Design & Consultancy for natural and built assets

General Electric Company

CLEANUP PLAN

Former United Nuclear Corporation
Naval Products Facility
New Haven, Connecticut

May 7, 2019

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APPENDICES

1 INTRODUCTION

On behalf of the General Electric Company (GE), Arcadis US, Inc. (Arcadis) has prepared this Cleanup Plan (Plan) for building deconstruction, and off-site removal and disposal of building debris and underlying soil (as needed) from the former United Nuclear Corporation (UNC) Naval Products Facility, located at 71 Shelton Avenue in New Haven, Connecticut (site; Figure 1).

1.1 Purpose and Objective

This Plan discusses the background, objectives, activities, and monitoring required to complete the objective of full building deconstruction and site remediation. This Plan presents the details for building deconstruction/demolition, underlying soil remediation (as needed), site restoration, and various ancillary and project support activities, including a Final Status Survey (FSS) to demonstrate that the property has achieved conditions associated with unrestricted future use.

1.2 Site Background

The site was originally operated by Olin Mathieson Chemical Corporation – Winchester Western Division (Olin) from April 1956 to May 1961 and by UNC from June 1961 to April 1976. Olin obtained a special nuclear material (SNM) license (License No. SNM-368; Docket Number 07000371) from the Atomic Energy Commission (AEC) (later the United States Nuclear Regulatory Commission [NRC]) in 1960 for fabrication and manufacture of reactor fuel components for the Naval Reactors Program in New Haven, Connecticut. Buildings 3H and 6H (still remaining at the site) were part of a larger nuclear fuel complex, referred to as the “H tract.” Some of the buildings in H tract appear to date back to 1914 (Winchester Repeating Arms Co.). In May 1961, Olin transferred these assets to United Nuclear – Fuels Division, and in June 1961, the NRC reissued License No. SNM-368 to United Nuclear – Fuels Division, which later became UNC. This license authorized possession and use of enriched uranium and source materials, including natural uranium, depleted uranium, and thorium for research and nuclear fuel fabrication. The radioactive material used in these operations was primarily enriched uranium commonly called highly enriched uranium (HEU). Building 3H contained the HEU and fuel fabrication facilities, while Building 6H was used primarily as a support area

In 1974, UNC announced the closing of the New Haven facility and transferred their equipment and inventory of radioactive materials from the facility to Montville, Connecticut. Final surveys of the New Haven facility were completed by February 1976 (an NRC contractor performed confirmatory surveys in March 1976). On April 22, 1976, the NRC amended License No. SNM-368 to remove the New Haven facility from the license. The site was released for unrestricted use in accordance with Regulatory Guide 1.86 (surficial contamination) and external dose (as low as reasonably achievable). Soil samples were analyzed but were not submitted because no regulatory criteria for soil concentration existed. In 1981, the NRC adopted SECY 81-576, which included maximum concentrations of residual soils and materials (30 picoCuries per gram [pCi/g] for enriched uranium) in addition to natural uranium limitations.

In 1989 to 1990, the NRC initiated a Terminated Sites Review Project to ensure that formerly licensed facilities by the AEC and/or the NRC were terminated in accordance with current NRC criteria for release for unrestricted use. As part of the Terminated Sites Review Project, the NRC's contractor (Oak Ridge National Laboratory) identified that License No. SNM-368 required additional review because final radiological survey records were either incomplete or inadequate. NRC Region I staff reviewed this assessment and determined that further site information was necessary to conclude that the facility met the current criteria for release for unrestricted use

The Oak Ridge Institute for Science and Education (ORISE; NRC contractor), conducted an independent measurements inspection in September 1996. The results of this inspection indicated that residual enriched uranium, in certain areas inside the building and inside a connected inactive sewer system, exceeded the release criteria of 30 pCi/g for enriched uranium in soil. These areas showed total uranium levels up to 723 pCi/g (Remedial Action Completion Report [RACR]; Cabrera Services, Inc. [Cabrera] 2018).

The NRC contacted UNC, which was acquired by GE in 1997, concerning the residual uranium. GE agreed to undertake remediation of the site. In 1998, GE informed the NRC that the U.S. Department of Energy (DOE) had accepted financial responsibility for remediation costs. A characterization plan and a decommissioning plan were developed by UNC (UNC, 1998) and approved by the NRC in 1999. In 2008, the NRC reapproved the characterization plan and decommissioning plan, as well as UNC's final status survey plan (NRC, 2018).

In April 2011, NRC and UNC discussed the remediation and decommissioning of the former facility and the release of the property and surrounding area. In September 2011, UNC commenced remediation activities and completed most of the work described in the decommissioning plan by July 2012. During the cleanup activities, UNC identified additional soil areas that exceeded 30 pCi/g of uranium and initiated a sampling program applying NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM; United States Environmental Protection Agency [USEPA] 2000). In July 2012, UNC submitted an addendum to their 1998 decommissioning plan (UNC, 2012) that used a dose-based release criteria (the Derived Concentration Guideline Level [DCGLw]), which was accepted by the NRC in May 2013. The DCGLw was subsequently revised to meet the State of Connecticut's dose standard (19 millirems per year [mrem/year] versus 25 mrem/year). The final DCGLw for soil was 435 pCi/g total enriched uranium. Subsequent investigations of the soil under the building did not find widespread contamination (Cabrera 2015), with impacts likely present under drainage holes in the south trench, a utility trench the length of the building. A survey of the floor surfaces, portions of the walls, and interior building surfaces (e.g., lamps, crossbeams) was conducted and reported in 2018 (Cabrera 2018).

Based on the history and characterization studies to date, it was decided to deconstruct the building and remove the debris and a portion of the underlying soil (as needed). To support these activities, in December 2018, Arcadis conducted limited volumetric sampling of the concrete floors, concrete and brick walls, roofing materials (built-up asphalt roof and wood decking), insulation, and sheetrock wall covering for waste characterization (refer to Section 2).

2 BUILDING CHARACTERIZATION ACTIVITIES

2.1 Building Descriptions

Built in approximately 1915, Buildings 3H and 6H were part of the H tract complex operated by Olin as a fuel fabrication facility. The building was originally part of the Winchester Repeating Arms Company prior to its acquisition in 1931 by Olin. The building is a slab-on-grade structure with varying thicknesses of concrete. The buildings are approximately 72 feet wide with a high bay (50 feet wide) and office/lab (22 feet wide) portions. The walls in the high bay, northern portion of the buildings are brick and cinderblock masonry to a height of approximately 25 feet; above this height are 10-foot-high glass windows. The walls in the lower, southern portion of the buildings extend to a height of approximately 15 feet and, similarly, are constructed of brick and cinderblock masonry with various interior wall coverings. The high-bay roof consists of steel trusses held up by a network of steel columns and cross bracing. The columns and corresponding roof trusses are spaced 16 feet apart. The roof of the southern building is constructed of steel beams supported by steel columns along the south wall and connected to the southern high bay columns. The southern side of the building is partitioned into a series of rooms of various lengths. Building 6H (western section) contains column nos. 1 to 32 and is approximately 510 feet long while Building 3H contains columns nos. 33 to 48 and is approximately 260 feet long. A floor-to-ceiling wall separates Buildings 3H and 6H. Two other interior walls bisect Building 3H into two larger rooms and one smaller center room. Much of the roof is dilapidated, with large gaps allowing precipitation into the building. The approximate total footprint of Buildings 3H and 6H are 17,600 and 36,800 square feet, respectively. Refer to Figures 2, 3, and 4 for building layouts.

There are three utility trenches within the building footprint. A 6-foot-deep concrete utility trench is located along the south side of the building for approximately 820 feet and contained utility pipes and conduits that had been abandoned. The trench has drainage holes, which may have allowed residual radiological materials to migrate to the underlying soil. A utility trench is also located along the north side of the building. A lateral utility trench is located between building columns 17 and 18, which connects the north and south trenches. Refer to Figures 2, 3, and 4 for trench limits.

2.2 Historical Assessments

Radiological assessments were initiated in 1973 prior to the request for license termination in 1976. Since that time, various radiological investigations have been conducted, primarily for surficial contamination or soil under the building or trenches including the south trench. These investigations focused on remediating the building for unrestricted use or remediating adjacent survey units such as the north trench and decontamination pit. None of the historical assessments focused on potential volumetric contamination in the floor, walls, steel columns, glass, or other physical material within the building or in the south trench. Table 2-1 summarizes the radiological assessments conducted at the site.

