administratively feasible. Sufficient facilities are available for the disposal of the excavated soils and demolition debris.

While the installation of additional shielding under Alternative 2 is technically feasible, the additional shielding would limit the ability of one of the tenants, an auto body shop, from conducting business, as there would not be sufficient space to lift automobiles for repairs.

The implementation of institutional controls under Alternatives 2 and 3 would be relatively easy to implement.

Cost

The estimated capital, O&M, and present-worth cost are discussed in detail in EPA's *Final Feasibility Study Report*. For estimating costs and for planning purposes, a 30-year time frame was used for O&M under Alternatives 2, 3, and 4. The costs estimates are based on the best available information. The highest present-worth cost is Alternative 4 at $38.8 million. The table below summarizes the estimated costs.

Alternative	Capital Cost	Annual O&M Cost	Present Worth
1	$0	$0	$0
2	$34,400,000	$109,000	$36,200,000
3	$33,500,000	$60,000	$34,200,000
4	$39,400,000	$0	$39,400,000

State/Support Agency Acceptance

NYSDEC concurs with the preferred remedial alternative.

Community Acceptance

Community acceptance of the preferred remedial alternative will be evaluated after the public comment period ends and will be described in the ROD.

PREFERRED REMEDY

Based upon an evaluation of the various alternatives, EPA, in consultation with NYSDEC and the other federal, state, and local governmental stakeholders, recommends Alternative 4, permanent relocation of the tenants, demolition of the former WACC buildings, contaminated soil excavation, contaminated sewer removal/cleaning, and off-Site disposal of the contaminated soils and debris, as its preferred remedy for the Site.

Under this alternative, the five tenants of the buildings on Lots 42, 44, and 46 would be permanently relocated. Subsequently, all of the on-Site buildings would be demolished.

Following the demolition of the buildings, all soils exceeding the PRGs on the former WACC property, including those highly contaminated soil that extend down to approximately 28 feet bgs beneath Lots 42 and 44, as well as beneath the roadway and sidewalks along Irving Avenue and Moffat Street and 308 Cooper Street and 350 Moffat Street properties, would be excavated.

The clay pipe sewer line beginning at the manhole located on Irving Avenue southwest of the former WACC property and extending northwest to the manhole located approximately 50 feet northwest of the intersection of Irving Avenue and Cooper Avenue would be excavated and replaced (approximately 120 feet of pipe). After the removal of the sewer line, bedding material samples would be collected from the open excavation to determine if the bedding material is contaminated. Any bedding material that exceeds the PRGs would also be removed and replaced.

The remaining portion of the sewer line down to the intersection of Wyckoff Avenue and Halsey Street (approximately 2,150 feet) would undergo jet cleaning using high-pressure water nozzles to flush out dirt, sediments/sludge, and any other matter from the sewer pipeline. The jetting would be performed in combination with vacuuming to collect the jetted waste for off-Site disposal. Following completion of sewer jet cleaning, a gamma survey would be performed within the flushed sewer to determine if high gamma counts are still present. Any portions of the sewer line with elevated gamma counts would undergo further investigation, including the sewer material and bedding, to determine the source of the radiological contamination. Those portions of the sewer line, along with any bedding material that exceeds PRGs would be removed and replaced.

In order to maintain uninterrupted sewer service during the sewer line replacement, upgradient sewage flow would need to temporarily bypass the portion of sewer line under construction to the downgradient sewer line. To do this, a temporary bypass system capable of the design flow capacity of the upgradient sewer line would be installed in the upgradient manhole to the downgradient manhole. Temporary plugs would be set in place between these points to allow the sewer pipe to be removed.

Final status surveys would be performed to ensure that PRGs are met prior to Site restoration in accordance with MARSSIM.

Site restoration would include backfilling the areas of excavation with clean fill followed by resurfacing of roadways and sidewalks impacted by the construction.

The excavated contaminated soil, sewer sediment, and debris would be disposed of either in a non-hazardous waste landfill or in a landfill permitted to accept radioactive waste, based upon the level of radioactivity in the materials.

Because this alternative would not result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, five-year reviews would not be necessary. If, however, due to the substantial cost of the alternative there is a need to incrementally fund the project, resulting in the remediation effort requiring five or more years to complete, policy five-year reviews would be required until the remedial action is completed.

During the RI, several nearby properties were reviewed to assess potential impacts from WACC operations. To accomplish this, the age of nearby buildings was compared to the time WACC conducted rare earth element extraction at the property (*i.e.,* approximately 1920 until 1954). If a building structure was present prior to 1924 and remained on the property until at least 1954, it was unlikely to have been impacted. However, if a building was constructed after WACC's processing began, the property could have been impacted. No data were collected at three properties-282 Moffat Street; 323 Moffat Street; and the parking lot of 335 Moffat Street. Additionally, only minimal data was collected at 335 Moffat Street and 338-350 Moffat Street. During the design of the selected remedy, an investigation would be conducted at the noted areas. Any contaminated soils in these areas would be addressed as part of the remedy.

Basis for the Remedy Preference

While Alternative 2 is approximately $3 million less costly than Alternative 4, the most-costly alternative, it requires the disruption of the five tenants twice (temporary relocation) and leaves significant levels of radiological contamination in-place in both the structures and underlying soil (which would also continue to produce radon/thoron gas) that would necessitate institutional controls, maintenance, and long-term monitoring to be protective. Furthermore, the additional shielding required by Alternative 2 would limit the ability of one of the tenants, an auto body shop, from conducting business, as there would not be sufficient space to lift automobiles for repairs. In addition, the ability to ensure that the institutional controls remain in place in such a setting as the WACC buildings would be difficult.

While Alternative 3 is the least costly action alternative and removes the radiologically-contaminated building materials and much of the contaminated soils, because some contaminated soil would remain, institutional controls would be necessary to restrict the future use of the property; ensuring such controls remain effectively in place can be difficult. Since the radioactive half-life of Th-232 is 14 billion years, institutional controls, maintenance, and long-term monitoring would need to be managed in perpetuity. Alternative 4 avoids the problems associated with such issues, because it permanently relocates the tenants and removes the radiologically-contaminated building materials and underlying contaminated soils, thereby allowing unlimited future use of the property.

The preferred remedy is believed to provide the greatest protection of human health and the environment, provide the greatest long-term effectiveness, be able to achieve the ARARs more quickly, or as quickly, as the other alternatives, and is cost effective. Therefore, the preferred remedy will provide the best balance of tradeoffs among alternatives with respect to the evaluating criteria. EPA believes that the preferred remedy will be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The preferred remedy will not meet the statutory preference for the use of treatment as a principal element of the remedial action because no proven and cost-effective treatment technology is currently available to treat radioactive wastes.

.

The environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy.[17] This will include consideration of green remediation technologies and practices.

---

17 See http://epa.gov/region2/superfund/green_remediation and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

Figure 1—Wolff-Alport Chemical Corporation Site

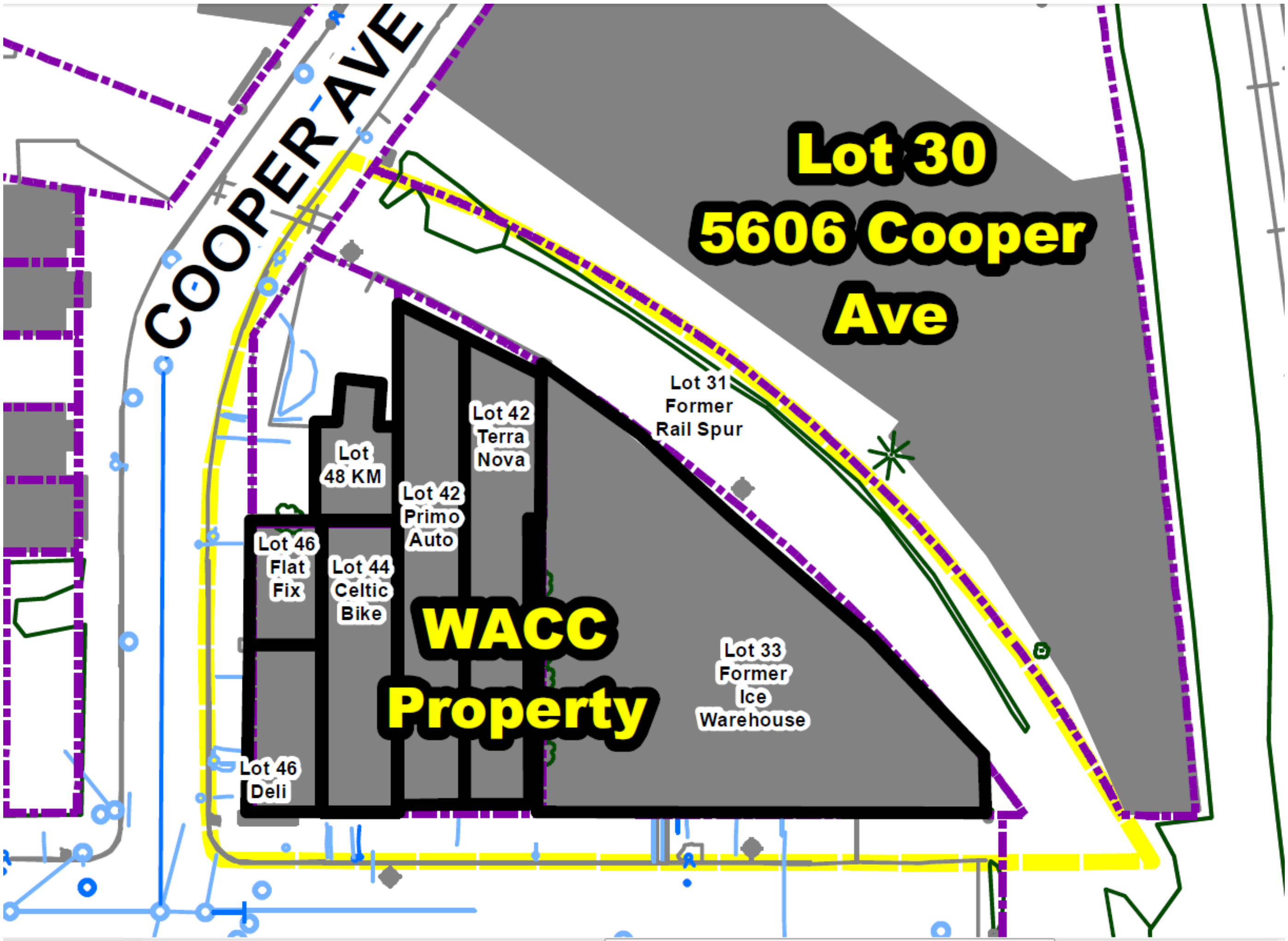
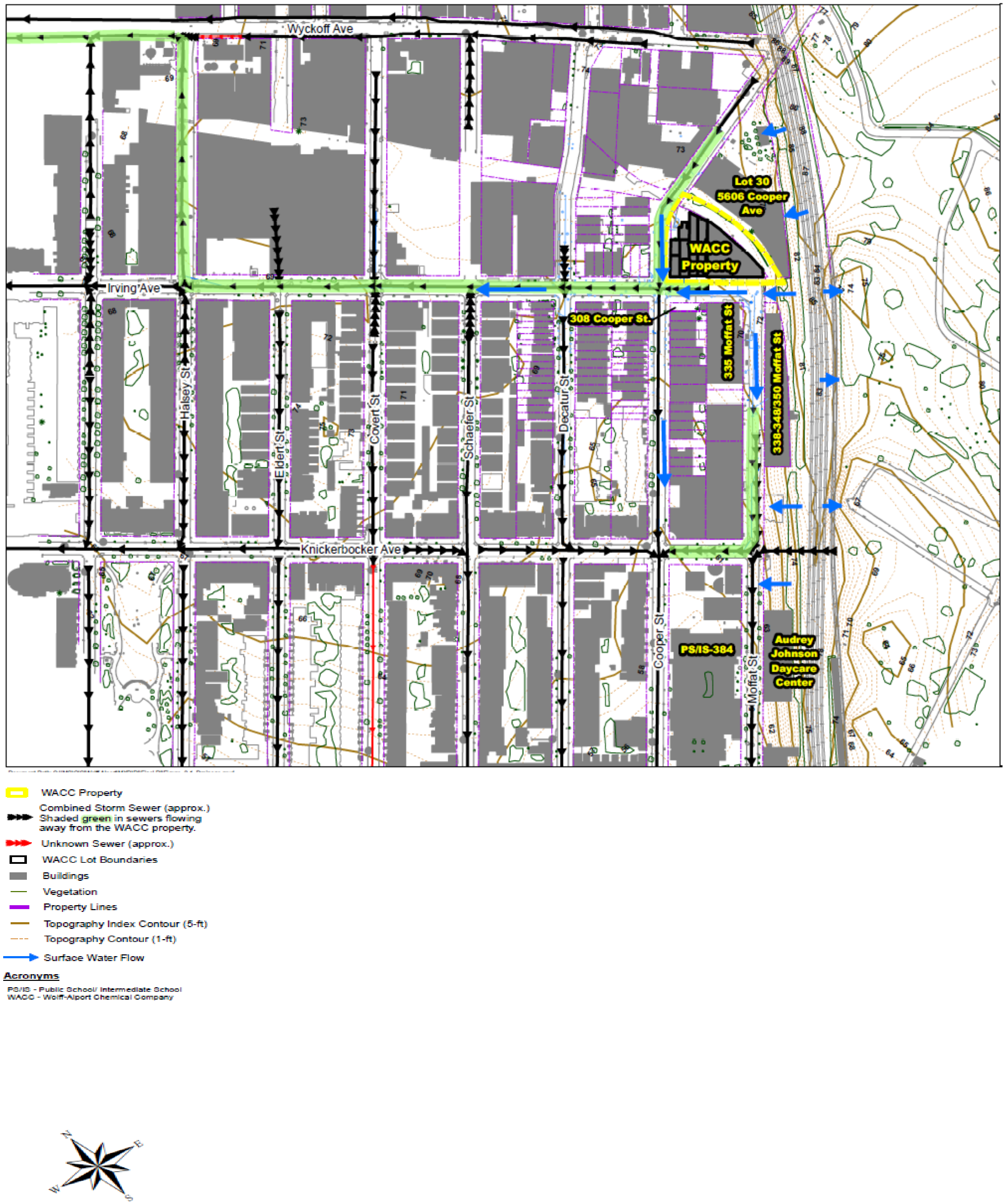


Figure 2—Wolff-Alport Chemical Corporation Site and General Area



WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX V
RESPONSIVENESS SUMMARY

ATTACHMENT B

PUBLIC NOTICES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

EPA Invites Public Comment on Proposed Plan for Cleanup of Wolff-Alport Chemical Company Superfund Site Border of Bushwick – Brooklyn/Ridgewood - Queens, NY

The U.S. Environmental Protection Agency has issued a Proposed Plan for the Wolff-Alport Chemical Company (WACC) Superfund Site in Ridgewood, New York. A 30-day public comment period on the Proposed Plan, which identifies the EPA's preferred cleanup plan and other cleanup options that were considered by EPA, begins on July 28, 2017 and ends on August 28, 2017.

EPA's preferred cleanup plan consists of the permanent relocation of the tenants of the buildings on the former WACC property, demolition of the former WACC buildings, contaminated soil excavation, contaminated sewer removal/cleaning, and off-site disposal of the contaminated soils and debris.

During the public comment period, EPA will hold a public meeting to receive comments on the preferred cleanup plan and other options that were considered. The meeting will be held on Wednesday, August 16, 2017, at 7:00 PM at the Audrey Johnson Day Care Center, 272 Moffat Street, Brooklyn, NY.