Table 2-1. Historical Radiological Assessments

Date	Group Conducting Assessment	Assessment Overview and Comment
1973-1976	UNC	Surficial contamination and exposure submitted to NRC for license termination. Comment: Release based on surface contamination and dose.
1996-1997	NRC / ORISE	Scoping survey, surface scans, soil, subfloor soil, trench residue. Soil concentrations exceeded the then-current release criteria of 30 pCi/g per SECY 81-576 (1981).
2005	AAA Env & IEM	Soil north of Building 3H, Argyle Street sewer, subfloor soil Building 3H (X-ray room and decontamination pit), contamination in the utility trenches.
2010	Cabrera	Soil and sediment characterization.
2011-2012	Cabrera	Characterization, decontamination, and remediation including soil, subfloor soil, and various surfaces.
2012	Cabrera / ORISE	An FSS was conducted on several survey units (SUs) following localized remediation. Samples collected include soil, subfloor soil, and surfaces (smears/measurements), including the former Argyle Street sewer area. ORISE performed an independent confirmatory survey (ORISE, 2012).
2016-2017	Cabrera	Gamma walking survey and alpha beta survey inside Buildings 3H and 6H. Downhole gamma for subfloor soil and pipe scale.

2.3 Building Characterization Measurements

2.3.1 Objectives

The objective of the building characterization was two-fold:

1. Determine the concentration of radiological isotopes (principally uranium) in various building materials (floor, walls columns, ceiling/roofing material, and miscellaneous items).
2. Estimate the quantity of impacted debris.

In addition, samples were analyzed to determine if hazardous materials may be present.

The results of the characterization will be used to determine appropriate off-site disposition of the various waste materials.

2.3.2 Approach

The scope of the December 2018 building characterization activities performed by Arcadis considered prior surficial survey data collected by Cabrera in 2016 (consisting of a gamma walkover survey and a surficial scan - alpha and beta), as well as historical documents. Two types of volumetric samples of floor and wall materials were collected: systematic and biased. The systematic floor sample locations were based on general MARSSIM guidance (USEPA 2000) while the biased floor and wall sample locations were selected based on the results of the Cabrera (2016) survey.

In Buildings 3H and 6H, systematic samples were collected based on a triangular grid. Biased samples were collected near locations with the highest count rates as reported in the Cabrera (2016) survey. The floor and wall samples were collected using a hammer drill. These samples were sent to an offsite laboratory for gamma spectroscopy analysis, to determine the uranium-235 and uranium-238 concentrations. Ten Building 3H floor/wall samples were also analyzed by alpha spectroscopy to determine isotopic uranium concentrations and ratios.

For the non-radionuclide constituents, concrete/brick floor and wall building characterization sample locations were typically co-located at the MARSSIM-based sample locations (USEPA 2000). In addition to these locations, samples were collected from built-up roof materials, roof wood decking, insulation, caulking, wall coverings, and painted materials (walls, steel). Analytical testing for non-radionuclide constituents included polychlorinated biphenyls (PCBs) by USEPA Test Method 8082, inorganics (Resource Conservation and Recovery Act [RCRA] 8 Metals) by USEPA Test Method 6010, and Toxic Characteristic Leaching Procedure (TCLP) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganics, and PCBs.

Of the 85 total samples collected during the waste characterization sampling program, the distribution of the analyses performed is as follows:

- Radiation – 71
- PCBs – 42
- Inorganics – 28
- TCLP – 16.

In addition to the building characterization sampling, GE performed a regulated materials survey to assess various materials and equipment for the presence of asbestos-containing material (ACM), hydraulic fluids, oils, light bulbs, lamps, ballasts, capacitors, biological hazards, batteries, and mercury-containing equipment. The ACM and universal waste surveys were limited to safe and accessible areas. For certain areas that could not be accessed, an assumption regarding the presence of ACM was made based on similarity to other tested materials, or judgement/experience.

Some portions of the facility were not accessible for supplemental characterization (e.g., subgrade concrete tunnels – South Trench). As necessary during building deconstruction activities, those materials will be segregated as generated and characterized prior to off-site disposition (see Section 2.4).

2.3.3 Results

The waste characterization results are summarized below and presented in Appendix A.

2.3.3.1 Uranium

The results of the analysis for uranium isotopes in Buildings 3H and 6H are presented in Table 2-3a.

For Building 3H, the range of total uranium concentrations vary from expected background in cinderblock and brick (1 to 2 pCi/g) to a maximum of 131 pCi/g (sample 3H-FB-12-1217). The uranium-234/uranium-235 ratio for sample 3H-FB-12-1217 indicates HEU is present.

For Building 6H, the total uranium concentrations in the floor or wall samples are consistent with background, with a maximum concentration of 2.1 pCi/g. This is within normal concentrations for cinderblock and brick. Two paint chips were collected with total uranium concentrations ranging from 1.2 to 2.8 pCi/g.

2.3.3.2 Non-Radionuclide

The total analysis results indicate the presence of low-level VOCs, including acetone, m-xylene & p-xylene, o-xylene, and trichloroethene; SVOCs including bis(2ethylhexyl) phthalate, fluoranthene, hexadecane, phenanthrene, and pyrene; metals including arsenic, barium, cadmium, chromium (total), lead, mercury, and selenium; and PCBs.

The TCLP analysis results indicate the presence of SVOCs including 3&4 methylphenol; metals including arsenic, barium, cadmium, chromium, lead, and mercury; and PCBs.

The total and TCLP analyses are summarized in Table 2-3b.

2.4 South Trench

The South Trench is a utility trench that runs east-west, along the southern portion of the buildings. Samples of the soil underlying the South Trench, collected through drainage holes, indicate total uranium concentrations ranging from 0.48 to 1741 pCi/g (Cabrera 2018). Samples have not been collected from the concrete walls and floor of the south trench. The south trench and the underlying soil will be addressed during the deconstruction phase of the cleanup. Waste characterization samples of the concrete and underlying soil will be collected from the south trench after it has been excavated and removed from the subsurface. This activity will be conducted after the above-grade portions of the building above the trench are removed.

2.5 Waste Quantities

The waste quantities and characteristics are discussed below.

2.5.1 Volume and Mass

Estimated waste volumes are provided in Tables 2-2a and 2-2b.

Table 2-2a. Estimated Volumes for Building 3H

Building 3H Deconstruction Project Component	Estimated Quantity (tons)
Above-grade inert materials (brick/concrete)	500
Above-grade steel	260
Roofing and window units (ACM)	60
At- or below-grade concrete materials (slab/tunnels)	2,000
Underlying soil (1-foot depth)	1,000
Estimated Total (Tons)	**3,820**

Table 2-2b. Estimated Volumes for Building 6H

Building 6H Deconstruction Project Component	Estimated Quantity (tons)
Above-grade inert materials (brick/concrete)	930
Above-grade steel	540
Roofing and window units (ACM)	180
At- or below-grade concrete materials (slab/tunnels)	3,400
Underlying soil (1-foot depth)[1]	600
Estimated Total (Tons)	**5,650**

Note:
[1] Quantity represents approximately 30% of the building footprint in anticipation that the entire footprint would not require removal.

2.5.2 Waste Characteristics

General radiological characteristics of the waste along with non-radiological characteristics are presented in Tables 2-3a and 2-3b.

Table 2-3a. Radiological Characteristics

Building 6H			Building 3H		
Floor/Walls			Floors/Walls		
Isotope	Concentration (pCi/g)		Isotope	Concentration (pCi/g)	
	Maximum[1]	Minimum		Maximum[1]	Minimum
Uranium-234	1.7[2]	ND	Uranium-234	126[2]	ND
Uranium-235	0.0612	ND	Uranium-235	4.7	ND
Uranium-238	0.343	ND	Uranium-238	0.2	ND
Total uranium	2.1	ND	Total uranium	131	ND
Other Debris			Other Debris		
Isotope	Concentration (pCi/g)		Isotope	Concentration (pCi/g)	
	Maximum[1]	Minimum		Maximum[1]	Minimum
Uranium-234	2.6	ND	Uranium-234	49.9	ND
Uranium-235	0.0609	ND	Uranium-235	1.83	ND
Uranium-238	0.145	ND	Uranium-238	0.413	ND
Total uranium[2]	2.8	ND	Total uranium	52.1	ND

Notes:

[1] Results presented for the sample with the highest total uranium concentration.

[2] Sample was analyzed via gamma spectroscopy. The uranium-234 was estimated based on a uranium-234 to uranium-235 ratio of 27 for HEU.

ND = non-detect (less than the MDC)

Table 2-3b. Non-Radiological Characteristics

TCLP Analysis	Building 3H Concentration (mg/L)		Building 6H Concentration (mg/L)	
Parameter	**Minimum**	**Maximum**	**Minimum**	**Maximum**
SVOCs				
3 & 4 Methylphenol	ND	0.016	-	-
Inorganics				
Arsenic	ND	0.46	-	-
Barium	ND	0.41	ND	0.59
Cadmium	ND	0.22	-	-
Chromium	ND	0.87	ND	0.064
Lead	ND	220	ND	3.1
Mercury	ND	0.0017	-	-
PCBs				
Total PCBs	ND	0.069	-	-

Table 2-3b. Non-Radiological Characteristics (continued)

Total Analysis	Building 3H		Building 6H	
	Concentration (mg/kg)		Concentration (mg/kg)	
Parameter	Minimum	Maximum	Minimum	Maximum
VOCs				
Acetone	ND	0.03	-	-
m-Xylene & p-Xylene	ND	0.0012	-	-
o-Xylene	ND	0.00083	-	-
Trichloroethene	ND	0.0004	-	-
SVOCs				
Bis(2-ethylhexyl) phthalate	ND	0.15	-	-
Fluoranthene	ND	0.058	-	-
Hexadecane	ND	0.048	-	-
Phenanthrene	ND	0.028	-	-
Pyrene	ND	0.042	-	-
Inorganics				
Arsenic	ND	460	ND	340
Barium	ND	7,300	ND	1,200
Cadmium	ND	3	ND	49
Chromium	ND	1,800	ND	1,700
Lead	ND	57,000	ND	68,000
Mercury	ND	18	ND	12
Selenium	ND	1.2	-	-
PCBs				
Total PCBs	ND	140	-	-

Notes:

1. Lead concentrations are representative paint chip samples in both buildings.
2. Total PCBs concentrations are representative of caulk samples in both buildings.

\- = not applicable

3 DISPOSAL FACILITY

Debris from the site will be sent off-site to treatment, storage, and disposal facilities (TSDFs) that have the applicable permits and licenses to accept the waste. Debris is defined as all designated above- and below-grade components of the demolished structures, building appurtenances, construction detritus, soil, and other such material to be transported to and disposed of at one or more TSDFs that are appropriately permitted and licensed to accept the debris.

3.1 Waste Categories

The debris generally consists of one or more of the following:

- *SNM-Impacted waste*. This term refers to any debris that contains or is believed to contain SNM. SNM-impacted waste may include:
  - *Radioactive Waste.* Waste containing or is believed to contain SNM and no other hazardous materials.
  - *Mixed SNM and RCRA Waste.* Hazardous waste governed under RCRA, as amended, that has hazardous and radioactive components (SNM).
- *Non-SNM-Impacted Regulated Waste.* This term refers to debris that is not SNM-impacted waste but is still regulated under current legislation. This waste may contain:
  - *Listed [RCRA] Waste*. Any hazardous waste listed in Tables F, K, P, and U of 40 Code of Federal Regulations (CFR) 261.
  - *Other Wastes*. Debris is expected to contain asbestos, lead, PCBs, and other substances that may be regulated under the Toxic Substances Control Act of 1976.
- *Non-Regulated Waste.* Waste that has no radiological or hazardous component and can be disposed of as common construction debris.

SNM-impacted waste will be sent to a TSDF with the qualifications and legal ability to receive, accept, possess, store, and dispose of debris containing SNM. This may be demonstrated by a radioactive materials license with the NRC (or Agreement State) allowing for receipt, possession, storage, and disposal of SNM.

Non SNM-impacted regulated waste will be sent to a TSDF with the qualifications and legal ability to accept the debris (e.g., landfill permitted for RCRA Subtitle C hazardous waste).

TSDFs qualified to accept SNM-impacted and/or non SNM-impacted regulated wastes include:

- Waste Control Specialists, Andrews, Texas
- Energy Solutions, Clive, Utah
- US Ecology, Grandview, Idaho.

Non-regulated waste will be sent to a RCRA Subtitle C or Subtitle D landfill.

3.2 Waste Acceptance Criteria

Debris will only be sent to the TSDF if it meets the waste acceptance criteria (WAC) for the TSDF. The building characterization data presented in Section 2, and any additional measurements obtained during site cleanup activities, will be used to determine if the debris meets the WAC for the TSDF. The site will provide the applicable data and measurements as requested by the TSDF to demonstrate that the debris meets the TSDF's WAC.

3.3 Transportation

The debris will be transported to the TSDF. The mode of transportation is dependent on the selected TSDF. Options include transport via rail (after being transloaded from the site over road to the rail facility) or roadway only. The debris will be packaged, labeled, and shipped per U.S. Department of Transportation (DOT) regulations.

3.4 Records of Transfer

For transfers of SNM, 10 CFR 70.42(c) requires that the licensee transferring the material will verify that the transferee's license authorizes receipt of the type, form, and quantity of SNM to be transferred. Methods for verification are provided at 10 CFR 70.42(d). To meet this requirement, a current copy of the TSDF's specific license or registration certificate will be obtained and retained for 3 years.

When SNM is transferred from the site to the TSDF with uranium-235 in a quantity of 1 gram or more, a DOE/NRC Form 741 Nuclear Material Transaction Report will be completed to document the transfer per 10 CFR 74.15.

4 BUILDING DECONSTRUCTION, DEMOLITION, AND DISPOSAL

This section provides an overview of the various components of the deconstruction program, including permitting; site access control; mobilization and setup; utility decommissioning, abandonment, and protection; removal of regulated materials; deconstruction of buildings; and management and disposition of demolition debris.

4.1 Permits

4.1.1 Demolition Permit

Prior to any work at the site, a demolition permit will be obtained from the City of New Haven. To be issued a permit, the following forms and activities must be completed:

- 90-day Delay of Demolition for structures listed with the New Haven Historic Commission.
- Provide asbestos removal forms from the USEPA and Connecticut Department of Energy and Environmental Protection (CTDEEP).
- Confirm all appropriate utility disconnections.
- City sewer lateral must be plugged per the direction of the City Engineer.

4.1.2 Excavation Permit/Sidewalk Permit

An excavation permit is required for any work in the city roadway related to utility termination work. A sidewalk permit is required for any city sidewalk, curb, or apron replacement.

4.1.3 National Historic Preservation Act Agreement

Per the New Haven Preservation Trust (NHPT), the subject property is a structure with historic significance located within the Winchester Repeating Arms Historic District. The City Code of Ordinances Article II, Section 9-50 (Demolition Delay Ordinance) specifies the steps necessary to obtain a Demolition Permit, which requires a 90-day delay period. Notifications of the Intent to Demolish were sent to adjacent property owners by certified mail and notices were posted at the property. Prior to building demolition, a Demolition Permit will be obtained as specified by the City Code for properties with historic significance and a Memorandum of Agreement between the Connecticut State Historic Preservation Office, Naval Reactors Laboratory Field Office, City of New Haven and the Property Owner will be completed .

4.2 Site Access Control

The site perimeter is secured on all sides with chain-link fence and gates. The primary site access is from Shelton Avenue. Two locked gates are located along Shelton Avenue: one provides direct access to an overhead door at the west end of Building 6H, the other gate is just north of the building that provides access to the remainder of the site. An additional locked gate is located along the northern perimeter fence that provides access from the paved alley between 71 and 91 Shelton Avenue, approximately half-way along the northern perimeter fence.

4.3 Deconstruction

4.3.1 Process Overview

Several project activities will be performed prior to the start of active demolition, including:

- The selected Deconstruction Contractor will prepare several administrative, safety-related, and technical submittals to comply with GE's contractual requirements, provide specific technical information where required, and describe the means and methods for various project components if not otherwise specified in the Design Drawings and Technical Specifications. Submittals will be reviewed by GE.
- Coordinate with entities, including:
    - Deconstruction, excavation, and sidewalk permits from the City of New Haven and any other permits related to demolition activities (e.g., sidewalk closure).
    - Notification to the EPA under 40 CFR 61.140 (National Emission Standard for Hazardous Air Pollutants, NESHAP), Occupational Safety and Health Administration (OSHA), Connecticut Department of Public Health (CDPH), and CTDEEP prior to performing ACM abatement activities.
    - Submit a request to the City of New Haven Department of Public Works related to the use of the city water system (hydrants) as possible sources of water, as well as water line service disconnections.
    - Prepare agreements for access to non-GE-owned property (as necessary).
- All Contractor personnel at the site are required to attend mandatory safety orientation conducted by GE prior to starting any project activities.
- Temporary services including, but not limited to, sanitary facilities, a field office trailer(s), ACM abatement support facilities, processing, staging area(s), and equipment decontamination area(s) will be set up and maintained throughout the project.
- Project activities will result in increased construction traffic on Shelton Avenue. Traffic control plans and measures will be implemented, including designated ingress/egress points for traffic entering the site, and installation of signage along Shelton Avenue.
- Equipment will be set up to monitor ambient air. Monitoring before and during the project will be conducted in accordance with the Community Air Monitoring Plan (CAMP) discussed in Section 8 and provided in Appendix B.