The Proposed Plan is available at www.epa.gov/superfund/wolff-alport or by calling Cecilia Echols, EPA's Community Involvement Coordinator, at (212) 637-3678 and requesting a copy by mail.

Written comments on the Proposed Plan, postmarked no later than August 28, 2017, may be mailed to Thomas Mongelli, EPA Project Manager, USEPA, 290 Broadway, 20th floor, New York, NY 10007-1866 or emailed no later than August 28, 2017 to mongelli.thomas@epa.gov.

The Administrative Record file containing the documents used or relied on in developing the alternatives and preferred cleanup plan is available for public review at the following information repositories:

Washington Irving Library, 360 Irving Avenue (at Woodbine St.), Brooklyn, NY 11237 and EPA Region 2 Superfund Records Center located at 290 Broadway, 18th Floor, New York, NY 10007.

La EPA invita al público a hacer comentarios sobre el plan propuesto para la limpieza de Wolff-Alport Chemical Company Sitio Superfund localizado en la Frontera de Bushwick - Brooklyn / Ridgewood - Queens, NY

La Agencia de Protección Ambiental ha emitido un Plan Propuesto para el Sitio de Superfund Wolff-Alport Chemical Company en Ridgewood, Nueva York. El 28 de julio de 2017 comienza un período de comentarios publicos de 30 días para el Plan Propuesto, que identifica el plan de limpieza preferido de la EPA y otras opciones de limpieza que fueron consideradas por la EPA.

El plan de limpieza preferido de la EPA consiste en la reubicación permanente de los inquilinos de los edificios de la antigua propiedad Wolff-Alport, la demolición de los antiguos edificios Wolff-Alport, la excavación de suelos contaminados, la eliminación /limpieza de un alcantarillado contaminado y la eliminación fuera del sitio de los suelos y escombros contaminados.

Durante el período de comentarios públicos, la EPA tendra una reunión pública para recibir comentarios sobre el plan de limpieza propuesto, su limpieza preferida y otras opciones que fueron consideradas. La reunión se llevará a cabo el Miércoles 16 de Agosto de 2017, a las 7:00 pm en el Centro de Cuidado Audrey Johnson localizado en el 272 Moffat Street, Brooklyn, NY.

El Plan Propuesto está disponible en www.epa.gov/superfund/wolff-alport o llamando a Cecilia Echols, Coordinadora de Participación Comunitaria de la EPA, al (212) 637-3678 y solicitando una copia por correo.

Los comentarios por escrito sobre el Plan Propuesto, con fecha de matasellos a más tardar el 28 de agosto de 2017, se pueden enviar por correo a Thomas Mongelli, Gerente de Proyecto de la EPA a USEPA, 290 Broadway, 20th floor, New York, NY 10007-1866 o por correo electrónico a más tardar el 28 de Agosto 2017 a mongelli.thomas@epa.gov.

El archivo del expediente administrativo que contiene los documentos usados en el desarrollo de las alternativas y el plan preferido de la limpieza está disponible para la vista pública en los repositorios de la información siguientes:

Washington Irving Library, 360 Irving Avenue (en Woodbine St.), Brooklyn, NY 11237 y EPA Región 2 Superfund Records Center ubicado en 290 Broadway, 18th Floor, Nueva York, NY 10007.

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX V
RESPONSIVENESS SUMMARY

ATTACHMENT C

AUGUST 16, 2017 PUBLIC MEETING TRANSCRIPT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

- -x

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE

PROPOSED CLEANUP PLAN

PUBLIC MEETING

- -x

Audrey Johnson Day Care Center
272 Moffat Street
Brooklyn, York

August 16, 2017
7:00 p.m.

P R E S E N T:

CECILIA ECHOLS,
Community Involvement Coordinator

KIM KASTER, CDM Smith

TOM MONGELLI,
Project Mansger

WALTER MUGDAN,
Acting Deputy Regional Administrator

OLEG POVETKO, Physicist

PAT SEPPI,
Community Involvement Coordinator

JOEL SINGERMAN,
Central New York Remedian Section Chief

LORA SMITH-STAINES,
Human Health Risk Assessor

WOLFF-ALPORT CHEMICAL COMPANY

MS. ECHOLS: Good evening, everyone. Thank you all for coming out tonight. I want to especially thank Ms. Julie Dent, the director of the Day Care, for allowing us to have the meeting here, right in your community.

I'm Cecilia Echols and I'm the Community Involvement Coordinator for the Wolff-Alport Chemical Company Superfund site, which is located in Bushwick-Ridgewood, Brooklyn-Queens border.

This is a very important matter for your community, and I'm very grateful for all of you to have come. We will have the question-and-answer period at the end of the presentation.

Before I begin, I just hope that everyone can put their phones on silence.

Additionally, we have Spanish interpreters to assist those who do not speak the native language. If anyone needs an earpiece, you can go to the back to see Collin, and he can assist you with receiving one.

The purpose of tonight's meeting is to discuss the proposed plan for the site, which will feature the preferred cleanup alternatives that EPA is recommending.

Community involvement or relations is a program designed to bring the community to a decision-making process, being part of the decision-making process, while we're in the public comment period.

On the panel today is myself; Joel Singerman, he is the EPA Central New York Remediation Section Chief; Tom Mongelli, he's the Project Manager; Lora Smith-Staines, she's the Human Risk Assessor; and Kim Kaster, she's with CDM, our contractor. They will be doing most of the presentation today.

Additionally, we have some other EPA representatives here in the front: Walter Mugden, he's Acting Deputy

Regional Administrator; Pat Seppi, she's the community involvement coordinator; and Oleg Povetko, he's a health physicist.

The public comment period started July 28 and ends August 28. Public notices were placed in The Ridgewood Times, along with El Correo newspaper. There is a site information repository at the Washington Irving Library on Irving Avenue.

I hope that everybody had an opportunity to sign in. We will take your addresses and make it part of the mailing list for the site. So, whenever we have fact sheets or community updates, you'll be able to receive those in the future.

We prepared a couple of the proposed plans and presentation to be handed out to you all. We didn't make copies for everyone, but you can get a copy or pull it up on your phone at the website. It will be towards the end of

WOLFF-ALPORT CHEMICAL COMPANY

the presentation you'll see the website; unless you want it now, and we'll tell you.

Lastly, after reviewing all comments tonight and during the public comment period, EPA's next step is to prepare a responsiveness summary, and it will be signed by the Acting Regional Administrator Catherine McCabe. Unless Donald Trump hires a Regional Administrator; then that person will sign, I guess. I don't know.

We have a stenographer, who will capture the presentation tonight along with our conversations. We ask that all questions be held to the end of the presentation.

Thank you so much for coming, and we'll open up for Joel.

MR. SINGERMAN: Several well-publicized toxic waste disposal disasters in the late 1970s shocked the nation and highlighted the fact that past waste disposal practices were not safe.

In 1980, Congress passed the Comprehensive Environmental Response Compensation and Liability Act, more commonly known as Superfund. The law provides federal funds to be used in the cleanup of uncontrolled and abandoned hazardous waste sites and for responding to emergencies involving hazardous substances.

In addition, the EPA was empowered to compel those parties that were responsible for these sites to pay for or to conduct the necessary response actions.

The work to remediate a site is usually very complex and takes place in many stages. Once a site is discovered, an inspection further identifies the hazards and contaminants.

A determination is then made whether to place the site on the National Priorities List, a list of the nation's worst hazardous waste sites.

WOLFF-ALPORT CHEMICAL COMPANY

Sites are placed on the National Priorities List based primarily on the basis of scores obtained from the hazardous ranking system, which evaluates the threats from the site. Only sites on the Nation Priorities List are eligible for funding and work under Superfund.

The selection of a remedy is based upon two studies: A remedial investigation and a feasibility study.

The purpose of remedial investigation is to determine the nature and extent of contamination emanating from the site and the threat it poses to public health and environment. The purpose of a feasibility study is to identify and evaluate ways to clean up the site.

Public participation is a key feature in Superfund process. The public is invited to participate in the decisions that we make at the site through the community relations program

WOLFF-ALPORT CHEMICAL COMPANY

public meetings, such as this one, are held as necessary to keep the public informed about what happened and what is planned for the site.

The public is also given the opportunity to ask questions about the results of the investigations and the studies conducted on the site and comment on the proposed remedy.

After considering public comments on the proposed remedy, a record of decision is signed. The record of decision documents why a particular remedy was chosen.

The site then enters the design phase, where the plans for the selected remedy to implement the remedy are developed.

Remedial action is actual hands-on work associated with cleaning up the site. Following completion of remedial action, the site is monitored, if necessary. Once the site no longer poses a risk to public health/environment, it can be deleted from National Priorities List.

Removal actions may be undertaken at a site at any time if the site poses an immediate threat to public health and environment.

Now Tom will talk about the history of the site.

MR. MONGELLI: Good evening, everybody. My name is Tom Mongelli and I am the Project Manager for the Wolff-Alport site, and I'm going to start off tonight by going over a little bit of the site history and site background.

This is the aerial view of the Wolff-Alport Chemical Company site. As you can see, it's located on Irving Avenue between Moffat Street and Cooper Avenue. It's approximately three-quarters of an acre in size, and there are five on-site buildings housing several businesses as well as one larger building on Lot 33, which is currently

WOLFF-ALPORT CHEMICAL COMPANY

an unoccupied warehouse.

From the early 1920s until 1954, Wolff-Alport Chemical Company operated at the site, and part of their business involved the importing of sand to extract what are known as rare earth elements.

Now, the sands often contained small amounts of thorium and uranium, which are both naturally occurring radioactive elements. These elements would concentrate in the waste products of their processes; and the waste, in turn, was disposed of directly into the sewer system and/or buried on site.

Between 1988 and 2010, several investigations and studies were completed by EPA, as well as city and state agencies, which confirmed the impact to the on-site businesses and the nearby sewer system.

Between 2012 and 2014, EPA conducted a removal action at the site, which involved the placement of concrete, lead, and steel shielding in two of the on-site businesses as well as a radon mitigation system in one of the on-site businesses. Shielding was also placed on a small section of the Irving Avenue sidewalk.

In 2014, the site was added to the Superfund list. And between 2015 and 2017, remedial investigation and feasibility study were conducted at the site.

I'm now going to turn the presentation over to Kim Kaster of CDM to talk about the remedial investigation.

MS. KASTER: Hi. My name is Kim Kaster. I'm an environmental engineer with CDM Smith.

As part of the remedial investigation presentation, I'll go over the objectives of the RI, the RI activities conducted at the site, and the data results.

The RI objectives were to review

WOLFF-ALPORT CHEMICAL COMPANY

and evaluate previous data collected by the New York City Department of Environmental Protection, New York State Department of Environmental Conservation, the New York City Department of Design and Construction, the New York State Department of Health, and EPA.

The RI then built off of that data and aimed to define the nature and extent of the contamination at this site. The data then was provided to support the completion of a feasibility study.

The RI investigation activities included a building investigation, a soil investigation, groundwater investigation, and sewer investigation.

The building and soil investigations included gamma scan measurements and soil or building material samples. And "gamma scans" are just a way to quantitatively measure levels of radioactivity. We also

WOLFF-ALPORT CHEMICAL COMPANY

completed a gamma exposure rate survey and a school and daycare investigation.

These are the site areas where investigation areas were conducted. The Wolff-Alport property is here, shown in yellow. There's also a property here.

And just to build off of what Tom said earlier, to give some background on the site, the majority of the Wolff-Alport processes took place on these two lots, Lots 44 and 42.

Lot 33 was used as a storage yard to unload and stockpile the stands that were brought in from the former rail spur here.

Other specific properties investigated include this property on 308 Cooper Street, the Circus Warehouse at 350 Moffat Street, condos at 338 and 348 Moffat Street, and the school and daycare. Roads investigated as part of the RI are this area on Cooper Avenue -- on Irving Avenue, Cooper Avenue shown in blue, and Moffat Street shown here.

WOLFF-ALPORT CHEMICAL COMPANY

The sewer investigation was conducted in the neighborhood of the Wolff-Alport property. You can see the property here, shown in yellow. When materials discharge at the Wolff-Alport property, it flows down the Irving Avenue line this way and then makes a right on to Halsey Street before joining with the Wyckoff Avenue line and making a left this way.

This figure shows the soil boring locations installed as part of the 2015 RI and also previous investigations. The colors indicate relative concentrations of radionuclides, with this orange color being the highest relative concentration background.

As you can see, the superficial contamination was in line with the history of the site: We found high levels of contamination below the Wolff-Alport property and along the former rail spur. We also had high levels of contamination on Irving Avenue south of the Wolff-Alport property and along Moffat Street.

Now, these circles indicate areas of deeper contamination. We found contamination down to approximately 30 feet below ground surface, below the buildings at Lot 42 and Lot 48 here; and then we saw contamination down to 20 feet below the Irving Avenue line here; and contamination was down to approximately six to eight feet below the Moffat Street and Irving Avenue intersection south towards Moffat Street.

We also collected samples for chemical contamination and found elevated levels of PAHs and PCBs in the superficial samples, and they were in areas already impacted by radionuclides as well.

We took building material samples as part of the building investigation and we found elevated

WOLFF-ALPORT CHEMICAL COMPANY

levels of radionuclides at buildings in Lot 42 and 44 and the building on Lot 43 and in the basement of the building on Lot 46.

An investigation was conducted in the sewer lines using a fiber scope and a gamma probe using an in-pipe crawler to go through the various sewer lines. You can see the Wolff-Alport property here in yellow.

The colors indicate relative gamma counts to background, with red and orange being the highest gamma count areas. The black indicates areas of no impact.

So, you can see that the first thousand feet of sewer lines from the Wolff-Alport property is the area of most significant impacts. Areas lacking information on this block were inaccessible due to flooding in the pipeline or blockages in the line.

We also took samples of construction materials in the sewer

WOLFF-ALPORT CHEMICAL COMPANY

manholes, and we found elevated levels of radionuclides in the manholes at the Irving Avenue-Cooper Street intersection; the two manholes between Cooper and Decatur, here; and the one manhole between Decatur and Schaefer.

As part of the sewer investigation, we also sampled sediments at the sewer discharge point in Newtown Creek, and we found no levels of radionuclides that would impact wildlife.

This figure summarizes the gamma exposure rate survey conducted at the Wolff-Alport property and immediately exterior. These measurements were taken after the shielding was installed, so the brown indicates where the shielding was installed.

You would expect these gamma exposure rates to be much higher if the shielding wasn't installed.

Along the exterior of the property, you can see high levels of

WOLFF-ALPORT CHEMICAL COMPANY

gamma exposure rates at the edge of the shielding, which is expected. And on the property itself within the buildings, we found elevated gamma exposure rates at Lots 44 and 42, a hot spot in the basement of Lot 46, and In lot 33.

Knowing that radiological contamination is at the Wolff-Alport property, we also conducted gamma exposure rate measurements in the neighborhood of the property.

The icons with the cross -- I don't know if you can see these -- indicate historical levels. And as part of the RI, we just took some samples to confirm the previous gamma exposure rates that we observed.

So, as you can see in the neighborhood of the site, green indicates within the range of background. So, most or pretty much all of the gamma exposure rates are within the range of background.

WOLFF-ALPORT CHEMICAL COMPANY

The two areas that we see elevated gamma exposure rates are here on Irving Avenue, a block away from the Wolff-Alport property; and here on Moffat street, which is also within a block of the Wolff-Alport property. And these gamma exposure rates align with what we saw in the soil sampling and the radionuclide results.