4.3.2 Pre-Demolition Preparation

4.3.2.1 Erosion and Sedimentation Controls

Erosion and sedimentation controls will be installed Silt fence, hay bales, and straw wattles will be installed to provide sedimentation and erosion control per the CTDEEP guidance document *The 2002 Connecticut Guidelines for Soil and Erosion and Sediment Control (DEP Bulletin 34)*. Protective barriers/devices will be installed at existing monitoring wells, sanitary sewers, storm sewers, and catch basins, as necessary.

4.3.2.2 Clearing and Grubbing

Vegetation (trees and brush) and other miscellaneous debris will be removed as needed to allow access for project activities, and to advance overall housekeeping onsite. Vegetation will be removed flush with the ground surface and may be temporarily stockpiled at the site until final disposal has been determined.

4.3.2.3 Utility Terminations

Prior to initiating active deconstruction activities, the location of all known existing above- and below-grade utilities, and related equipment and structures, will be identified and reviewed, and those utilities potentially affected by the project will be terminated, protected, or rerouted.

As appropriate, utility activities will be coordinated with the utility service provider, including but not limited to Frontier (telecommunications), Southern Connecticut Gas Co. (natural gas), The United Illuminating Company (electric), and Regional Water Authority (water). Additionally, the Contractor must plug the sewer lateral per the specifications of the City of New Haven Engineer. Appropriate permits will be secured prior to any excavation or sidewalk related work activities.

Once de-energized, electrical components within any transformers or trenches will be accessed for further characterization sampling (if needed) and/or ACM abatement. The electrical components will be removed for disposal based on the results of these characterization activities.

4.3.2.4 Universal Waste Removal

Prior to deconstruction, the identification, removal, segregation, processing, containerization, and management of universal wastes and other liquid wastes will be performed. Universal wastes include items such as hydraulic fluids, oils, light bulbs, lamps, ballasts, capacitors, biological hazards, batteries, and mercury and mercury-containing equipment. The materials will be carefully removed to guard against releases, discharges, breakage, or damage, and will be segregated by type as appropriate and containerized in DOT-approved containers pending offsite transport to GE-approved disposal facilities.

Other liquids may be encountered prior to and/or during project activities that will require removal, management, and off-site disposal. These liquids may be present in piping, trenches, tanks, pits, or sumps. The liquid will be characterized for off-site transport and disposal.

4.3.2.5 Asbestos Abatement

The ACM survey identified that Buildings 3H and 6H contain both Category I nonfriable ACM (e.g., built-up roofing systems, fire door insulation, glues and mastics, floor tile, transite paneling) and Category II friable ACM (i.e., window glazing, joint caulking, pipe, ceiling, and flange gasket insulation). For these materials, ACM abatement activities will be conducted consistent with applicable federal, state, and local regulatory requirements and codes. These include CT regulations, OSHA Construction Industry Standard for Asbestos (29 CFR 1926.1101), and the USEPA National Emission Standard for Hazardous Air Pollutants (NESHAP). The removal, segregation, and containerization of ACM will be performed by a contractor who is licensed to perform asbestos abatement in Connecticut and by personnel who have completed a 40-hour OSHA hazardous waste training course.

ACM abatement and deconstruction of the buildings will require additional precautions and controls due to the poor condition of the timber roof structure. Because the roof structure will not support ACM abatement activities conducted from the roof itself, the building is considered unsafe and ACM abatement (including the post-demolition disposal of the comingled ACM roof, concrete block and brick walls, ceiling insulation, wood decking as ACM waste) will proceed without the removal of all ACM. An Alternative Work Practice will be submitted to the EPA and CT Department of Public Health for approval.

During the investigation activities conducted in December 2018, the north, lateral, and south trenches were not inspected because they were not accessible due to safety reasons or obstructions (vehicle storage area). However, between late August 2011 and June 2012, Cabrera subcontracted to Abatement Industries Group to abate the asbestos in the all three trenches. Abatement activities included removing insulation from the piping and the trench floor.

4.3.2.6 Lead-Containing Paint/Miscellaneous Debris

To the extent possible and prior to deconstruction, loose paint (known or assumed to contain elevated lead concentrations) will be removed from the interior and exterior surfaces of the buildings/structures and materials. Performance of the work pertaining to disturbance of these materials will comply with OSHA 29 CFR 1926.62, Lead in Construction Regulations.

Removal techniques will consider the nature and condition of the painted surface. Removal of paint that is well adhered to the subject material will not be performed. Loose paint material will be collected from surfaces using methods that minimize generation of airborne dust.

Loose paint, including dust, dirt, or debris that contains loose paint, will be containerized in DOT-approved containers, characterized for disposal, and transported for offsite disposal at an NRC-approved facility.

4.3.3 Waste Segregation and Disposal

Pre- deconstruction activities will generate several materials that require disposition, including accessible ACM, universal wastes, paint and miscellaneous debris, liquids, equipment, piping, and several other solid wastes (e.g., glass, general refuse/trash). A disposition plan for the pre-demolition materials and debris was prepared based on the characterization data and applicable regulations, and is discussed below.

The offsite transport and disposal of pre- deconstruction waste materials will include ACM, universal wastes, and loose paint and debris. Other materials subject to off-site disposal include solid wastes such as wood and debris. Waste materials removed from the buildings will be subject to offsite disposal at the appropriate disposal facility per Section 3.

To support transportation and disposal activities, materials may be subject to additional characterization and loading and transport activities will adhere to all project safety requirements. Waste manifests for disposal will be prepared per USDOT regulations. Disposal requirements are discussed in Section 3.

4.4 Demolition

4.4.1 Process Overview

Deconstruction will generally involve the complete removal of the above-grade portion of the buildings and partial removal of the at-grade and subslab features. The above-grade portion includes interior and exterior walls, roof systems, structural steel, concrete supports, windows, doors, utilities, equipment, and other ancillary items (bollards and, fencing). The at-grade and subslab portions include slabs, trenches to full depth, interior and perimeter foundation walls to a depth of approximately 1 foot below slab bottom, and approximately 1 foot of soil from underneath the finished slabs and trenches.

Several activities will be performed in conjunction with deconstruction, including handling and preparation of demolition debris, management of post-demolition building materials, implementation of site controls onsite during the work, and performance of restoration activities. The demolition sequencing will consider these project components, as well as the structural integrity of all buildings, accounting for changes to the structural support of the buildings as demolition proceeds and changes in consideration of dead and live load conditions (e.g., vibration, impact, wind, snow, rain). Specific measures and procedures will be implemented to prevent the errant release of demolition debris to unintended areas.

4.4.2 Dust, Erosion, and Sedimentation Control and Protection

The prevention of airborne dust and tracking of materials from the site to offsite areas is a critical component of the project. To mitigate dust and tracking, several work practices will be implemented throughout the project as needed, including:

- Applying water to areas/activities of potential dust generation.
- Applying water to exposed material piles.
- Covering material piles with sheeting or tarps.
- Reducing surface area of exposed material.
- Modifying the rate of demolition activities, or specific methods.
- Modifying material handling methods.
- Modifying site vehicular traffic.

To control erosion and sedimentation, silt fence, hay bales, or straw wattles will be installed around the site perimeter (along the fence) and at stormwater collection basins onsite as necessary. In addition, two layers of geotextile will be inserted under catch basin grates to prevent migration of demolition debris, soil, and other materials.

Protective devices will be installed at existing fire protection elements, sanitary sewers, storm sewers, and catch basins.

4.4.3 Site Transport Plan

It is anticipated that above-grade and subslab demolition debris will be temporarily staged and/or sized on the existing building slabs prior to being transported within the site to a constructed staging area. Any transport of debris will be done safely and with minimal generation of airborne dust. Installation of a temporary access road will eliminate travel through low areas that typically collect stormwater and minimize the transport of mud or debris. To prevent tracking of site materials onto adjacent roadways, all vehicles will be properly decontaminated prior to leaving the site.

4.4.4 Sampling and Analysis

It is anticipated that sampling and analysis activities will be performed during the project to characterize some materials for disposal. This includes materials that are generated as a result of project activities and materials that were not previously accessible for safety reasons (e.g., removal of building subslab trenches, piping in trenches). Once the floor slabs and trenches are removed, underlying soil will be sampled.

4.4.5 Waste Segregation and Disposal

Deconstruction activities will generate several materials that require disposition, including concrete, brick, stone, ferrous and nonferrous metals, wood, non-accessible ACM, equipment, piping, and other solid wastes (e.g., glass, general refuse/trash). A disposition plan for the demolition debris has been prepared for the buildings/structures included in this project, based on the characterization data and applicable regulations. The demolition debris will be subject to offsite disposal or recycling at disposal facilities per Section 3.

During the project, the demolition debris will be generated, segregated, staged, prepared for transport (e.g., sized, cut, crushed), and loaded in a manner as to minimize the potential for mixing waste streams, generating dust and/or runoff, or tracking materials throughout the site. All staged wastes will be appropriately protected using polyethylene sheeting and berms, if warranted.

4.4.6 Offsite Disposal

The offsite transport and disposal of demolition debris will be to a TSDF licensed to accept the waste as identified Section 3.

To support transportation and disposal activities, materials may be subject to additional characterization, processing, and sizing as required by the receiving facilities; and loading and transport activities will adhere to all project safety requirements. Disposal activities will be documented and recorded. Documentation will include transport information (truck identification, loaded weight, weigh tickets), waste material manifests, and copies of disposition facility receipts for materials transported offsite for disposal, as applicable.

4.4.7 Recyclable Metal

Ferrous and nonferrous metals that are not otherwise regulated for disposal will be transported to a GE-approved commercial recycling operation. Such materials will be separately stockpiled from other materials. The Contractor will coordinate aspects of recyclable metal transportation and recycling (e.g., scheduling, recordkeeping, loading, weighing).

5 SOIL EXCAVATION AND DISPOSAL

After the buildings are deconstructed, impacted soil under the buildings will be excavated and shipped to the TSDF. Impacted soil will be identified based on prior characterization sampling, radiological field surveys, and soil sampling. Soil with total uranium concentrations exceeding 435 pCi/g of total uranium will be remediated. The total uranium concentration of 435 pCi/g is the $DCGL_W$ for soil per the Decommissioning Plan Addendum (UNC 2012). After the soil is excavated, an FSS of the remaining soil will be performed per Section 6 to verify the soil meets cleanup criteria.

Soil excavation will be conducted per a radiological work permit (RWP) discussed in Section 9.1. A Health and Safety Plan (HASP) will discuss the nonradiological safety aspects of the excavation activities.

5.1 Permits

No permits are required for soil excavation onsite that is not related to utility work. Utility-related permits and permit requirements are discussed in Section 4.1.

5.2 Access Control

A physical barrier (e.g., fencing) with postings and designated entry and exit points will be installed around the work zone (i.e., excavation area) and around waste staging areas to prevent inadvertent access. Excavated soil will be placed in containers or supersacks for shipment to the TSDF. These containers/supersacks will be stored within the work zone or the waste staging areas prior to shipment to the TSDF.

5.3 Excavation and Disposal

5.3.1 Process Overview

After Buildings 3H and 6H are removed, radiological surveys of the underlying soils corresponding to the footprint of Buildings 3H and 6H will be performed to determine if soils exceed the $DCGL_W$. Based on prior characterization surveys, soil exceeding the $DCGL_W$ are present under the south trench. Impacted soil under the south trench and impacted soil identified by the radiological survey will be excavated in approximately 1-foot lifts. Excavated soil will be placed in containers/supersacks for disposal. After each excavation, radiological surveys will be performed within the excavation to identify any additional soil with radioactivity levels greater than the $DCGL_W$ and this soil will be excavated. Excavation and radiological surveys will continue until all soil exceeding the soil $DCGL_W$ is removed.

5.3.2 Radiological Surveys

After the buildings are deconstructed, a gamma scanning survey will be performed to identify soil with elevated radiation levels (count rates). These surveys will be performed using a Ludlum 44-10, 2- by 2-inch sodium iodide detector coupled with a Ludlum 2221 ratemeter (or equivalent; a Ludlum 3x3 may be selected). The gamma scanning survey will be performed by walking over the excavation surface with the detector approximately 6 to 12 inches above the ground surface, in transects spaced approximately 1-meter apart. The detector will be moved in a serpentine (i.e., snake-like, s-shaped) pattern across the surface. Excavation sidewalls will be surveyed in a similar manner as the gamma scanning survey, approximately 6 to 12 inches from the sidewall surface in a serpentine pattern. Elevated count rates will be identified by the ratemeter's audio response and confirmed by the screen displaying the count rate on the ratemeter.

Soil exceeding a detector threshold will be marked with flags, paint, or similar. The detector threshold will be established based on the instrument response to HEU and the $DCGL_w$ of 435 pCi/g total uranium. The detector threshold will be set lower than the $DCGL_w$ to ensure that soil potentially exceeding the $DCGL_w$ is identified and excavated. Radiological surveys will be performed in areas where soil is excavated, until all soil exceeding the $DCGL_w$ is removed.

During the excavation activities, soil sampling may be performed at the discretion of the radiation safety officer (RSO) to determine if the soil exceeds the $DCGL_w$. However, considering the time required to analyze soil samples at an offsite laboratory, field instrumentation will be the primary method for identifying soil that exceeds the $DCGL_w$ during excavation. Soil sampling will be conducted for waste characterization (Section 5.3.3) and for the FSS (Section 6).

5.3.3 Sampling and Analysis

To characterize the waste for disposal, soil samples will be collected from the containers/supersacks and analyzed. The sampling method (e.g., grab, composite), analyses, and number of samples per container/supersack will be dictated by requirements of the TSDF. After the TSDF is selected, the sampling protocol for waste characterization will be determined in consultation with the TSDF.

5.3.4 Waste Segregation and Disposal

Soil will be segregated by placing in containers/supersacks as noted above and will be staged within the property in preparation for offsite disposal. Control measures will be implemented to prevent migration and release of dust emissions from waste soil awaiting loadout for offsite disposal. Soil will be shipped to a TSDF that has the applicable permits and licenses to accept the waste, as described in Section 3.

6 FINAL STATUS SURVEY PLAN FOR SOIL

After soil excavation is complete, FSSs will be conducted per MARSSIM (USEPA 2000). The objective of the FSS is to collect sufficient information to demonstrate that uranium concentrations meet the release criteria and that the site can be released for unrestricted use.

Soil remediation and FSSs were performed in 2011 and 2012 by Cabrera (2018) in limited areas under and near the foundations of Buildings 3H and 6H. The SUs included the decon pit, x-ray reading room, Argyle Street sewer, laydown area, and haul road. These FSSs met the criteria for unrestricted release. These areas will not be resurveyed for release unless they fall within a larger area already undergoing radiological surveys per the FSS. The majority of the soil under the building foundations has not been surveyed for unrestricted use.

6.1 Release Criteria

The $DCGL_W$ for soil is 435 pCi/g of total uranium per the Decommissioning Plan Addendum (UNC 2012).

6.2 Survey Design

6.2.1 Area Classification

Areas at the site will be classified as impacted or nonimpacted per MARSSIM (USEPA 2000). Impacted areas are those that have the potential to contain contaminated material. Nonimpacted areas have no reasonable potential for residual contamination and do not need any level of survey coverage.

The soil under the Buildings 3H and 6H (including soil under the south trench, where the south trench extends from the southeast corner of the Building 3H foundation) will be classified as impacted. The impacted area will be defined as the footprint for Buildings 3H and 6H, and a 10-foot buffer on all sides of the buildings (and south trench).

Soil outside the footprint of the buildings (and south trench) will be classified as nonimpacted. Soil outside of the building footprint, including the former x-ray read room, laydown area, haul road, and Argyle Street, were characterized and remediated, and FSSs were conducted by Cabrera (2018). The FSSs demonstrated that soil met unrestricted release criteria; therefore, the soil will be identified as nonimpacted and will not be revaluated as part of the FSS.

Impacted areas are further classified as Class 1, Class 2, or Class 3. Class 1 areas include those that prior to remediation, had a potential for radioactive contamination or known contamination. Class 2 areas include those that have, or had prior to remediation, a potential for radioactive contamination or known contamination, but are not expected to exceed the $DCGL_W$. Class 3 areas include any impacted areas that are not expected to contain residual radioactivity, or are expected to contain levels of residual radioactivity at a small fraction of the $DCGL_W$ based on site operating history and previous radiological surveys.

Areas where remediation will be performed per Section 5 will be classified as Class 1. Areas located outside of the remediated areas but inside the impacted area (building footprint plus a 10-foot buffer) will be classified as Class 2.