A school and daycare investigation was conducted due to the proximity to the Wolff-Alport property. Soil borings were advanced at the locations shown; under the basement of the school and the daycare, and along the sidewalks outside of the buildings.

The soil results did not exceed the cleanup levels. The radon investigation conducted at the school and daycare found no concentrations of radon above EPA's radon action level of four pico-Curies per liter. And the gamma exposure rates collected at the school and daycare were mostly within the range of background, with a couple of spots slightly exceeding background at 13 versus 12, which is background.

The RI concluded that radiological contamination exists in soils at the site, building materials at the Wolff-Alport property, and the sewer; however, no radiological contamination was found in groundwater or in the Newtown Creek sediments at the sewer discharge point.

The air concentrations in the school and daycare were below EPA's action level, and, in fact, none of the investigations conducted at the school and daycare found radionuclide levels indicative of contamination from the Wolff-Alport processes.

And the RI concluded that the data is sufficient to support the completion of a feasibility study.

Now I will pass it over to Tom. Thank you.

MR. MONGELLI: So, based on the

results of the remedial investigation, a feasibility study was completed. And, as Joe mentioned earlier, the goal of the feasibility study is to develop remedial alternatives or cleanup options for the site.

As part of the feasibility study, four alternatives were developed for the Wolff-Alport site, and I'll go into each of these in a little bit more detail.

Alternative 1 is no further action; that is, no further actions over and above what EPA has already done at the site, which I spoke about earlier. That's the installation of shielding in two of the on-site businesses and a portion of the sidewalk, the installation of radon mitigation system.

The Superfund program requires consideration of a no-action alternative to serve as a baseline for comparison for the other alternatives. And in this scenario, because contamination is left in place, the site would be reviewed once every five years.

Before I go into Alternatives 2, 3, and 4, which are similar, although they differ slightly from each other, there is one common element to all three and that is the cleaning or removal of sections of the sewer system that are impacted from the contamination.

A small section of clay sewer pipe which is immediately adjacent to the site would be removed under all three of these alternatives.

The remaining portion of the contaminated sewer line would first be jet cleaned to determine if any of the contamination is removable and is located in the sediment within the sewer pipes themselves.

After the jet cleaning is completed, additional investigations would be conducted to determine where, if any, areas of the sewer line are still exhibiting elevated radiation levels. Based on this investigation, additional samples would be taken of the sewer pipes themselves as well as bedding material and soil beneath the sewer lines to determine where contamination is located.

Alternative 2, in addition to the work in the sewer system that I just mentioned, would involve the temporary relocation of all of the on-site businesses while construction takes place; the unoccupied warehouse on Lot 33 would be demolished in this scenario; and all areas of the site where no building are located, which would include Lot 33 as well as areas underneath the street and the sidewalk, would be excavated to a maximum depth of four feet below the ground surface.

Of the buildings that remain on site, Lots 42, 44, as well as the basement wall on Lot 46, would receive additional shielding above what's already been placed there.

WOLFF-ALPORT CHEMICAL COMPANY

Institutional controls, which are restrictions placed on the property, would be enacted, which, at a minimum, could limit intrusive activities at the site in the future, they would allow EPA's access to the site to conduct monitoring, and they would required radon mitigation systems be installed in any new buildings put on the property.

And, again, because contamination would be left in place under the scenario, the site would be reviewed every five years to ensure that the remedy is protective of human health.

This figure shows what that alternative would look like. The sort of purple-shaded areas indicate areas of two excavation depths while the orange area is four-foot excavation depth, and that's mostly along Irving Avenue and a short section of Moffat Street.

In the western portion of the site, you can see there's an area that is not shaded, and that's where the buildings would remain in place and would receive additional shielding.

Alternative 3 goes a little further than Alternative 2 in that in addition to the common element of the work in the sewer system, all of the on-site tenants would be permanently relocated under this scenario and all of the on-site buildings would be demolished.

Soil would again be excavated to a depth of approximately four feet below the ground surface, including beneath the streets and sidewalk. And, again, institutional controls and five-year reviews would be required as they were in Alternative 2.

This is a figure of what that scenario would look like. You can see it's very similar to Alternative 2 except the buildings previously being left in place and receiving additional shielding would be demolished. And the soil beneath them would be excavated to a depth of between two and four feet.

And the final alternative, Alternative 4, goes a bit further still. So, in addition to the work in the sewers, all of the current on-site tenants would again be permanently relocated and buildings demolished; however, in this scenario all of the contaminated soil would be removed. And because all of the contamination in the soil and in the sewer system would be removed, no institutional controls would be placed on the property and no five-year reviews would be necessary.

This figure shows what that scenario would look like. Again, very similar in area to Alternative Three; however, you can see a small section of Irving Avenue is shaded in green. That indicates a depth of excavation of approximately 20 feet below the ground surface. The soil underneath portions of Lots 42 and 44 would be excavated to approximately 30 feet below ground surface and a short section of Moffat Street would be excavated to a depth of between six and eight feet below the ground surface.

This slide shows you a comparison of the three active alternatives. You can see, again, very similar to each other in terms of area, the main difference being, again, in Alternative 2 there's a small section of the property where buildings would remain in place and no excavation would occur and in Alternative 4 all of the contaminated material would be removed from the site.

This slide shows a comparison of the cost of each remedy.

The capital cost column is intended to -- is really an estimate of the actual cost to construct the remedy. That would be the excavation of the soil, the work in the sewer system.

The third column, annual

operation and maintenance, is the estimated cost to maintain those remedies.

And the present worth cost is the sum of the capital cost and operation and maintenance cost calculated out over 30 years.

So, Alternative 1, which is no further action, obviously would cost $0 to implement; Alternative 2 comes in at approximately $36.2 million, which is slightly more expensive than Alternative 3 due to the placement of the shielding as well as some additional technical considerations when excavating around the buildings that would remain on the site; Alternative 3 is least expensive of the three active alternatives, coming in at $34.2 million; and Alternative 4 is the most expensive, just slightly more expensive than Alternative 2, at $39.4 million, and, again, under that scenario all the contamination would be removed from the site.

WOLFF-ALPORT CHEMICAL COMPANY

So, to decide between those four alternatives, EPA uses nine criteria to ensure that the remedy that's selected meets federal Superfund requirements as well as any technical or policy considerations for the site.

The first two criteria that we use are called threshold criteria because these are the minimum standards that a remedy must meet in order to be selected. First is protection of human health and the environment the second is compliance with applicable or relevant and appropriate requirements.

Alternative 1, which is no further action, would not meet either of these threshold criteria, so it's not considered for further evaluation.

The next five are known as balancing criteria, and this is where we look at tradeoffs between the alternatives to look at the pros and cons, and see which one is best suited for the site. So, these include both

WOLFF-ALPORT CHEMICAL COMPANY

the long-term effectiveness of the remedy, as well as the short-term effectiveness while it's being implemented; we look at EPA's ability to implement the remedy, as well as the cost, which we already talked about.

The final two criteria are called modifying criteria because the preferred alternative could be modified based on input that we receive from these two. So, the eighth criteria is state acceptance and the final is community acceptance, which is based on the input we receive from the community during the public comment period, which began on July 28 and runs through August 28, as well as any comments or questions that we receive here tonight.

So, based on those nine criteria, EPA has selected Alternative 4 as the preferred remedy for the site. So, to recap, under this scenario, all of the current on-site tenants would be permanently relocated and all of the

WOLFF-ALPORT CHEMICAL COMPANY

current on-site buildings would be demolished, all of the contaminated soil would be executed and disposed of offsite, and the impact to the sewer system would be cleaned or excavated as appropriate.

And this, once again, is a figure of what that alternative would look like when it's implemented.

And with that, we're going to turn it over to questions and comments.

Cecilia?

MS. ECHOLS: Does anybody have any questions?

Are there any elected officials here, first?

MR. GIORDANO: You have representatives here.

MS. ECHOLS: Would you like to state your name and who you're with?

MR. GIORDANO: I'm Gary Giordano. I'm the District Manager of Community Board 5 in Queens.

There are several elected

officials' representatives here.

MS. ECHOLS: Okay. If there are any, would you please just stand and state your name and who you're with.

MR. CEPADA: My name is Dylan Cepeda. I'm a representative of Councilmember Elizabeth Crowley.

MR. KOHN: My name is Jeff Kohn, I'm the Chief of Staff of New York State Assembly Member Mike Miller.

MS. REYES: Good evening. I'm Jackie Reyes, representing Assembly Member Erik Martin Dilan.

MS. LEON: Good evening, everybody. My name is Celeste Leon, District Manager, Community Board 4.

MS. ECHOLS: Thank you.

Now we're going to open up for any questions from the audience. Please stand and state your name so the stenographer can record it properly.

Would you pass the mic.

MS. VIONA: Good evening, everyone. My name is Marta Viona. I

WOLFF-ALPORT CHEMICAL COMPANY

live in the community and I have a child that attends PS-384. I do have a few questions.

The first one is when you were doing -- when EPA did remedial investigation, in the documents that have been presented and there were available online, in one of the pages it stated if the radon and gases of radon and thorium were higher than four, it could --

I don't know if you mentioned that by liter in the air?

MS. KASTER: By liter.

MS. VIONA: -- the EPA was going to leave meters at the school.

I did receive the information, the results talking about the measurements of the schools and none of the results issued higher than four; issued 0.1 all the way to 0.6.

My concern is that because you left the meters and the federal government thinks that it cannot -- if it's higher than four. And as the document stated, in certain rooms the levels of these contaminants, radon and thorium, were higher in the school.

Now, in the document that you presented today on Page 7, it says that the study found that it was done around the school it was slightly higher. So, my question is how higher was that?

Because I know that this -- even though after the remedial investigation was done and all the work presented today, in the site right now is over 700 pico-Curies per gram when you measure the soil.

That's my first question and I have another one.

MR. MONGELLI: So, according to the remedial investigation, none of the air results within the school reached EPA's action level of four pico-Curies per liter of radon in the air.

I think what you're referring to is the gamma radiation, which we found at a level of --

MS. KASTER: 13. And background is 12.

MR. MONGELLI: So, it's essentially the same as background. So, that indicates that there's no impact to the school, or the daycare for that matter, from the contamination.

MS. VIONA: Because this is something that is not in the plan according to the proposition number four. So, no removal from any materials from the school will be done, so the gamma will be there forever. And this is after -- before the number was 18 when the gamma radiation was measured, and after that, when you refer there slightly higher is 13 right now, after, because they did fix a hole or something that was in the basement inside the school.

MR. MONGELLI: Right.

MS. VIONA: This does not create a health problem to the kids while we have elementary children, you know, for pre-K on the first floor, kindergarten, and first graders? Number 13 is not high.

MR. MONGELLI: Again, the 13 was not in the school, it was outside. And that's from naturally occurring background radiation, not from impact from the site. If it was from the site, it would likely be much higher than that.

MS. VIONA: So, when you left the meter even though the document says that if gases were high enough you were to leave the meters, the meters were left at the school, so that's my question.

MR. MONGELLI: Again, the 13 figure is not measured from the meters that were in the school. The meters in the school measured radon in the air, and the number 13 is from the gamma radiation which was in the soil.

MR. RAHMANI: I can answer. My

name is Ali Rahmani. I'm the CM for the project.

Basically, what we did for the school and daycare, we followed the EPA protocol to install the radon instrument in each room with the surface, that's the basic guideline. And we did some short-term testing, which was, like, five-day testing, and then we did some long-term testing, which was, like, six months and one-year testing. So, those are the detectors that we left for a year.

MS. VIONA: I see.

MR. RAHMANI: So, because radon can fluctuate throughout the year, that's why we want to do radon test for year, to get average reading.

Based on that reading, all the results were below four; actually, it was well below two. EPA guidelines are that if you have a sample of those above two pico-Curies per liter, then you need to do a follow-up test. Since the

WOLFF-ALPORT CHEMICAL COMPANY

results were well below two, we were not even required to do a follow-up test for any kind of mitigation.

MS. VIONA: So the reason that you left the meters, it was because you were doing the test for the whole year.

MR. RAHMANI: That's right.

MS. VIONA: Something that was not included in the documents that I read. During the remedial investigation. Thank you.

MR. POVETKO: My name is Oleg Povetko. I'm a health physicist, radiation health physicist in EPA Region 2.

One thing that was not mentioned was that during this entire investigation, remedial investigation, there was no indication that there was a contaminant present in the school or the daycare.

Why we did investigation? Because its proximity, just to make sure. It's a sensitive population;

children, it's a lot of them. And just that's the only reason. There was no indication that some material from the site is around here in the school or in the daycare.

And what Ali just mentioned below four; four says EPA action level for radon concentration in air; basically, pica-Curie per liter. If level rises above this, some action is recommended. It's not regulatory required.

Also, as we observed here, 0.1, 1, 2, that's exactly what you see all over New York city. This is the natural background. There's not coming from the site. If it elevated in any way, it would be on this study.

The same level, this radon gas coming from the ground, from the nature materials in the ground everywhere, all over, all over this place, basically.

But they fluctuate. You go to country like Iran, it's not four, it's like five, six some places; go to, like, South pacific Islands, it's 0.0, it's nothing, because there was no uranium there. But in New York City, it's about the same what Ali just told you and the same in school and same in the daycare.

MS. VIONA: So, the uranium is only located in the Wolff-Alport Chemical Company site right there, so the uranium that didn't spread through the neighborhood.

MR. POVETKO: The material for most, it's thorium, but it's similar to uranium, some uranium.

Most material is there. Some material was spread through the sewer system. That's what was just in presentation. Some material is more under the pavement, it's not on the surface. All our swipes, no, we didn't find anything on the surface. It's locked up.

And some of it, a little bit of it, spread to, say, under the Moffat

Street, say, maybe 200 yards from the site, but small portion of it; and in the sewer, several blocks inside the sewer line.

But, I don't know, around 99 percent -- it's hard to say, but most of the material locked up in that triangle in the site, underground. That's where the work will be done.

MS. VIONA: Thank you.

My second question is regarding proposition number four. I know EPA -- I want to speak for myself as member of the community. I do want that place cleaned because if it doesn't get cleaned, the contamination keeps growing and growing.

So, I do have a concern about once we choose -- you are inclined to go with number four -- where the money is going to come.

I found a report that is written by Scott Pruitt. He is the EPA administrator, the new one. He suggests

WOLFF-ALPORT CHEMICAL COMPANY

that the cleaning of the site, the national -- I forgot, the NPL, I think it is, National Priority List, should be cleaned. And we agree -- I mean, I agree with that. But my concern is in this document, they're talking or he's talking with a group to give that cleanup to a third-party but also get private investors and include developers.

And as you know part of the report in your report for the last ten years, this Bushwick has been changing with new buildings. My concern is once we or you give this to a third-party company -- the developers will never lose money, investors will never lose money -- how secure is going to be the cleanup?

The air contamination, because we're talking about dust, removal. You're also talking about traffic, how you going to be dealing with the traffic, probably closing some streets.

And the work will be between one year and five months, it could be a little longer than that.

To be specific, I am concerned if EPA, as the EPA Administrator recommended, to give the cleanup to a third-party of private investors and developers to be in charge of that site. They're not going to care about the community.

MR. MUGDAN: My name is Walter Mugdan. I'm currently serving as the Acting Deputy Regional Administrator for EPA Region 2. My normal job is that I'm head of the Superfund program for EPA Region 2.

So, as Joel mentioned when he did his original presentation, the Superfund program, Superfund law, has two basic purposes: One is to ensure that sites like this one all around the country that present an unacceptable risk are cleaned up; and the second major thrust of the law is that if we can find what are called "responsible parties," they would have to be -- they can be made to pay for the cleanup or even to carry it out. Actually, across the country, about 70 percent of all money spent on cleaning up Superfund sites comes from responsible parties.

Responsible parties are the companies that created the contamination, that brought the hazardous substances to the site, that own or operated the site in the past when materials were disposed of there, or even that own the sites today. Those are people who are classified in law as responsible parties.

Here, the obvious major responsible party is the Wolff-Alport Chemical, which is where the thorium and other contamination came from way back decades ago. As Tom indicated, the company operated from 1920 to 1954, so it has been out of business and gone since 1954; therefore, there's no

WOLFF-ALPORT CHEMICAL COMPANY

obvious major responsible party for us to look to.

Now, we will do what we call sort of forensic corporate history investigations. We'll see whether or not that company, the Wolff-Alport Chemical Company, maybe either in total portion -- a portion of it or maybe even in its entirety was sold to some other company and that other company may still exist. We don't think so, but we'll look into that very carefully.

Right now, we're operating under the assuming that this cleanup is going to have to get paid for by the Superfund.

So, the reason the law is nicknamed "Superfund" is because when the law was originally written in 1980, on Congress specified there would be a particular fund, a special account, if you will, created in the U.S. Treasury, into which certain monies would go and from which Congress can appropriate money year by year by year and that EPA can use to actually clean up these sites.

So, the money we spent so far on the removal action, putting the shielding down, and doing some of those other steps that Tom spoke about, that work was paid for out of the Superfund. The remedial investigation and the feasibility study that Tom spoke about, and Kim, that was paid for out of the Superfund.

The remedial design, which will be the next step after we actually select one of these alternatives, that money will come from the Superfund. And by the way, we have that money set aside already now.

So, your question comes to what happens at the end of the design when it comes time to actually build this remedy, to construct it. And we heard something like $39 million change is the estimated cost.

WOLFF-ALPORT CHEMICAL COMPANY

So, what we do know is for the last 10 or 15 years, there has never been enough money in the appropriations that EPA gets every year from Congress to start the cleanup at every site that is shovel-ready; that is, ready for the cleanup to start. There's never been enough money in any of the years for the last 10, 15 years.

So, what EPA has been doing for the last 10, 15 years is typically once or twice a year we have a special expert panel from all around the country that get together and they look at all the sites that are shovel-ready, where construction is ready to go, and they evaluate those sites against each other in terms of which ones present the biggest risks, and the available money goes to those sites that present the biggest risks.

Typically, sites that present a little less risk that are not at the top of the list, it may take two or three, possibly even four years before that money becomes available. But we try to make sure that sites don't stay on the list forever. So, even if they present a little risk less than some of the other sites, we try to find the money within several years.

Now, this particular site, the Wolff-Alport site, although the risk to the workers and the residents and the people who are in this area have been dramatically reduced by the removal action that you heard about -- putting the shielding on and putting the radon mitigation system and things like that -- the risk has been dramatically reduced for the workers and for the residents. But there is still some residual risk; that's why is we're worked about it, that's why we're concerned.

So, I am cautiously optimistic that when the time comes to find the money to actually do this work the site will rank high enough in this prioritization effort so that available money will become -- so that the money that exists in that particular year will be made available to this site.

Now, if we can get this remedial design completed in a year, which I think is what Tom and Joel have projected -- let's play out the timeline for a moment: Right now, we're in the public comment period. We need to hear from you; what do you think, what questions you have. Obviously, we want to answer those but, if you have observations or comments, just as you just did, saying yeah, you would like to see as much of a cleanup as possible, that's what we want to hear right now.

We will then select one of those alternatives. Our preferred alternative is number four. If by and large the community agrees with that, if we don't hear any strong reasons to select one of the lower alternatives, three or two, we

WOLFF-ALPORT CHEMICAL COMPANY

will make a decision about that and we'll make that decision -- we hope to be able to make that decision by the end of September. And we have the money in hand to immediately proceed with the design.

So just to play the timeline out, if we make our decision by, let's say, September 30, we can essentially start working on the design by October 1. And if it takes about a year to finish the design, at just about this time next year we'll be getting nearly to the end of the design.

So, at that point, we're going to be looking and working with our colleagues around the country and at EPA headquarters to say: How can we find the money to start the work?

Now, we don't have to get all the money all in one year, but we want to be able to start it as soon as possible after the design is completed.

I know you have follow-up

question, other people have questions as well, but --

MS. VIONA: I just need to be 100 percent sure of what you're saying.

You are saying that the cleanup of this site will be paid by EPA with the $39 million that you already set aside. The Trump Administration --

MR. MUGDAN: No, no. We have set aside the money for the design.

MS. VIONA: Just the design.

MR. MUGDAN: I don't know how much that is.

MR. SINGERMAN: To start the design.

MR. MUGDAN: To start the design.

So, we have several hundred thousand dollars in money right now in our pocket, so to speak, that will allow us to start the design let's say around October.

When the design is getting close to being completed, that's when we and

WOLFF-ALPORT CHEMICAL COMPANY

every other site around the country that is in a similar ready-to-go position will get evaluated to see which one or which ones will be funded out of whatever money is available then. So I'm not making a guarantee -- I cannot, I'm not legally permitted to make a guarantee -- that we will have that money one year from now.

I am cautiously optimistic that we will have enough money to start the work a year from now, but it's possible that we will not. That is a matter for Congress to decide, how much money they'll give EPA in any given year. And it's also a question of how does this site come pair to other sites around the country that are also ready and also present some risks. We'll have to pick those that are the most urgent at that time.

MS. VIONA: Thank you. For next year, the Trump Administration says that they will cut 330 million to EPA, so I'm concerned about that. Thanks.

MR. MUGDAN: You're correct that the President's proposed budget that was submitted to Congress a few months ago does propose some significant cuts to EPA. The House of Representatives is the body of Congress that has to make the first decision about the budget.

The House Appropriations Committee, which is the key committees in the House of Representatives that prepares its version of a budget, their decision was to increase the Superfund budget by two percent in the fiscal year that starts on October 1.

Now, we have no idea how that will play out in the next several weeks and months. The federal fiscal year ends on September 30. A new federal budget is supposed to be in place by midnight on September 30.

There have been many years in the past where it hasn't happened; it's been delayed for weeks or months

WOLFF-ALPORT CHEMICAL COMPANY

thereafter. When that happens, Congress typically extends the current year budget for a few more weeks or months until the new budget can be finalized.

But all of that is happening in Washington, D.C. Those are all the kinds of debates going on right now in Congress. But as I said, the House Appropriations Committee recommendation to the entire House of Representatives is to actually increase the Superfund budget by two percent over this year's budget. So, we'll have to see how it all plays out.

MR. COMACHO: Hi. How are you? My name is Robert Comacho.

You gave us four alternatives here, meaning you wanted four to be part but we don't know if the money is going to be there, right?

The people that are going to be disenfranchised, that are going to be moved out of their homes, out of that area, may not come back.

MR. MUGDAN: That is correct.

MR. COMACHO: I understand that is correct because as you see what's going on, people that been here for so many years are leaving. And the only reason why they're leaving is because of the rents in this place.

So, now you prolong this, there's not enough money, it stays empty, people won't be there, then all of a sudden somebody brings the smart idea, puts the money in, which is the big investors like you want, they put -- the big investors, they put in there and guess what? We only get a little percentage of what's there.

I think you need to go back and make sure this money be put in place before we go with option four. You're going to make sure that the people that are staying there, that live there, that need to be living there, that they're safe and comfortable, and you come back to us an let us know that you have money

WOLFF-ALPORT CHEMICAL COMPANY

for us and work for us because we're not going anywhere. We've been here for too long.

You saw this has been here 1954, right? I haven't heard nobody died yet, but it's been here since 1954. So, we want to make sure that this is not another scapegoat or project to try to get rid of our people to create some sort of illusion and then you get those big investors coming in here and move us out.

MR. MUGDAN: That's a good question, and this lady asked a similar questions about investors who might come in.

Let me just make sure that I emphasize a few things. First of all, the relocation of the businesses that operate in that area, that would be permanent relocation under both option three and four. Under option two, it would be temporary because we'd leave the buildings in place and put additional shielding in. But under options three and four, the buildings would be demolished so the businesses would have to be relocated first. And we will work with the businesses, and we've spoken to each of the businesses about this.

Clearly, that is very disruptive for the businesses. And we understand that. But we have experience working with businesses to do relocation in a way that is as best as it can be done for the businesses. And if we were to select either Alternative 3 or 4, both of which require permanent relocation, that is what we will do, we'll work very closely with those businesses.

You did ask a couple of different questions. Let me see if I can remember them and respond to them.

One was you were concerned about the businesses being moved out and relocated and then the buildings standing empty for some long period of

WOLFF-ALPORT CHEMICAL COMPANY

time before we find the rest of the money needed to actually do the demolition and the soil cleanup.

That is a concern that I have quite strongly. If we can at all avoid it, I don't want to leave an empty building or group of buildings standing around in a community like this one for an extended period of time. That's a concern on one side.

The concern on the other side is even though we have put shielding down in these buildings, the workers are still being exposed to levels of radioactivity that are above what we think is appropriate; only a little bit above, but nevertheless above. So, we don't want to delay the relocation too long either because we're concerned about the health of the workers.

So, we have to balance these two considerations; we want to make sure the health of the workers is paramount, and we also don't want to have an extended

WOLFF-ALPORT CHEMICAL COMPANY

period of time when an empty building is standing around. So, we'll have to balance that very carefully, and I can't tell you right now exactly how the sequence of timing is going to work, but that is a point that we will make very clearly when we make our case to this priority-setting panel that figures out which sites need this available money first.

Now, you and the other speaker earlier asked what about an investor who comes in and says: I'm a developer. I want this piece of property once you tear down the buildings and clean out the soil. And by the way, I'm willing to put some money into the pot to make that happen faster.

Well, we would be open to that kind of an offer if it happened to come, but, number one, absolutely nothing that such a theoretical or hypothetical investor could say would cause us to do less of a cleanup than we think is appropriate.

So, the absolute number one priority is once we pick a cleanup alternative, one of these four, and let's say we pick number four, which is the one we're recommending, then we will absolutely assure that that is the work that gets done.

So, if somebody were to come in and say, well, I would pay you to do number two or I'd pay you to do number three, but not number four, if we've selected number four the answer is I'm sorry, that's our decision, that's the cleanup that has to be carried out.

Now, the other question is sort of what if once these buildings are gone, assuming they are ultimately demolished, and once the soil is cleaned up and the sewer is cleaned up and the streets are cleaned up, the question of what kind of redevelopment will be carried out or can be carried out or is allowed to be carried out on this

WOLFF-ALPORT CHEMICAL COMPANY

property, that's out of EPA's hands.

That is a question of local land use decision-making. It's a question for the New York City Planning Department, Planning Commission, to decide. It's a question for Zoning. It's a question that the local community boards would be wanting to have hearings about and decide about and make recommendations about.

And it's important for the community -- the residents, the commercial operators, the businesses that live here and work here -- to have their voice be heard to the City of New York, saying this is what we think would be an appropriate kind of development. Maybe if it's going to be residential, maybe it's important that it also be affordable. If it's going to be commercial, maybe there's certain kinds of commercial that are desirable and others that are not.

So, this gentleman has, I think,

probably a comment on this very issue; is that right?

MR. RENZ: My name is Theodore Renz. I'm with the Myrtle Avenue Business Improvement District in Queens, better known as the Ridgewood Local Development Corporation.

This site is in Ridgewood's IBZ, Industrial Business Zone. And my colleague Quincy is here. The Brooklyn Outreach Center manages the Ridgewood IBZ as well as Maspeth IBZ.

This site, which has another Superfund site, Newtown Creek --

MR. MUGDAN: Yes, it does.

MR. RENZ: But it's an industrial business zone. And under the City Planning Ordinance and the City of New York -- actually Mayor DeBlasio has gone on record as saying this -- there's no residential development in an industrial business zone.

So, the new development that will come there will be for

WOLFF-ALPORT CHEMICAL COMPANY

manufacturing use. That's my understanding.

MR. MUGDAN: So there you have it as to what the current intended land use is for this parcel of property.

Again, I want to stress that EPA does not -- we have no decision-making authority over the kinds of uses that are projected by the local municipal government or other authorities.

We take that as an input to evaluate to make sure that our cleanup is compatible with the future intended use.

MR. RENZ: I have a further question. With regard to businesses, how much time will they be given and will they be fully compensated or is their responsibility to find a site and then you give them money? What's the story.

MR. MUGDAN: I'll ask my colleague Pat Seppi to step up because she has far more experience than I do

WOLFF-ALPORT CHEMICAL COMPANY

with actual relocations.

Pat?

MS. SEPPI: Sure. Thank you Walter.

I also work in the same division as is Cecilia, the public affairs division, but I have been involved in many, many permanent and temporary relocations for the past 25 years with EPA. Now, that's residences and businesses.

So, we've worked with Department of Transportation regulations on relocation. We've relocated, as I said, many businesses. And I knew that my answers tonight are not going to be definitely what you want to hear because we still at this point have a proposed plan.

Assuming that we do end up with Alternative 4, permanent relocation, what we would do is once we have a final decision sit down with all the business tenants. And each is individual. You know, there's a lot of questions we would have to ask before we can let you know exactly what type of assistance you would be eligible for. There are questions like: How long have you been there? Do you have a lease? Have you paid your rent? Just questions like that. And each benefit or assistance would be individual-based on those questions.

We work very closely with the U.S. Army Corps of Engineers. They're actually the agency that works with us to do this. So, the first thing we would do when we have a final decision and relocation is the option is we would get in touch with the Corps, we would have them come here as soon as they could -- obviously, we have to have some funding to do that -- and they would sit down individually with each of the tenants and go through those questions so they could provide you with a good idea of what the assistance would be in

WOLFF-ALPORT CHEMICAL COMPANY

terms of money and moving and time and all that kind of information.

So, I wish I could give you something more concrete as far as details at this time, but I really can't. But I just want to assure you that we've done this many times in the past; we've had many businesses, many residences. And the program is fair. Businesses are difficult because a lot of businesses, it's just even difficult to find a new location for them to go to; it's not so much that we can't provide the assistance, but can we find someplace for them to go to?

And other questions arise, like: What about my clientele? Are they having go to follow me there?

Those are all the things we do address when we can sit down and meet with you all individually.

MR. COMACHO: I understand the Queens side and all the businesses side, but I feel that since I live in Bushwick

WOLFF-ALPORT CHEMICAL COMPANY

what happens to one side happens to another side. Let's not be naive, let's be serious about it. Because it's manufacturer -- look at Williamsburg. It's not manufacturers in those areas there.

So you have to be very, very smart about things like that. And, also, just because it doesn't effect them, it effects us. And we don't need to reap the refund on some of the situations that are going on over there.

Thank you.

MR. MUGDAN: If I understand, what you're saying is you're a little skeptical or have some doubts that it would actually be manufacturing. But, again, that would not be up to EPA. We have absolutely no authority to say this is the kind of use that can be put here and this is the kind that can't be put here.

Sir, in the back?

Want to bring a microphone to

this gentleman?

MR. CARTER: My name is Justin Carter. I am one of the owners of a business at 56-06 Cooper Avenue, adjacent to the Wolff-Alport site. And I have a few questions that have come up that don't really pertain to my business but I'm going to ask you first because they're based on the last few minutes of the conversation here.

One is what are the risks that you believe will elevate this project to the top of the list when it comes up for consideration?