6.2.2 Survey Units

Per MARSSIM (USEPA 2000), SUs should be limited in size based on the classification. The suggested areas for land area SUs are as follows:

- Class 1: Up to 2,000 square meters (m^2)
- Class 2: 2,000 to 10,000 m^2.

The SU boundaries will be established after remediation is complete. The SUs will be limited in area to the surface areas identified above and recommended by MARSSIM (USEPA 2000). Remediation areas that are physically located close together and separated by unremediated areas may be grouped into a single Class 1 SU (including the unremediated area), provided the SU does not exceed a surface area of 2,000 m^2.

Considering the estimated size of the building footprint and the soil characterization data collected to date, two SUs are anticipated:

- One Class 1 SU in the remediated areas, located primary along the south trench
- One Class 2 SU for the remaining building footprint (and 10-foot buffer).

6.2.3 Background Reference Area

Uranium is naturally present in soil at a small fraction of the $DCGL_w$. Subtracting background uranium concentrations would not significantly impact the results. Therefore, a background reference area will not be sampled, and soil sample results will be compared directly with the $DCGL_w$ for conservatism.

6.2.4 Number of Sample Locations

Twenty-two systematic samples will be collected from each SU, consistent with the prior FSSs of soil conducted at the site (Cabrera 2018). Adequate characterization data are not available to calculate a relative shift using site-specific data. Per Table 5.4 of MARSSIM (USEPA 2000 [for contaminant not present in the background]), 14 samples are recommended, given a relative shift of 3.0 and Type I and Type II error rate of 0.05. Twenty-two systematic samples per SU will be performed for conservatism.

The systematic samples will be established on a grid with a random starting location. A triangular grid will be established and the grid spacing will be calculated per Section 5.5.2.4 of MARSSIM (USEPA 2000) based on the SU area and number of systematic sample locations (22).

6.3 Surface Gamma Surveys

6.3.1 Instrumentation and Detection Sensitivity

Gamma scanning surveys will be performed using a Ludlum 44-10, 2- by 2-inch sodium iodide detector coupled with a Ludlum 2221 ratemeter (or equivalent) to identify soil that potentially exceeds the $DCGL_w$. Per Table 6.7 of MARSSIM (USEPA 2000), the scan MDC for a 2- by 2-inch sodium iodide detector ranges from 96 to 132 pCi/g for enriched uranium (depending on the percent enrichment), well below the $DCGL_w$ of 435 pCi/g. Because the scan MDC is less than the $DCGL_w$, demonstrating the detector is sufficient to detect small areas of elevated activity, it is not necessary to calculate an area factor per MARSSIM (USEPA 2000).

6.3.2 Conducting Surveys

Gamma scanning surveys with 100 percent coverage will be conducted in each SU. For FSSs, the detector will be coupled with a global positioning system to allow real-time data collection and mapping. The gamma scanning survey will be performed as described in Section 5.3.2. Areas do not need to be resurveyed, if they were surveyed as discussed in Section 5.3.2 and the soil was not remediated. The gamma scanning surveys will be presented in the Final Status Survey Report (FSS Report).

6.4 Confirmation Sampling

Twenty-two systematic samples will be collected in each SU per Section 6.2.4. Biased samples will be collected at locations identified during the gamma scanning survey that exceed the detector threshold per Section 6.3.2. Samples will be collected from a depth of 0 to 6 inches. The sample will be obtained by scooping soil into a large bowl using a trowel. The soil will be mixed and placed into a sample container specified by the offsite laboratory. At least 500 grams of soil will be collected from each sample location.

The samples will be transferred to the offsite laboratory for analysis and analyzed by gamma spectroscopy. The MDC for gamma spectroscopy analysis will achieve 10 percent of the $DCGL_W$. The uranium-235 and uranium-238 concentrations will be measured via gamma spectroscopy analysis. The uranium-234 concentration will be conservatively estimated using a ratio of uranium-234 to uranium-235 of 27 to 1 for HEU. To calculate the total uranium concentration for each sample, the uranium-235 and uranium-238 concentrations are summed and the uranium-234 concentration is added based on the uranium-235 concentration multiplied by 27.

6.5 Decision Rules

The total uranium concentrations will be directly compared with the $DCGL_W$ of 435 pCi/g. If the sum of the uranium-234, uranium-235, and uranium-238 concentrations are less than the $DCGL_W$ for all samples in the SU, then the SU will be recommended for unrestricted release.

If the sum of the uranium-234, uranium-235, and uranium-238 concentrations exceed the $DCGL_W$ for any sample in the SU, then additional remediation will be performed and the FSS will be performed again. If remediation is required in a Class 2 SU based on the FSS results, the remediated area will be reclassified as a Class 1 SU.

6.6 Quality Control

To produce analytical measurement data of known quality, quality control (QC) measures will be implemented during the FSS sampling and subsequent analysis, as summarized below:

- Qualified and trained staff will perform the FSS.
- Radiological instrumentation will be calibrated at least annually in accordance with industry standards using National Institute of Standards and Technology traceable radioactive sources.

- QC operational checks will be performed daily prior to using radiological instrumentation, as described in Section 9.4.
- Samples will be submitted to the offsite laboratory using chain-of-custody procedures.
- Field duplicate samples will be collected and analyzed at one in 20 (5 percent) of the sample locations.
- The offsite laboratory will have a documented quality system and accreditation per the National Environmental Laboratory Accreditation Program.

6.7 Reporting

Upon completion of the FSS, the FSS results will be documented in the FSS Report. The FSS Report will include the analytical sample data, gamma scanning survey, and the data analysis. The FSS Report will be submitted to the NRC and a copy will be provided to the CTDEEP for information.

7 SITE RESTORATION

Following the completion of demolition activities and final site surveys, several restoration activities will be conducted, including:

- Placement of fill materials into excavated areas of the site to match the surrounding grade elevation.
- Repair and/or replacement of security and site access measures, including permanent fencing and access gates, and temporary/portable fencing.
- Restoration and/or repair of soil surfaces, pavement, fencing, curbs, culverts, and other features disturbed, damaged, or destroyed during the project that were not otherwise identified for demolition.
- Cleaning and removal of equipment and project support areas.
- Remove interim stormwater protection measures at all site and adjacent stormwater collection features.
- Miscellaneous restoration, cleaning, housekeeping, and demobilization activities.

8 COMMUNITY MONITORING PLAN

Appendix B contains a CAMP to monitor ambient air quality and assess potential airborne, project-related particulates during deconstruction and soil remediation activities. Monitoring equipment will assess the potential presence of total suspended particulates less than 10 microns in diameter (PM_{10}). The action levels for PM_{10} concentrations are as follows:

- If the ambient air PM_{10} concentration at a downwind station(s) is greater than 100 micrograms per cubic meter (µg/m^3) above the background (upwind) concentration for the 15-minute average, or if airborne dust is visually observed leaving the work area, additional dust suppression activities will be employed, potential source(s) of the PM_{10} or visible dust will be identified, and corrective actions to reduce or abate the emissions will be employed. Work activities and air monitoring may continue following the implementation of dust suppression measures provided that the downwind PM_{10} concentration does not exceed 150 µg/m^3 above the background concentration (15-minute average) and there is no visible dust migrating from the work area.
- If, after implementation of dust suppression measures, the downwind PM_{10} concentration is greater than 150 µg/m^3 above the background (upwind) concentration (15-minute average), work activities will be stopped and re-evaluated. Additionally, ambient air sampling for PCB analysis (24-hour sample) will be performed to document conditions associated with the elevated airborne particulate levels. Work activities may resume only if dust suppression measures or other corrective actions reduce the downwind PM_{10} concentration to less than 150 µg/m^3 above background (15-minute average).

Radiological airborne emissions will be monitored using high-volume fixed location air samplers at the site boundary. The air samples will be analyzed for uranium and compared with the uranium effluent limit of 5E-14 microCuries per milliliter (µCi/mL; 10 CFR 20, Appendix B, Table 2, Column 1). The project action level will be set at 20 percent of this effluent limit, consistent with 10 CFR 20.1101(d) and 40 CFR 61 Subpart H, to maintain doses to the public as less than 10 mrem/year.

If emission control measures do not consistently prevent exceedance of the action levels, project activities may be suspended until such time that additional control measures are implemented to allow the work to continue without exceeding the action levels.

9 RADIOLOGICAL SAFETY

9.1 Radiological Work Permit

Cleanup activities inside the work zone will be performed per an RWP. The RWP will be approved by the RSO and will include the following requirements for work inside the work zone:

- Radiological training
- Personal protective equipment
- Occupational air monitoring
- Engineering controls (e.g., dust suppression)
- Administrative controls (e.g., posting)
- Health physics coverage
- Control limits to pause or stop work.