It just seems that there are two -- that you're saying two things at once: One is we put in protections that make it safe for the workers; the other is we believe that it will be high enough of a risk that it will float to the top.

So, what are the risks to the site, the workers there, and to the community at large that you believe will --

MR. MUGDAN: I understand the question.

First thing, I want to make sure I'm not -- I don't want to overpromise. The last thing I want to do is make a promise here or make what sounds like a promise and then have to come back a year from now or two years from now saying: Oops, sorry, I was wrong.

So, let me stress that I have no crystal ball. I can't predict with any certainty what will happen a year from now when we hope to be in that position of being able to advocate for this site while our colleagues from around the country advocate for their sites that they think present a high risk.

Now let me go back to your specific question of what are the risks that exist there right now that we would be speaking about.

So, first of all, even though the shielding has been installed in these businesses and in a number of the buildings and that has dramatically reduced the exposure to radiation that the workers or passers-by on the sidewalk might be exposed to, there is still a residual risk.

I don't know whether one of you wants to address it numerically. Lora, do you want to talk a little bit more about that, like what risk -- what number? How much does this compare to background that these folks are exposed to right now.

MS. SMITH-STAINES: I will make two points.

As Walter was saying, the shielding has greatly reduced the exposure to the workers and people on the sidewalk; however, there is still quite a bit of radiation in the building materials inside these buildings that has not been addressed by the shielding. So, there is still a current risk to folks that are working in these buildings.

And in Superfund, we evaluate not only the exposures to current populations, we look at future populations. So in that evaluation, we assume that the shielding is not present. So, those risks are actually quite a bit higher.

So, that rates it pretty high, I would say, among other sites, although without knowing what the sites will be in the next year it's hard to say where it will be.

But radionuclide contamination is different than traditional chemicals. They're in the environment and they can be there for a very long time, so I think that might set it a little higher compared to other sites as well.

MR. MUGDAN: Let me make sure Lora, what I understood her to say right now, I want to make sure I'm getting it right.

When this comparative ranking is

being done about one shovel-ready site versus another one, when looking at a site like Wolff-Alport, the risks that would be assumed for that exercise assume that the shielding isn't there.

MS. SMITH-STAINES: Correct.

MR. MUGDAN: And there's a reason for that, a good policy reason for that: We don't want to have any disincentives to putting things like those shielding in place as soon as possible, right?

And if people like me around the country had to say if I go and put the shielding in, then my site is going to rank lower in a couple of years when it comes time to look for the real money, that would be a disincentive and we don't want to the do that.

So, the evaluation of the sites, whether it's a radioactive site like this one or a site with more typical kinds of contaminants, chemical contaminants, is done based on the

WOLFF-ALPORT CHEMICAL COMPANY

assumption that you haven't taken these interim steps along the way to protect people right now so that we don't create any disincentive to that immediate protection.

So, do I know how this site will rank against others? I don't. But I do know radioactive materials are serious concern and what we do know is that people are actually being exposed, even still now after we've taken those steps, in small amounts.

By the way, this other gentleman said nobody has gotten sick. It is almost impossible with any scientific or medical certainty to say that a particular person's illness is due to a particular exposure to a particular chemical or a particular amount of radioactivity at a particular time and in a particular location. It's just unbelievably difficult to do that.

So, we work with broad expectations based upon large populations, saying if a very large population -- not just a couple of dozen people, but thousands or tens of thousands or millions of people -- were actually exposed to this chemical or this much radioactivity for this much time we could predict that some percent of that total population that's exposed in that way would get, let's say, cancer who otherwise wouldn't have gotten it.

I stress that about one in three people in the United States will get cancer in their lifetime. The risks that we are trying to avoid when we look at a site like Wolff-Alport are much, much, much smaller than a one-in-three risk; we're trying to avoid cancers that are maybe one in a thousand or one in 10,000 risk. And those are the kind of risks being presented by this site before the shielding went in.

Even in dealing with one in a thousand risk, if you have 20, 40, 60, 80, or 100 people who have worked in

WOLFF-ALPORT CHEMICAL COMPANY

this location over the last couple of decades, it would be extremely difficult to say with any certainty if they got sick, was their sickness due to this exposure.

But we want to err on the side of caution, we want err on the side of being protective, so we make very conservative assumptions: How many hours will a worker be there for how many days for how many weeks for how many years and when the worker is working there how long will the worker stay in this location, which is the highest level of radioactivity, versus this location over here, which has a little less, versus the one over there, which has even less?

And we try to balance that out and make some conservative assumptions about what the reasonably maximally exposed person might be exposed to. So, we're trying to be very cautious here and very conservative, but we think

WOLFF-ALPORT CHEMICAL COMPANY

that's the appropriate way to do this. And if and when we spend tens of millions of dollars to clean this site up, we want to clean it up properly and completely so that it really is as safe as it can reasonably be in the future.

MR. CARTER: Just another question that goes along with that is the funding, how you said it happened kind of in tiers.

So, if you get funding for the design and then next you get funding for the project to go forward, you don't get all that funding at once.

MR. MUGDAN: Right.

MR. CARTER: Is there some kind of guarantee, is there some law, that says that once a project has made it on to the list and it has begun that it must continue to be funded so that a project doesn't get stuck midbuild or I don't know what you call it?

MR. MUGDAN: The short answer is no, there's no such law, but the agency

WOLFF-ALPORT CHEMICAL COMPANY

has for the last 35 years, since this law was originally written, we've had a strong policy that once we start an actual cleanup, we're going to do everything we can to keep it going and finish it for exactly the reason that you just said.

What we don't want to do if we can possibly avoid it is spend a bunch of money, do a portion of the cleanup, and suddenly say oh, we're out of money, and it has to sit there idle for four years.

Can I guarantee that will never happen? No.

MR. CARTER: What is the track record.

MR. MUGDAN: The track record extremely good. Every year Congress appropriates a certain amount of money for these kind of clean-ups. The first priority has always been that we take the available money and the first priority sites are those that are

WOLFF-ALPORT CHEMICAL COMPANY

already underway and need another year's worth of money to keep going.

And then, for whatever is left over, that's when the new sites that are shovel-ready but not yet funded get evaluated. We say: All right. We have whatever it is, X million dollars left over. Let's see how many of these sites we can now cross off and get going.

So, your question of how does this go in tiers, once the design is finished the next steps include -- let's say we pick either Alternative 3 or 4. One of those next steps would be the permanent relocation of the businesses. That will cost a certain amount of money, but much less than the total 39 an a half million dollars that we're talking about for the entire project.

The sewer is another chunk of work that could be done and it has some amount of money assigned to it. I'll look to my colleagues and see whether it might conceivably -- I'm not saying this is how it will be done, it might conceivably make some sense to clean the sure even before we do the other work. I'm not sure that that's true, but it's possible.

The demolition is another chunk. Got to demolish the buildings if we pick three or four; even number two has some demolition in it. So, that's a chunk.

And then the soil excavation, digging up the soil under the building, around the building, into the streets, that's another chunk.

So, there are these different chunks of work that can happen in maybe a couple of different sequences even and we can use the available money for over a couple of years, two other or three years, instead of having to get the entire 39 and a half million dollars all in one year.

MR. CARTER: I have one question specific to my business. It's about the sewer cleanup. I imagine this will also effect other people that have businesses and live in the neighborhood as well.

Can you tell us about what happens when the sewer is being cleaned to our water supply or, rather, to our sewage and our businesses and in our homes?

MR. MONGELLI: So right now, we're ready to sign the record of decision for the site. The next step after that is going to be the remedial design, so that's a question that will be answered during the remedial design.

We'll certainly work with the City to ensure that the residence service is not disrupted. We would ensure that the plan moves forward with a plan to make sure that that doesn't happen.

And that goes not only for the sewers but we'll have traffic control plan if a street needs to be shut down ensure that businesses are minimally affected.

WOLFF-ALPORT CHEMICAL COMPANY

MR. CARTER: Thank you very much, thank you.

MR. SOLIS: Hi. My name is Harold Solis. I'm a member of the community as well.

I would echo that last portion of your question, and I think you answered it already, but if we do go with number four, whatever you guys end up doing, it would be a very terrible situation if --

MR. MUGDAN: Nobody is going to be left without their toilets.

MR. SOLIS: The process itself aggravates the situation as well.

MR. MUGDAN: That's an important element in the design. I just was answering questions about the possible different chunks of work that are involved in this project and how they might be sequenced. I don't know the answer, but in the design those are very detailed questions that have to be answered: What's the sequence of

WOLFF-ALPORT CHEMICAL COMPANY

events?

You don't want to do something that will then get recontaminated when you do something else. You want to make sure that all the services that are essential, to the businesses, to the residences, are maintained and are disrupted as little as is possible.

The City is constantly having to do work on sewers, so the City Sewer Department and the Department of Environmental Protection is very knowledgeable on how to do this. Whether they have to install a temporary line to divert sewage into a different line or something like that, there are various ways that this can be done.

We're sensitive to that. As Tom said, during the design phase we'll be working with the other agencies that have the expertise, but we'll also be interacting with the community and we'll be letting you know what issues are out there and what issues are having to be made. So, we'll be looking for more community input as we go along.

MS. DENT: Hello, good evening. My name is Julie Dent, and I'm the chairperson of Community Board 4 as well as the executive director here at the Audrey Johnson Learning Center.

My concern is we know that we had these testings and we get the reports and it says that things are okay and it's safe for the children to continue attending the centers as well as the school at PS-384. But if you're saying there is contamination for people just walking, the children have to walk by to get to the schools.

In addition to that, when you move the contaminated soil, where is it going? Where are you going to put it? Where is it stored?

So that is very -- I have a lot of questions and I know you can't answer everything tonight, but it's very concerning. What would you do with the contaminated soil, the sewer pipes, and whatever else you're going to move, where do you put them when you move them from one place to the other?

MR. MUGDAN: Good questions.

Let me first start by saying thank you very much for your hospitality having us here tonight and particularly for the hospitality of putting out that the lovely plate of fruit there. Thank you for that.

MS. DENT: You're welcome.

MR. MUGDAN: You had couple or few questions.

First of all, what about children and other residents that walk along the site, are they exposed?

Before we put the shielding down on the sidewalk, if people walked on that sidewalk there were spots where there was a little more radioactivity coming up than we thought was safe or appropriate. Now, a person walking by doesn't spend much time there; couple of minutes, maybe they sit and chat for a moment, maybe somebody bringing a car to be repaired at auto repair shop. They might be there for a few minutes, but certainly not there a long time, the way the workers are.

So, the workers were actually the ones -- we would assume that they would be exposed much more than any residents, and children walking by would certainly not be exposed in any significant way at all.

You also asked where does contaminated soil go once we dig it up?

We have quite a few sites around the country and even in my region where we're dealing with radioactive contaminated. It is excavated by team -- and correct me if I'm wrong, Tom or Joel -- by people wearing protective equipment.

So, when that time comes where the guys are operating the backhoes and the excavators are actually digging it

WOLFF-ALPORT CHEMICAL COMPANY

out, they're going to be wearing protective equipment that somebody might call a "moon suit." That's going to be a little startling to people in the neighborhood, but you have to understand that these people are people who work with that soil day in and day out.

It will be carefully removed, it will be placed into containers that will be wrapped or isolated in n appropriate way, it will then be sent, probably by truck to rail and then by rail, to one of several licensed and highly regulated disposal facilities in the United States that are licensed to accept radioactive material. Typically, that might be in Utah; there's a large one in Utah, there are several others, but that's where it goes.

You can not get rid of radioactivity. There's nothing we can do to stop it or to eliminate it or to treat it. All we can do is isolate it and keep it from harming people or animals. So, we have these permanent licensed radioactivity waste disposal facilities, and that is where this material has to go.

We have a question over here as well.

MS. GAFFNEY: Good evening. My name is Yvonne Gaffney, and I'm a resident. I live on the block of Decatur between Knickerbocker back and Irving.

And my question goes back, I guess, to when you first detected this as into how you went about it.

Is that what those little black boxes that used to be on the block wrapped around a pole, is that what they were doing.

MR. MONGELLI: It's possible, although I wasn't involved with the site at this point. When were these boxes --

MS. GAFFNEY: Oh, man, that was off and on for some years, two years.

MR. MONGELLI: It's hard to say,

but I think the important thing to remember is -- let me find the slide --
MS. GAFFNEY: When you mean it's hard to say, you don't know what was used to detect this contamination.
MR. MONGELLI: Well, I'm not sure if the particular devices you're speaking to were part of EPA's investigation or maybe a city investigation or state investigation. It can be something unrelated to the site, potentially.
MS. GAFFNEY: So you tested this area there. Have any other blocks around that area, Cooper, this block, my block, any other block in the vicinity been checked?
MR. MONGELLI: Yes. That's why I brought up this slide. I know it's probably difficult to see these green dots, but the presentation is available on the our website.
MR. MUGDAN: You said you're on Decatur; is that right?

MS. GAFFNEY: Yes.

MR. MUGDAN: Well, here's Decatur...

MR. MONGELLI: Between Knickerbocker and Irving.

So, the readings on that block, as well as the surrounding community, were well within normal background levels except for the immediate vicinity of site and a short stretch of Irving Avenue.

So, to answer your question --

MR. POVETKO: I'd like to add about the black boxes. I personally walked around on these blocks everywhere. We used handheld instruments; we took them out of the vehicle, we test them, calibrate them, we walk around, we got the measurements, we put them back.

We don't leave boxes. The only thing we were leaving was little charcoal canisters in the school because the protocol requires them to leave them for long time; for weeks, for months. And this was inside the school and inside of this building and inside of the businesses. But at least for last ten years, we didn't use any black boxes. We didn't place any kind of boxes.

But your block, I walked this block and on this neighborhood and also person independent from New York state, from Albany, came and he did walk over. And it was same like in background, same like rest of Brooklyn.

MR. MUGDAN: In addition, back quite a number of years ago, four or five years ago, when the site was being considered for putting it on the Superfund list, there was a larger device that was brought out and left in one specific spot, I think somewhere near the intersection of Irving and maybe either Decatur or Schaefer. It was left in one spot for 24 hours, but people were there the whole time because

WOLFF-ALPORT CHEMICAL COMPANY

we needed a 24-hour measurement.

But that's the only sort of longer-term device that was left even for one day. So I don't know, you might be speaking about something that either a different agency had or, as Tom said, might have had no relationship at all to this particular site.

ANGELA: Hi. My name is Angela. I'm from The Muse Circus, which is at 350 Moffat, so we're right kind of in the middle. And we had testing done in our location and that proved to be safe; however, with all of the plans there's excavation surrounding our whole location, which would tear up the whole street, all of the access points, as well as part of our yard.

So my question is for a location that is that close and closely affected, would we be relocated or would it be a temporary closure? Would bridges be built to access, I don't know, with hazard suits?

WOLFF-ALPORT CHEMICAL COMPANY

MR. MONGELLI: The question is going to be similar to the 56-06 Cooper answer in that that's a question that will have to be answered during design. But we will work with all the businesses that are effected to ensure there is some form of entrance to your building if at all possible.

And I'm sorry that I can't give you a more definite answer right now, but we will be sure to take this into account and absolutely work with businesses.

ANGELA: If it was that we were permitted to still be in the building and you were able to give us access to the building, the excavation plan does go below the foundation. Would there be underpinning or some way to secure -- we are circus artists, and that structure is our lifeline, so...

MR. MONGELLI: Absolutely, that would all be part of design. We wouldn't start an excavation if we

WOLFF-ALPORT CHEMICAL COMPANY

thought that it would affect the buildings in any meaningful way like that.

MS. SEPPI: Can I just add something about the relocation also?

We've had situations like that before. And what people have to do, when the time comes, we'll see. Obviously, if you don't have egress and access to your building, we would certainly consider temporarily relocating you.

Most people want to stay in their home, so we work very diligently to have that happen. But if we get to the point where you feel unsafe or we feel there's any underpinning or anything like that that needs to be done, we would certainly talk to you about temporary relocation.

MR. MUGDAN: Street excavations, when they repair a street or do sewar work in streets, they're typically done half and half. So, there's many design

WOLFF-ALPORT CHEMICAL COMPANY

techniques to ensure that access for people who live or work in this area will be maintained to the maximum extent possible.

ANGELA: And what would the timeline be on an excavation? Are we talking like a week or two weeks?

I assume that's not the biggest length of time for the whole project, but...

MR. MUGDAN: I don't know that we can say street excavations with that level of precision, but I think it is correct to say that, first of all, we would work closely with the city transportation department; we have to and we would. And their goal is the same as ours, which is to keep any either partial or let alone complete street closure to an absolute minimum of time.

Complete street closures are very rare, because, again, people live and work throughout the city. There's constant work being done in streets throughout the city. Everybody is sensitive to the fact that the workers and the residents have to get to their homes and their businesses.

ANGELA: If the workers are in these kind of haz-mat suits and working, we are permitted to be going in the building but we're that close to it, like literally surrounded by it, I would assume there would be at least a temporary period of closure.

MR. MUGDAN: We absolutely do -- if we have any area around a work site that we think would present some unacceptable risk to the neighbors or the community or the residents or the workers, obviously we would cordon that off.

Again, I want to stress it's startling when you see in your neighborhood somebody working on excavator or some other piece of equipment and they're wearing a haz-mat suit and you're not.

But what you've got to understand is these workers do this day in and day out. They do it all year long, and they are working directly with the material in question. They're much closer to it than any resident or passerby. So, their health and safety obligations from their employers and from us oblige them to wear protective equipment against any possible risk that they might encounter in the course of their work.

And those risks are just quantitatively much greater than for anybody who's just a passerby or a nearby resident. These people are doing this for their entire career and that's a concern we have to keep in mine.

MR. POVETKO: Specifically, I'd like to make one comment about your building.

You have several ways to enter. You can get Moffat one, two, you can open the gates, so that's probably -- and you have a backyard, you can go to the backyard. It's open; August now, nice breeze. I did work over there. Check it out.

But I walked inside of your facility, so, yeah, there's options there that definitely will be considered. I don't expect this particular building will be just blocked and moved, no. You have different options for partial closure here.

MS. SMITH-STAINES: I just want to add something as well. It will be determined in the design, of course, but we usually put different controls in place to make sure that people who are nearby these remediation sites are not effected.

So, we would probably have some sort of air monitoring going on, probably have some sort of dust suppression; if things get dusty, water or foam, spray it down. We'll have

WOLFF-ALPORT CHEMICAL COMPANY

controls in place to ensure you're not impacted and there won't be any health issue from the work being done.

ANGELA: Sure.

Another thing, because we are a circus school, is sound because they have to hear the instructor. If there's construction and they're 35 feet in the air, they can't hear their cues and there's a life and death situation. So, a lot of consideration of...yeah.

MS. SMITH-STAINES: Sign language.

MR. MUGDAN: We probably cannot guarantee that there will not be noise.

ANGELA: Right.

UNIDENTIFIED SPEAKER: Hi. I'm Angela's partner.

You were showing the sewage testing. And as far as I could tell, there was no testing that was shown on Moffat Street, next to the business.

MR. RAHMANI: Typically, the sewer line goes along Irving Avenue, and

WOLFF-ALPORT CHEMICAL COMPANY

that's not connected to Moffat Street. There's no sewer line at the top at the corner of Irving and Moffat. It starts from there, you see --

UNIDENTIFIED SPEAKER: There are manholes.

MR. RAHMANI: There are manholes, but not sewer line. So, here you see manholes, they are not sewer line manholes. It starts from here.

So these, you can see where we went, we start the survey line here, and we did not find any contamination. This is not connect to the sewer line.

MR. MUGDAN: I believe what Ali is saying is that sewage from this building in particular, but all these building here, travels this way. It doesn't travel that way; right?

MR. RAHMANI: Right.

MR. PICCOLO: My name is Len Piccolo.

What happens to the tenants, okay, should you get denied funding for

WOLFF-ALPORT CHEMICAL COMPANY

the projects, okay?

If you move them out and you get denied funding, what happens?

MR. MUGDAN: That is a situation that we are going to do everything we can to avoid. The last thing we want is to just have the tenants moved out, be permanently relocated, and then have the empty but still contaminated building standing there for year after year after year after year.

Standing here, I don't have the legal authority to promise you that that won't happen. What I can say is it would be absolutely against our policy to have that be the outcome. While it could conceivably happen for a few years, couple years, year or two, that's possible; I would certainly try to avoid it, but it's possible.

But for any long extended period of time, that simply is not something that we're -- we're going to do everything we can to avoid that and I have every reason to believe that we can avoid that. That would be bad for the community, it would be bad for the landlords and the property owners, and it wouldn't advance our goal of cleaning up the site.

But I believe -- I'm not giving you a guarantee, but what I believe is the case is that if the agency -- the EPA, not just me personally, but the larger agency -- makes the decision to go forward with the relocation, that implies a commitment to, in a relatively short period of time, continue with the other steps of the remedy, whatever remedy we select.

I'm giving you my best prediction. I'm in this business 42 years, so I expect to be here long enough to see that work happen.

MS. HERNANDEZ: Penelope Hernandez, Bushwick resident. I have two questions and a comment in the form of question; if you have an answer, that

WOLFF-ALPORT CHEMICAL COMPANY

would be great.

First question: Is there a list available to the public of Superfund sites around the country?

MR. MUGDAN: Yes. There are approximately right now 1,700 or 1,750 Superfund sites that are around the country.

Is that about the right number you think? I think that's about the number. So it's quite a few sites.

The list lists are available online and we can provide you with a citation how to get that.

In the City of New York, the five boroughs, right now there are three: Gowanus Canal, Newtown Creek, and Wolff-Alport Chemical.

There was a fourth one about 20, 25 years. It was called the Radium Chemical Company, which also was a radioactive site, and it was located in Queens, just off the BQE between the LIE and the Grand Central. That one was cleaned up many decades ago already.

MS. HERNANDEZ: Have you had any developers express interest in helping pay for the cleanup.

MR. MUGDAN: No, I don't think we have, no. I would be surprised if we had any until we were getting closer to doing the actual cleanup.

MS. HERNANDEZ: Earlier you mentioned community feedback, and this is the comment of the question.

I would like to know whose idea was it to have this meeting in the middle of August when there are so many families affected, especially speaking of the families with children in the educational institutions that are affected, making it nearly impossible to reach them and to invite them to such a meeting as this.

MR. MUGDAN: That's a fair comment. I hope that the majority of people who would be interested, who would be desirous of making a comment

WOLFF-ALPORT CHEMICAL COMPANY

would be here during this four-week period of the public comment period being open. We recognize that any given time of year, there's always going to be some individuals for whom it's difficult to get involved.

I will say that there is an advantage that we saw to being in a -- putting ourselves in a position to be able to issue the record of decision in the current federal fiscal year, which ends on September 30. The advantage is that we happen to have money right now that we can start the design with, and that's the next step.

So, if we are in a position to issue that record of decision, let's say by September 30, we would be in a position to take this money right away and immediately start the design.

Working backwards from that, we weren't really ready to issue the proposed cleanup plan until we were ready, until we he had done all the

WOLFF-ALPORT CHEMICAL COMPANY

other work; the remedial investigation and feasibility study. And we were really satisfied that we had dotted every "I" and crossed every "T."

Unfortunately, we weren't at that position until June. So, in June, that was the earliest date that we could have issued the proposed plan -- June or July -- July 27, sorry. And then the arithmetic is we need to provide at lease 30 days for a public comment. That brings us to the end of August.

Then that still gives us four, five weeks to evaluate all the comments. And unless there's some show stoppers that we hadn't anticipated, we should still be able to get our final decision out by September 30. I do recognize, though, that the timing may not be ideal for some families, and for that I apologize.

MS. JACKSON: Barbara Jackson, CB4, district resident.

You said responsible parties

WOLFF-ALPORT CHEMICAL COMPANY

should pay for that and you didn't know who owned this property?

MR. MUGDAN: No, no, I said -- yes, we know exactly who owns each of these properties and we've been in contact with all of them, and they are among -- the owners are among the potentially responsible parties.

But when we're dealing with 39 and a half million dollars needed to clean up this site, we also need to be realistic about the expectations we can have. So, my working assumption is that to get this work done, Uncle Sam and the State of New York are going to have to pay for most of it at least in the short term.

Now, it's possible that eventually we'll find that the old Wolff-Alport Chemical was, indeed, maybe, part of it was sold to some other company that was sold to some other company that still exists. If so, we'll go after them. But my working expectation is that EPA will have to pay for this cleanup together with the State of New York.

The law requires that the federal government pays 90 percent and the state pays 10 percent if it's going to be paid for by the government. That's the way it works.

MS. JACKSON: There's no way to find who really owns the property?

MR. MUGDAN: Oh, no, we know exactly who owns all the property.

MS. JACKSON: So, after you do the property, can they now come back and say that it's theirs?

MR. MUGDAN: The property is theirs. We don't take the property from them. What we do is say we need to -- for example, if we pick Alternative No. 4, what we're going to t go say is we're going to have to relocate their tenants; that means the tenants will not be paying their rent anymore. We have to demolish the buildings; that means the

WOLFF-ALPORT CHEMICAL COMPANY

buildings are no longer there and can no longer be rented later on. On the other hand, we're going to clean the property; and, therefore, arguably the property gains value.

Now the law allows us -- this gets into probably more complexity than is necessary right now, but the law allows us to place a lien on the property so that if and when the property is then later on sold to some other developer who's going to maybe build a manufacturing facility or whatever gets built there, at that point, when that transaction happens, and now it's a clean property that is being sold for value, we have a lien on the property that we may be able to recover some of the money that we spent on the cleanup. But that kind of thing typically would be at the other end of the process; it wouldn't be at the front end, it would be at the other end.

But this becomes very

complicated of how we will interact with the property owners. We know exactly who they are. We've been in communication with all of them already a number of times.

Joel has something to add.

MR. SINGERMAN: Before we do any investigation of a site, we're first required to look for responsible parties. We thought maybe Wolff-Alport Chemical had some subsidiaries or someone bought it, but we came to a dead end. It doesn't exist. No one owns it, so we have no option but to fund it. Therefore, we don't really expect to find any viable parties.

MS. JACKSON: No one owns the building.

MR. SINGERMAN: The building is currently owned by the parties that currently own it.

But Wolff-Alport, which used to own, they're defunct. There's no successor companies that we could find to be liable. So, therefore, I'm not exactly sure how the current owners acquired the property, but they're the current owners. We don't own the property, the current owners own it.

Wolff-Alport, the company that owned it originally and is responsible for the contamination, we came to a dead end. They're bankrupt and there's no subsequent entities that bought them out or whatever that we can tap for funds. That's what Walter's saying, that's why Superfund has to pay for this.

MR. MUGDAN: Yes.

MS. KELLY: 45 years ago, they decided to rezone Bushwick.

MR. MUGDAN: Would you just state your name also?

MS. KELLY: Linda Kelly.

It just seems a little weird to me this has been -- they have left since 1954. Ms. Dent says that she's only presented the problem, I guess, like the whole thing, since 2014.

WOLFF-ALPORT CHEMICAL COMPANY

Now, to me, I think it just seems like a little coincidental that it seems to be that now that they're rezoning Bushwick, now they're taking care of this. Now, these people have dealt with this since 1954 to even 2014, and nobody really cared about it. But now that Bushwick is being rezoned because we're, like, this hot area now, now people are looking to it and saying: Oh, wait, we can't have this toxic waste here in this area now. We've got to get rid of it.

But these people have suffered with it since 1954. You know, it just seems a little coincidental to me somewhat.

MR. MUGDAN: This is the first I'm hearing that Bushwick is being rezoned, but okay.

MS. KELLY: It is.

MR. MUGDAN: Our involvement in this site actually goes back quite some time. EPA became aware of the fact that

WOLFF-ALPORT CHEMICAL COMPANY

there is radioactivity at this site actually, I don't know, 15 years ago or something.

UNIDENTIFIED SPEAKER: It was in the '80s when they did review --

MR. MUGDAN: The reporter needs to know who's speaking and the translators need to have one person speaking, so let me just say this.

Our decision has absolutely nothing to do with the rezoning. I didn't know was happening, in any event. We've been involved in this site since 2011 in a much more active way and in 2012 is when we began the removal action, putting the shielding down. That took place between 2012 and 2013. In 2014 is when this site went on the Superfund list. That's about a year long or year and a half long process to get a site on Superfund list.

So while it is a fair question to ask, if we knew about this radiation back in the 1980s why didn't we do something then, that's a fair question, it's better that we finally got around to doing it rather than leave it be as it is, and that work started really in earnest around the 2010, 2011 time frame.

MR. SEGRETTI: Hi. Joseph Segretti, Ridgewood resident.

I came in late, I don't know if you covered it, but was there any sampling or testing done in the subway tunnel next to the site, where the L train passes?

MR. MONGELLI: No, that wasn't part of the remedial investigation.

MR. SEGRETTI: Just the sewers?

MR. MONGELLI: Just the sewers and the soil and others related to the side, not the subway tunnel.

MR. MUGDAN: The reason the sewers were investigated is because we knew the Wolff-Alport company dumped the liquid waste that they had -- they had liquid waste and they had solid waste.

WOLFF-ALPORT CHEMICAL COMPANY

The liquid waste they dumped into the sewer intentionally.

And, actually, the Atomic Energy Commission, which had been created after World War II, after the Manhattan Project, the U.S. Atomic Energy Commission became aware of it, and in 1947 they ordered the Wolff-Alport company to stop doing that. And instead, the AEC actually started to purchase from the Wolff-Alport company the radioactive waste materials that the company didn't want.

And that meant that from that point on, from 1947, presumably, it wasn't going in the sewer anymore and it wasn't being dumped onto the ground or buried under the ground anymore and, instead, the AEC was taking it away and doing something else with it.

But the actual company was really just literally putting it in the sewer, and that's why we knew the sewer to be investigated. We had no reason to

WOLFF-ALPORT CHEMICAL COMPANY

believe the subway area would be effected.

MR. RAHMANI: As part of the investigation, we did a gamma scan of the treat, entire Moffat Street, from Irving Avenue to this corner. And based on the gamma scan reading, we did the borings.

So, halfway down here, we did not find any high gamma radiation. So, we don't expect any contamination to be close to subway.

UNIDENTIFIED SPEAKER: The subway is to the right.

MR. RAHMANI: Subway is right here, right?

UNIDENTIFIED SPEAKER: That's the station, but the tunnel --

MR. SEGRETTI: There's tracks run right in this part. Part of the tracks are out.

MR. RAHMANI: So, we did some collective samples here. We found some contamination here. That needs to be

WOLFF-ALPORT CHEMICAL COMPANY

further delineated during the design.

MR. SEGRETTI: That's on the surface track for the freight train.

MR. RAHMANI: Right.

But nothing here.

UNIDENTIFIED SPEAKER: The L train is to the right of that.

MR. RAHMANI: We did not investigate on this side. We investigated only on this side and we found some type of contamination around here and that needs to be further delineated.