Individuals working inside the work zone must read and be briefed on the requirements of the RWP. The RSO, a health physicist, or a health physics technician can perform the RWP briefing. Individuals will sign an RWP sign-in sheet and will understand the requirements in the RWP. Only individuals signed in on the RWP will be permitted inside the work zone. The work zone will consist of a physical barrier (e.g., fencing) with postings and designated entry and exit points to prevent inadvertent access.

The RWP will cover the radiological safety aspects of the cleanup activities. A HASP will be developed to cover the non-radiological safety aspects of the cleanup activities.

9.2 Dosimetry

The effective dose from external radiation is expected to be well below 500 mrem/year, or the limit when external dose monitoring is required for occupational workers per 10 CFR 20.1502(a)(2). Additionally, the effective dose from external radiation is expected to be well below 100 mrem/year, or the limit for a member of the public per 10 CFR 20.1301(a)(1).

Although the occupational monitoring of external dose is not required, dosimetry will be worn by individuals within the work zone as prescribed by the RWP, to confirm the effective dose from external radiation is minimal. The dosimeters will be exchanged at least quarterly and may be exchanged more frequently (e.g., monthly) at the discretion of the RSO.

9.3 Airborne Radioactivity

Community monitoring for airborne radioactivity will be performed using fixed-location air monitors at the site boundary, as described in the CAMP (Appendix B).

Occupational monitoring will be performed using high-volume air samplers (i.e., 40 to 100 liters per minute) to collect general area (GA) samples and lapel air samplers (i.e., 2 to 10 liters per minute) to collect breathing zone (BZ) samples. GA samplers will be placed within or adjacent to the work zone, to monitor the general airborne concentrations. The location of the GA samplers will be moved as needed to accommodate the changing work area. BZ samplers will be worn by individuals within the work zone to perform individual monitoring.

GA and BZ samples will be collected and analyzed for alpha activity using the Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter). The alpha activity will be compared with the derived air concentration for uranium of 2E-11 µCi/mL (10 CFR 20, Part B, Table 1, Column 3). Air sample results will be documented on an air sample form.

9.4 Equipment and Personnel Surveys

Surface contamination surveys will be performed for equipment and personnel leaving the work zone. Equipment and personnel will be scanned using a Ludlum 43-93 coupled with a Ludlum 2360 (or equivalent alpha/beta detector). Smear and air samples will be analyzed using a Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter).

Radiological instrumentation will be calibrated at least annually, after repair, or when the instrument fails an operational check and requires servicing. QC operational checks will be performed daily prior to using the instrument. The QC operational checks will include visual inspection for signs of damage, battery check, source check by measuring a radioactive check source, and background check. Daily source and background checks will be compared with acceptance criteria to verify instrument operability. If the QC operational check fails, the instrument will be removed from service. QC operational checks will be recorded and documented on an instrument QC operational check form.

Acceptable surface contamination levels for release of equipment and personnel are presented in Table 9-1. These surface contamination limits are consistent with those in Table 2 of NRC Regulatory Guide 8.30 Health Physics Surveys in Uranium Recovery Facilities (NRC 2002).

Table 9-1. Surface Contamination Limits

Criteria	Value	Comments
Average[1]	5,000 dpm alpha per 100 cm^2	Average over no more than 1 m^2
Maximum[1]	15,000 dpm alpha per 100 cm^2	Applies to an area of not more than 100 cm^2
Removable	1,000 dpm alpha per 100 cm^2	Determined by smearing with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the smear

Notes:
[1] Value includes both fixed and removable contamination.
cm^2 = square centimeter
dpm = disintegrations per minute

Personnel surveys will be performed at a designated entry/exit (step-off) for the work zone using a Ludlum 43-93 coupled with a Ludlum 2360 (or equivalent alpha/beta detector). If counts are identified greater than background, the individual will remain in the work zone and a health physics technician will perform a full body frisk and assist with removing contamination by brushing off the material or washing the skin with water. The health physics technician will perform additional measurements to confirm the activity is less than the values in Table 9-1, with a goal of background. Once this is confirmed, the individual can leave the work zone.

Release surveys will be performed for equipment and tools leaving the work zone. Release surveys will include a scanning survey, static measurements, and smears. The equipment will be scanned and static measurements will be performed using a Ludlum 43-93 coupled with a Ludlum 2360 (or equivalent alpha/beta detector). Smears will be analyzed using the Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter). The measurements will be compared with the values in Table 9-1 to determine if the item can be released. If the results approach the values listed in Table 9-1, specific project conditions and controls, practices, etc. will be reviewed to identify potential measures that may be implemented to achieve lower results. Release surveys will be documented on a radiological survey form.

10 CONSTRUCTION AND EXCAVATION SAFETY

Work will be conducted for the project in accordance with applicable OSHA 29 CFR 1926, Safety and Health Regulations for Construction, including (but not limited to) excavation support and entry, elevated work, and crushing/downsizing debris. Nonradiological hazards will be identified, evaluated, and mitigated per task-specific JSAs.

11 REFERENCES

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FIGURES

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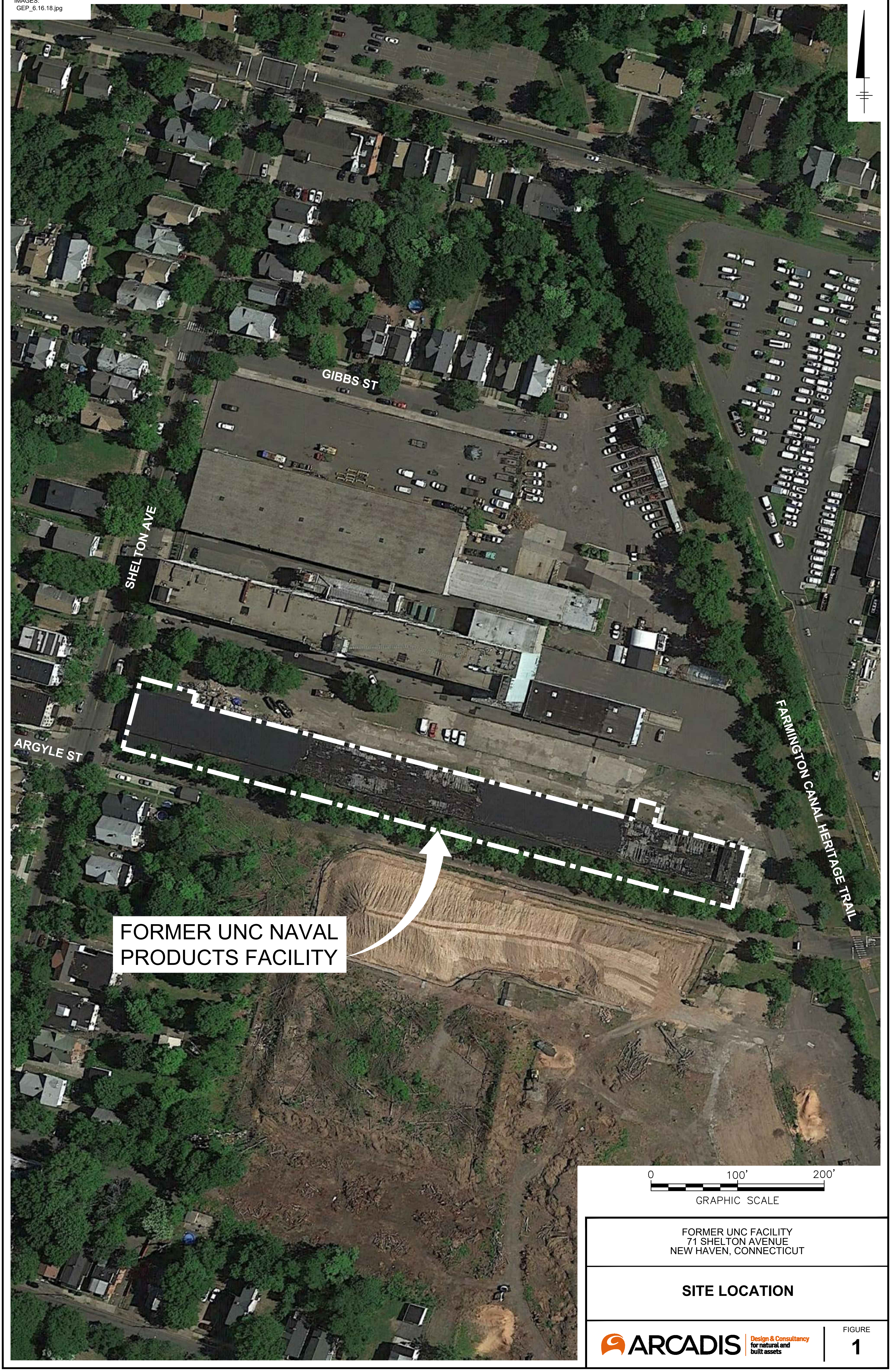