UNIDENTIFIED SPEAKER: But the tunnel is probably near there.

MR. RAHMANI: We'll look into more during the design phase.

MR. MUGDAN: During the design of any Superfund cleanup, one of the things we do, exactly as Ali just said, is we do a much more detailed delineation of exactly where this stuff is that we need get away and get it out because we need to have pretty precise

WOLFF-ALPORT CHEMICAL COMPANY

information for the contractors who are going to do the work so that they know exactly or very close to exactly what it is that they're going to have to be dealing with.

So, there will be more delineation to determine exactly where the stuff got to and where it didn't get to, and that's -- the question about the subway is one that we'll keep in mind.

MS. ECHOLS: Do we have any more questions?

MR. MUGDAN: We've had a lot of questions here and I think that's great. We tried to share information. But what we also want to hear from you is which of these alternatives you recommend and you think are the most appropriate.

So, if you want to say it now, that's great. If you want to send it to us in writing, we'll put the slide up that has the information again.

UNIDENTIFIED SPEAKER: One last question, maybe.

WOLFF-ALPORT CHEMICAL COMPANY

So we heard about this through the news, but I didn't see anything being posted on the street or anything of that sort. I'm hoping that now that we gave our e-mails we'll be getting information through that.

But I'm just asking if communication will be more open going forward.

MS. ECHOLS: I did come to your office. I dropped off fliers at The Muse. We did an extensive mailing to 300 homes in the community. We also placed public notices in the newspapers. I hand-delivered packages to the tenants, the business tenants. I dropped off fliers at the school; about 300 fliers at the school, about 200 fliers here at the daycare.

There was an extensive outreach. No, there wasn't anything posted on telephone poles or anything like that, but I did come to your business and dropped off fliers.

WOLFF-ALPORT CHEMICAL COMPANY

MR. MUGDAN: I think you said that people who leave us their information will be on our mailing list.

MS. ECHOLS: Yes, anyone who signed in and they wrote legibly, they will be added to the mailing list.

Unfortunately, if you didn't write legibly, I can't include you because I can't make it out. Unless you left a telephone number; maybe I can call you. Or if there's an e-mail address I can make out, I can e-mail you and ask for your address.

Anyone who sends in comments, we'll have their information as well.

MR. MONGELLI: And I would just add one more item.

My contact information is listed on this slide. There's also a website at bottom where you can find a copy of this presentation, you can find the proposed plan, you can find earlier site documents.

And my contact information and

WOLFF-ALPORT CHEMICAL COMPANY

Cecilia's contact information is on website. Feel free to call, e-mail, if you have any questions, and that goes for everybody.

MS. ECHOLS: So, do we have any more questions?

MS. VIONA: This is the only thing: I know that the next step will be the design and the money has been assigned for that. Still, I'm worried what's going to happen.

Even though I do want the site to be cleaned up, but it's the recommendation -- the paper that I have in hand is the recommendation and response of administrator Scott Pruitt on May 22, 2017. And the recommendation addresses expedited cleanup and remediation process, reducing financial burden on all parties involved in the entire cleanup process, encouraging private investment, promoting redevelopment and community rehabilitation, and building and attracting partnerships.

So, I worry who in reality is going to be these private investors. As a private investors, they're not going to care about the community.

MR. MUGDAN: Again, I have no idea who a possible developer might be some day for this piece of property.

One thing I can assure you is once we make the cleanup decision, that's the decision that's going to get implemented. As I said earlier, if some hypothetical developer comes along a year or two from now and says: Wait a moment, I don't need it that clean; if you picked number four, I would have been okay with number two or number three -- once we make the decision, we made that decision.

If the developer that you've hypothesized says I'm interested in this piece of property and I want to buy it from the landowner -- there are owners of the piece of property right now -- I

WOLFF-ALPORT CHEMICAL COMPANY

want to buy it and that money that I'm prepared to pay to buy the property could go to the cleanup to make it more easy for EPA to find the 39 and a half million dollars that we need, then obviously we're going to be open to that discussion.

But what's not going to happen is that some developer is going to wander in and say I'm willing to do the entire cleanup, just trust me, I'll do it right, that isn't how we do the business. We will be involved in this cleanup every step of the way and it is almost absolutely a certainty that when it gets carried out, it will be carried out by the U.S. Government with U.S. Government contractors doing the work.

Even if it were a private party, for example, let's say we -- I don't think it will happen, but say we suddenly found some successor to the Wolff-Alport company that still was there and they had a lot of money and we said you're liable, you have to do the work, we had still be overseeing every step of that work.

The one guarantee I can give you -- I can't give a lot of guarantees here tonight, but the one guarantee I can give you is that once we make a decision on the cleanup plan, that's the plan that will be implemented, not some half measure.

You're still looking very worried.

MS. VIONA: Because I've read the document. It talks about --

MR. MUGDAN: Again, the translator and stenographer can't hear you without the mic. But I hear what you're saying. I've read the document as well and we've been involved in the development of that document.

We have always -- not just now, but we always try to make it possible for a site that we clean up to then be put back into productive use, so that

WOLFF-ALPORT CHEMICAL COMPANY

it's not just a blight on the community. It's up to the community, through the municipal government, to figure out what should go there. That's not our choice, that's the community's choice working through the municipal government.

But our goal is to make the site able to support whatever use the community ultimately feels is the appropriate one as that decision is expressed through the zoning and through land use decisions. And that's where the community boards, by the way, become very important. And you have a number of community board representatives right here.

So I would urge you as the next couple of years go by and we get closer to that moment in time, I'd urge you to work with your community boards on trying to see what are the intended uses. We heard here it's intended to be manufacturing. That's an opportunity to bring some manufacturing work and maybe some jobs.

Those are decisions and discussions that can be held at the local level.

MS. ECHOLS: Any more questions?

You have a question?

MS. GAFFNEY: My name is Yvonne Gaffney.

I don't know per se -- this is not a question, and I don't have your proposal plan one, two, or three in hand to give you a definite opinion on which one I had would prefer, but I would say that I want what's best for the community; the tenants, if they have to have close, relocate, I would rather them be able to come back to the neighborhood where they came from; I would want to say that I would want the cleanup done at 100 percent but in a decent amount of time, okay?

MR. MUGDAN: Thank you. That's a helpful comment. I appreciate that.

MS. ECHOLS: Okay. I don't

think we have any more questions.

I want to thank each and every one of you for coming tonight. Don't forget that the public comment period is over August 28. Please send in your questions to the address and e-mail here for Tom. We appreciate every one for coming out tonight.

MR. MONGELLI: Thank you.

(Time noted: 9:09 p.m.)

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

I, LINDA A. MARINO, RPR, CCR, a Shorthand (Stenotype) Reporter and Notary Public of the State of New York, do hereby certify that the foregoing transcription of the public meeting held at the time and place aforesaid is a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action, nor in any way interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 31st day of August, 2017.

____
LINDA A. MARINO, RPR, CCR

WOLFF-ALPORT CHEMICAL COMPANY SUPERFUND SITE
RECORD OF DECISION

APPENDIX V
RESPONSIVENESS SUMMARY

ATTACHMENT D

LETTERS RECEIVED DURING THE PUBLIC COMMENT PERIOD

COMMUNITY OFFICE:
71-19 80TH STREET, SUITE 8-303
GLENDALE, NY 11385
TEL: (718) 366-3900
FAX: (718) 326-3549

CITY HALL OFFICE:
250 BROADWAY, SUITE 1765
NEW YORK, NY 10007
TEL: (212) 788-7381
FAX: (212) 227-7164
EMAIL: ecrowley@council.nyc.gov
WEBSITE: www.council.nyc.gov/crowley

THE COUNCIL OF
THE CITY OF NEW YORK

ELIZABETH S. CROWLEY
COUNCIL MEMBER, 30TH DISTRICT, QUEENS

CHAIR
FIRE AND CRIMINAL JUSTICE SERVICES

COMMITTEES
CIVIL SERVICE AND LABOR
COMMUNITY DEVELOPMENT
CULTURAL AFFIARSM LIBRARIES AND
INTERNATIONAL INTERGROUP RELATIONS
MENTAL HEALTH, DEVELOPMENTAL
DISABILITY, ALCOHOLISM, DRUG ABUSE
AND DISABILITY SERVICES
WOMEN'S ISSUES

August 28, 2017

Thomas Mongelli
EPA Project Manager
United States EPA
290 Broadway, 20th floor
New York, NY 10007

Dear Mr. Mongelli:

Please consider this correspondence my official comments on the proposed plan for cleanup of the Wolff-Alport Chemical Company (WACC) Superfund site located at 1125 to 1139 Irving Avenue and 1514 Cooper Avenue in Ridgewood, Queens, New York, and Council District 30, which I represent.

I fully support the cleanup of this property and I support alternative four presented in the proposed plan, which includes: permanent relocation of the tenants, demolition of the former WACC buildings, contaminated soil excavation, contaminated sewer removal/cleaning, and off-site disposal of the contaminated soils and debris. While this site is considered an "orphan" site, it is essential that the EPA use funding from its Superfund trust to ensure the safety of the area, given its urban location and population density. This alternative will provide the greatest protection to human health.

Please give this issue your utmost attention and please update my office on your findings and proposals moving forward. I also would like to schedule a meeting to discuss the transportation of waste and future use of the land. Feel free to contact my office with any additional questions by mail at 71-19 80th St, Suite 8-303; Glendale NY, 11385 or by phone at (718) 366-3900.

Sincerely,

ELIZABETH S. CROWLEY
Council Member, 30th District

THE CITY OF NEW YORK
LAW DEPARTMENT
100 CHURCH STREET
NEW YORK, NY 10007

ZACHARY W. CARTER
Corporation Counsel

HALEY STEIN
phone: 212-356-2320
fax: 212-356-1148
email: hstein@law.nyc.gov

August 28, 2017

Via Email
Mr. Thomas Mongelli
Acting Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway –20th Floor
New York, NY 10007-1866
mongelli.thomas@epa.gov

Re: **Proposed Plan for Cleanup of Wolff-Alport Chemical Company Superfund Site Border of Bushwick – Brooklyn/Ridgewood - Queens, New York**

Dear Mr. Mongelli:

The City of New York ("City") submits the following comments on the United States Environmental Protection Agency's ("EPA") Proposed Plan for the Wolff-Alport Chemical Company Site ("Site"). This letter supplements the City's May 25th and June 6th letters regarding EPA's Feasibility Study for the Site. The City incorporates by reference its previous submissions relating to the Site and requests that these comments be included in the administrative record for the Site.

Sewer Infrastructure

EPA's Proposed Plan calls for the removal and replacement of approximately 150 feet of sewer line and related sewer beds. Proposed Plan, pages 11-12. As the City previously stated, sewer removal and replacement raises significant financial, environmental, safety, and social concerns that EPA should take into account in its evaluation of alternatives. These concerns, when considered as a whole, may possibly outweigh the human health risks identified for future and current site receptors under current conditions, especially for utility workers. In light of the significant challenges relating to sewer removal and replacement, the City urges EPA to undertake the following actions prior to determining whether a sewer line and its associated sewer bed warrant removal and replacement.

First, the City urges that, prior to determining that any portion of the sewer line requires removal, EPA should analyze a future use scenario for utility workers that reflects the limited time that utility workers are expected to spend in the sewers. This analysis is likely to demonstrate a lower risk to utility workers. According to the New York City Department of Environmental Protection ("NYCDEP"), workers spend limited time in these sewers in part because these sewers are generally maintained by mechanical equipment operated from the surface. Similarly, manhole maintenance is infrequent and would typically require less than an hour of time spent in the sewer. Finally, utility workers rarely, if ever, come into contact with sewer bed material (in fact, most of exposure to this material occurs during sewer removal and replacement activities). In contrast, worker time in the sewer and trenches for sewer removal and replacement would be extensive, potentially requiring days to weeks in the trench dug to replace the sewer. EPA should consider the overall risk to workers under both scenarios.

Second, the City recommends that the sewer sections identified for removal first undergo jet washing or other exposure reduction methods (i.e. pipe lining) prior to a determination that these sections be removed. Based on the nature of the contamination, which is likely mostly in sediments, it is possible that contamination could be reduced sufficiently through non-construction activities. This could result in reduced costs, reduced risks, and reduced social impacts while still adequately addressing existing contamination.

The City believes that these steps could minimize the need for disruptive and costly construction activities while still meeting EPA's evaluation criteria, including being protective of human health and the environment and being compliant with applicable or relevant and appropriate requirements. Proposed Plan, page 14.

Excavation Depths in the Right of Way

Under EPA's preferred alternative, up to 20 feet of excavation is required for portions of the right of way. As explained in the City's June 6th letter, the City recommends that EPA adopt a modified version of Alternative 4 that limits excavation in the right of way to the depth needed to remove and replace sewers (approximately 8-12 feet) for the areas requiring this type of work, and to a depth of 5 feet for all other areas in the right of way. The City believes that excavation to these proposed depths would still be protective of human health and the environment because, based on the City's experience in this area of the City, there is no realistic future use scenarios that would result in human exposure to the soil below five feet for areas not subject to sewer removal, or, for areas where the sewer will be removed, to soil below the sewer depth. Therefore, the City is restating its request that the EPA limit the excavation depth within the right of way.

Implementability and Cost

Based on the extensive experience of the City and its agencies in street and sidewalk excavations, sewer cleaning, and sewer replacement, and consistent with the City's previous comments, the City believes that EPA significantly underestimates the cost and feasibility of implementing its preferred alternative. The City repeats its request that EPA include in its analysis the additional costs associated with the proposed work identified in the City's May 25th and June 6th comments, including costs associated with community disruptions and temporary utility relocation that would be required under the preferred alternative.

Conclusion

The City appreciates the opportunity to submit these comments, and looks forward to continuing to work with EPA and others to address historic contamination at the Site.

Sincerely yours,

_____/s/_______________

Haley Stein
Assistant Corporation Counsel

cc: Jean Regna

Mongelli, Thomas

From: Uebel, Annett <Annett.Uebel@commerzbank.com>
Sent: Tuesday, August 29, 2017 12:28 PM
To: Mongelli, Thomas
Cc: 'annett.uebel@gmail.com'
Subject: WOLFF-ALPORT CHEMICAL COMPANY | Superfund Site Profile | Superfund Site Information | US EPA

Dear Mr. Mongelli,

My name is Annett Uebel and I am one of the tenants on Lot 46 at 1125 Irving Avenue, Ridgewood NY 11385.

I only found out last night (Mon, 8/28) about the proposed clean-up plan when a neighbor stopped me on the street and asked if I had heard about it, which I had not.

He then pointed me toward the Audrey Johnson Day Care center where I saw the invite for the public meeting on 8/16 and the public comment period ending 8/28 along with the EPA's website and your email address. I got a lot of questions answered on the website, thank you!

I do have some remaining questions, I apologize for the late email as I realize the public comment period has passed:

1. How were the proposed cleanup plan and public comment period made public? I personally was not notified (no flyer in my mailbox or taped to the door etc). Was my landlord and/or his management company notified?
2. Once a decision is reached on a remedial alternative, who gets notified and how, and by when would tenants need to be relocated?
3. What is the usual process of tenants' relocation (temporary or permanent)?

Thank you in advance for any insight you could give me. If I should contact someone else, could you please point me in the right direction?

Thank you,
Annett Uebel

Kind regards
Annett Uebel
Business Administrator

Commerzbank AG
Group Risk Management
GRM-CRC Corporates International

225 Liberty Street, New York, NY 10281
Phone +1 212 266 7336
annett.uebel@commerzbank.com

Mongelli, Thomas

From:	Aaron Gershonowitz <AGershonowitz@ForchelliLaw.com>
Sent:	Monday, August 28, 2017 12:08 PM
To:	Mongelli, Thomas
Subject:	Wolff-Alport Chemical Company Superfund Site: Comments on Proposed Cleanup Plan

Dear Mr. Mongelli:

These comments on the Proposed Plan for Cleanup of the Wolff-Alport Chemical Company Superfund Site (the "Proposed Plan") are submitted on behalf of LPL Properties, Inc. ("LPL"). LPL owns property in the site and is very concerned about the extent to which the proposed plan would disrupt the community.

1. Community Impact.

Community Acceptance is one of the criteria by which EPA must assess proposed cleanup plans and the attendance at the August 16, 2017 public meeting demonstrates that the local business community opposes the Proposed Plan. This opposition is based largely on the disruption of numerous small businesses. We understand that the Proposed Plan calls for the relocation of tenants and does not view that as a major cost. EPA's discussion of relocation, thus underestimates the importance of location to a business. Businesses choose a location because it provides advantages such as proximity to customers, suppliers or transportation routes. Removing these businesses from the neighborhood could thus irreparably harm these small businesses. Move them aware from their customers and the customers may not follow. Asking them to relocate is, in many ways, like asking them to start their business over again, which in today's economy is very risky. Based on the community opposition and the damage these businesses would face, EPA should examine options that do not require relocation of businesses and demolition of buildings.

While the impact on the local businesses is obvious, EPA should also consider the impact on the property owners. Some of the property owners are small business owners who need a steady rent stream to pay taxes on the properties. EPA's plan is to encourage tenants to move, knock down the buildings and create a situation whereby there could be several years of no tenants and no rent. We understand that EPA intends to provide compensation to tenants with regard to the relocation. EPA should consider the impact on the property owners and examine more closely those remedial options that do not require relocation of tenants and demolition of buildings.

2. Taking of Property.

The Fifth Amendment of the Constitution prohibits the government from taking property without compensating the owner. Each property owner at the site has a property interest in its buildings at the site. The demolition of those buildings involves taking that property. We understand that EPA's theory is that the remediation will enhance the value of the properties. That may or may not be the case and a reasonable property owner could decide to give up his building in exchange for that possibility for future gain. However, an element of unfairness is introduced when EPA makes that choice for people, without making the effort to explain to explain why the buildings need to come down and how the effects are going to be mitigated. If EPA really believes that the remediation will enhance the value of the property, it should offer the owners fair market value for their properties. That would eliminate elements of the community opposition and, if EPA is correct about enhancing the value, EPA could profit on the resale.

3. It is Not Clear that the Risk Justifies the Remedy.

A Feasibility Study needs to explain the risks and apply NCP criteria to explain which remedy best addresses the risk. The feasibility study does not report that any individuals have suffered harm from conditions at the site, conditions that have existed for many years. Moreover, EPA has already spent significant sums on interim remedial measures (e.g. the lead sheathing), which were intended to mitigate the risks associated with the site. In light of these interim remedial measures, EPA has not fully explained why this remedy is necessary. If EPA really thought there was a significant risk to working in the area after the interim remedial measures, it would have addressed that sooner or recommended relocation sooner. It did not. Based on that, the tenants and business owners are faced with significant damage to their businesses based on an EPA message that is mixed at best and inconsistent at worst. If it is OK to work there after the interim remedial measures (and EPA has indicated that it is), then the disruption of the community is not justified; and if it is not safe to work in the area, then the disruption should have occurred earlier. EPA should reassess the remedial options and either come up with a remedy that is less harmful to the local businesses or better explain why that harm is necessary.

We appreciate the opportunity to provide these comments.

Aaron Gershonowitz

Aaron Gershonowitz,
Partner
Forchelli, Curto, Deegan,
Schwartz, Mineo & Terrana, LLP
The Omni
333 Earle Ovington Boulevard
Suite 1010
Uniondale, New York 11553
516-248-1700- Telephone
516-248-1729- Firm Fax
AGershonowitz@ForchelliLaw.com
WWW.FORCHELLILAW.COM

From:	Joseph Kleinmann
To:	Singerman, Joel
Cc:	The Muse Events; Daly, Eric; Rebecca; Rebecca Heinegg; Yoni Kallai; Larissa Humphrey; Mongelli, Thomas; Echols, Cecilia; James Shannon
Subject:	Re: Cleanup of Wolff- Alport Chemical Company Superfund Site: Border of Bushwick
Date:	Friday, August 04, 2017 2:21:29 PM
Attachments:	image002.png image003.png

Thanks

Joe K

Joseph Kleinmann, AIA

KLEINMANN
ARCHITECTS
212.877.8075 w
917-880-7296 m
212.742.9500 f

261 W 35th Street, Suite 1402
New York, New York 10001
www.kleinmannarchitects.com

On Fri, Aug 4, 2017 at 2:16 PM, Singerman, Joel <Singerman.Joel@epa.gov> wrote:

> I think that construction work commencing in 15 months would be extremely optimistic.
>
> **From:** Joseph Kleinmann [mailto:joseph@kleinmannarchitects.com]
> **Sent:** Friday, August 04, 2017 2:01 PM
> **To:** Singerman, Joel <Singerman.Joel@epa.gov>
> **Cc:** The Muse Events <themuseevents@gmail.com>; Daly, Eric <Daly.Eric@epa.gov>; Rebecca <rebecca.heinegg@gmail.com>; Rebecca Heinegg <rebecca@fkolaw.com>; Yoni Kallai <yonirk@gmail.com>; Larissa Humphrey <larissa.themuse@gmail.com>; Mongelli, Thomas <Mongelli.Thomas@epa.gov>; Echols, Cecilia <Echols.Cecilia@epa.gov>; James Shannon <james@kleinmannarchitects.com>
>
> **Subject:** Re: Cleanup of Wolff- Alport Chemical Company Superfund Site: Border of Bushwick
>
> Thanks for your reply. Is it then safe for us to assume that for the near future, EPA will be primarily performing exploratory work in the study area? Once the due diligence is completed, plans for the work will be prepared, bids will be requested and then the actual remedial work will commence. Given your estimate of a year for the design and completion of CDs for the project and a 3-6 month bid period it seems that actual construction work will not commence for at least +/-15 months. Do you agree with this assessment?

Your feedback will be very helpful to our client, The Muse, with determining the potential impact on the planning we're currently involved with.

Thanks again for your prompt attention.

Regards,

Joe K

Joseph Kleinmann, AIA

KLEINMANN
ARCHITECTS
212.877.8075 w
917-880-7296 m
212.742.9500 f

261 W 35th Street, Suite 1402
New York, New York 10001
www.kleinmannarchitects.com

On Fri, Aug 4, 2017 at 8:37 AM, Singerman, Joel <Singerman.Joel@epa.gov> wrote:

> At present, we have completed a remedial investigation to determine the nature and extent of the contamination and a feasibility study to identify and evaluate remedial alternatives. The feasibility study, which is available at https://semspub.epa.gov/work/02/503969.pdf, only conceptually presents the remedial alternatives that were considered. If the preferred remedy is ultimately selected, sampling will need to be performed sitewide to refine the boundaries of the contaminated soil that will require excavation and, based upon that information, a design of the sitewide remedy will be prepared. The design will contain plans and specifications to implement the remedy. It is anticipated that the design will take at least a year to complete.
>
> **From:** Joseph Kleinmann [mailto:joseph@kleinmannarchitects.com]
> **Sent:** Thursday, August 03, 2017 6:27 PM
> **To:** The Muse Events <themuseevents@gmail.com>
> **Cc:** Singerman, Joel <Singerman.Joel@epa.gov>; Daly, Eric <Daly.Eric@epa.gov>; Rebecca

<rebecca.heinegg@gmail.com>; Rebecca Heinegg <rebecca@fkolaw.com>; Yoni Kallai <yonirk@gmail.com>; Larissa Humphrey <larissa.themuse@gmail.com>; Mongelli, Thomas <Mongelli.Thomas@epa.gov>; Echols, Cecilia <Echols.Cecilia@epa.gov>; James Shannon <james@kleinmannarchitects.com>
Subject: Re: Cleanup of Wolff- Alport Chemical Company Superfund Site: Border of Bushwick

Mr. Silverman,

I am the architect referred by Angela.

Is it possible to see the excavation plans for the project that impact on the Muse property. The building is basically built on grade with no cellar that I am aware of. I expect that the proposed excavation will likely be deeper than the existing footings/foundations. Therefore, I am particularly interested in the shoring and/or underpinning plans for your project.

It will be helpful to have these plans in advance of the public meeting so that we can address any issues that may come up.

Please call me if you have any questions.

Regards,

Joe K

Joseph Kleinmann, AIA

KLEINMANN
ARCHITECTS
212.877.8075 w
917-880-7296 m
212.742.9500 f

261 W 35th Street, Suite 1402

New York,   New York   10001
www.kleinmannarchitects.com

On Thu, Aug 3, 2017 at 2:23 PM, The Muse Events <themuseevents@gmail.com> wrote:

HI Joel Thank you for being in touch .

Thank you I am greatful EPS will be workingin a way in which we can stay safe . If at all possible the sooner we can understand dates our space will be inpacted the better since we have clients/shows etc booked far in advance.

We look forward to the meeting Wed the 16th .

Thank you

THE MUSE BROOKLYN- Home of the Working Professionals

Thank you for allowing us to host your next big event, bring you world class entertainment & the opportunity to welcome you to The Muse Brooklyn Circus Family

--

A GLIMPSE

The Muse Brooklyn

350 Moffat St.

Brooklyn, NY, 11237

www.themusebrooklyn.com

On Wed, Aug 2, 2017 at 3:51 PM, Singerman, Joel <Singerman.Joel@epa.gov> wrote:

I am Tom's supervisor.

While, as Cecilia notes in her email, your questions will be addressed in the Responsiveness Summary, which is attachment to the Record of Decision, the document that formalizes the selection of a remedy, I just wanted to let you know that the remediation work will be performed in a manner that protects public health. In addition, EPA will work with you to minimize impacts on the workings of the Muse Brooklyn Circus.

From: Echols, Cecilia
Sent: Wednesday, August 02, 2017 2:04 PM
To: The Muse Events <themuseevents@gmail.com>; Mongelli, Thomas <Mongelli.Thomas@epa.gov>
Cc: Daly, Eric <Daly.Eric@epa.gov>; Joseph Kleinmann <joseph@kleinmannarchitects.com>; Rebecca <rebecca.heinegg@gmail.com>; Rebecca Heinegg <rebecca@fkolaw.com>; Yoni Kallai <yonirk@gmail.com>; Larissa Humphrey <larissa.themuse@gmail.com>; Singerman, Joel <Singerman.Joel@epa.gov>
Subject: RE: Cleanup of Wolff- Alport Chemical Company Superfund Site: Border of Bushwick

Angel-

Thank you for the letter. Your questions are part of the public comment period and they will be addressed within our responsiveness summary. As I mentioned a short while ago, Tom is out of the office and he will be back on Monday, August 8. He will be able to address your questions sometime after he returns.

We look forward to seeing you at the public meeting on Wed., August 16 at the Audrey Johnson Day Care which is located down the street from TheMuse.

Warm Regards,

Cecilia R. Echols

Community Involvement Coordinator

Intergovernmental and Community Affairs Branch

U.S. EPA, Region 2

Public Affairs Division

290 Broadway, 26th Floor

New York, New York 10007

work: 212-637-3678

www.epa.gov/region2

www.epa.gov/enviroed

https://blog.epa.gov/blog/category/greeningtheapple/

https://twitter.com/EPAregion2

https://www.facebook.com/eparegion2

From: The Muse Events [mailto:themuseevents@gmail.com]
Sent: Wednesday, August 02, 2017 1:51 PM
To: Mongelli, Thomas <Mongelli.Thomas@epa.gov>; Echols, Cecilia <Echols.Cecilia@epa.gov>
Cc: Daly, Eric <Daly.Eric@epa.gov>; Joseph Kleinmann <joseph@kleinmannarchitects.com>; Rebecca <rebecca.heinegg@gmail.com>; Rebecca Heinegg <rebecca@fkolaw.com>; Yoni Kallai <yonirk@gmail.com>; Larissa Humphrey <larissa.themuse@gmail.com>
Subject: EPA: Cleanup of Wolff- Alport Chemical Company Superfund Site: Border of Bushwick

Cecilia it was wonderful to talk with you today and I appreciate very much you taking time to address some of my questions today and meeting with you on August 16th . I have always been very grateful of the EPA's clear and honest communications and attention to safety .

Thomas I look forward to connecting with you. MY name is Angela I am the owner of TheMuse Brooklyn Circus located at 350 Moffat Street . We are a community center focused on circus, dance and other performing arts modalities. We are a hub for families and working artists though out the city running classes from 17month - adults and showcasing new works and shows.

My concerns are primarily in regards to safety of our artists and clients as well as access and logistic questions connected tot he clean up .

Thank you for taking the time to help my team understand and address the following :

1) Whom will be managing this project and is it possible to be in contact through out the planning and execution of this project for communications .

Will you please send us the plans and so our architect may review them and guide us accordingly .

2) What is the time line for this clean up ?

3) Will the project be done in sections or all at once ?

4) **SAFTEY & ACESS**

According to what we were able to see online the plan for excavating is between 6-8ft right up to our building and blocking all of our entrances & exits .

This can directly effect the structural integrity of the building and foundation .

a) Will our building be unde-rpined for support .

(our architect Joe is cc-ed here for further questions)

b) Will bridges be build to access our building ?

c) Will Moffat be excavated in sections / halves or all at once?

d) Once excavated what is the time line of repair and restoration ?

e) With this construction I am aware alot of trucks and variants in traffic will occur we have many children that come to our space and alot of foot traffic of our studio participants , what safety precautions will be set up and taken to ensure our clients safety gaining access to and from the studio ?

f) I also see in areas in our outdoor space needing to be dug up . Will all of this be scheduled well in advance for us to prepare ? Will all be restored / repaired by EPA ?

5) With the excavating will the area still be safe to be working in ?

We have many artists who spend 6- 12 hours in our space and in our yard at a time once the land of the site if dug up will it be safe to breath and be working in the area ?

a) If we are permitted to continue working will there be any additional safety necessary for our building to protect us ?

6) Will the Studio need to be closed for any period of time ?

7) How much notice will we receive ?

8) CLOSURE & COMPENSATION?

According to what we could see online we will be directly effected even if with in our building is safe we may not have access or there may be noise restrictions, no parking , trucks and heavy construction , blocked or no visibility etc ....

For any amount of closure will our operating expenses ex Rent and overhead be covered in this interm and how is loss of business managed and our staff compensated for loss of work ?

We host many events, shows and classes and much of the work we do is planned well in advance. We even have some weddings on the calendar coming up . I want to be as mindful and respectful to our clients so that their special days are not interfered with or protected int he best way possible. Also if we have a better sense on time line and out line we can prepare ahead .

Any and all communications in regards to our safety and access is greatly appreciated so we can be as best prepared as possible.

Additional questions may arise from our team and architect as we move forward . We look forward to meeting you on the 16th and appreciate your efforts to clean up this area and make it safe for all.

Thank you Angela

THE MUSE BROOKLYN- Home of the Working Professionals

Thank you for allowing us to host your next big event, bring you world class entertainment & the opportunity to welcome you to The Muse Brooklyn Circus Family

--

A GLIMPSE

The Muse Brooklyn

350 Moffat St.

Brooklyn, NY, 11237

www.themusebrooklyn.com