FORMER UNC FACILITY
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NEW HAVEN, CONNECTICUT

SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
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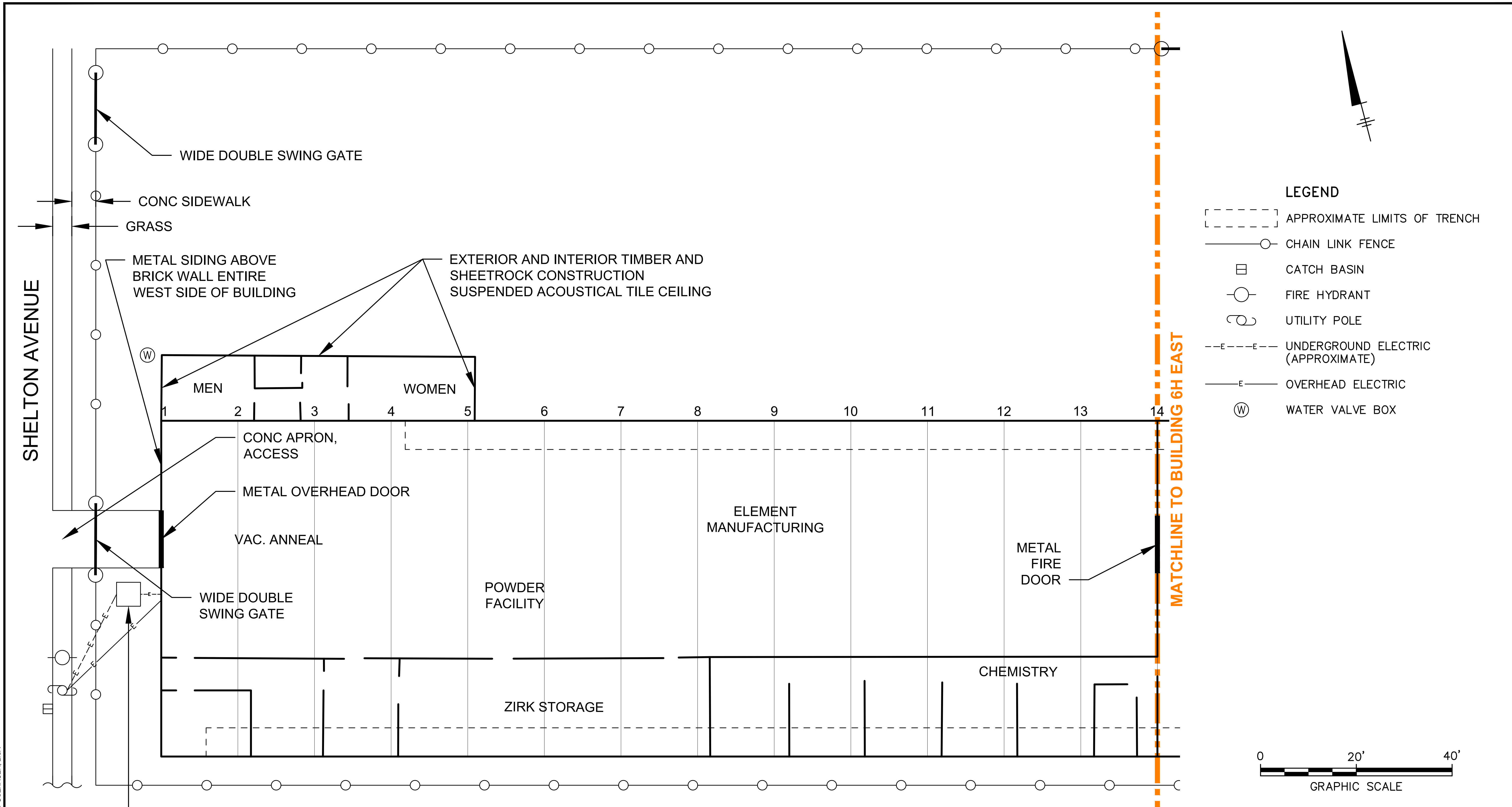

FORMER UNC FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT

SITE LAYOUT, BUILDING 6H WEST

ARCADIS Design & Consultancy for natural and built assets

FIGURE
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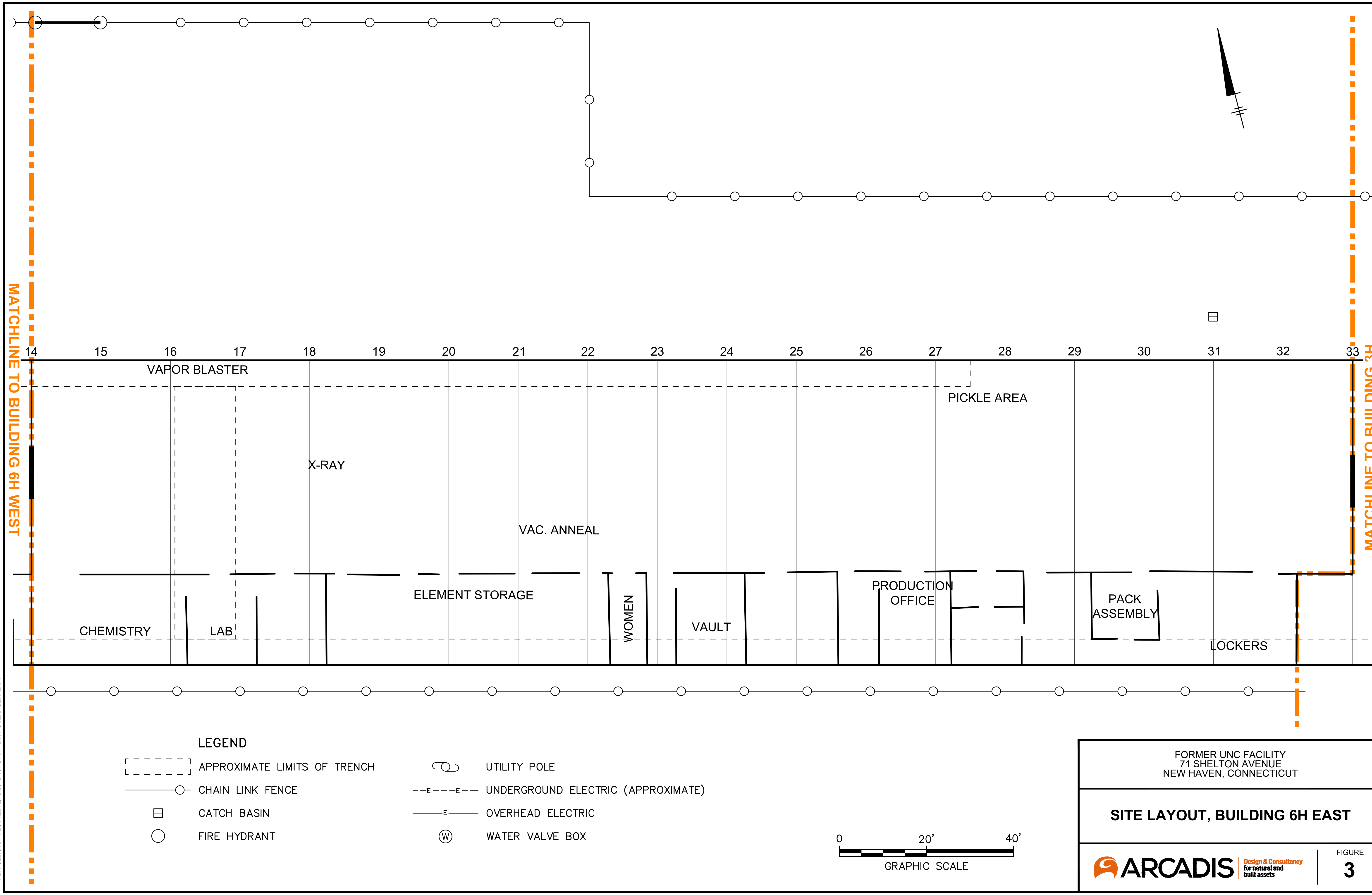
MATCHLINE TO BUILDING 6H WEST
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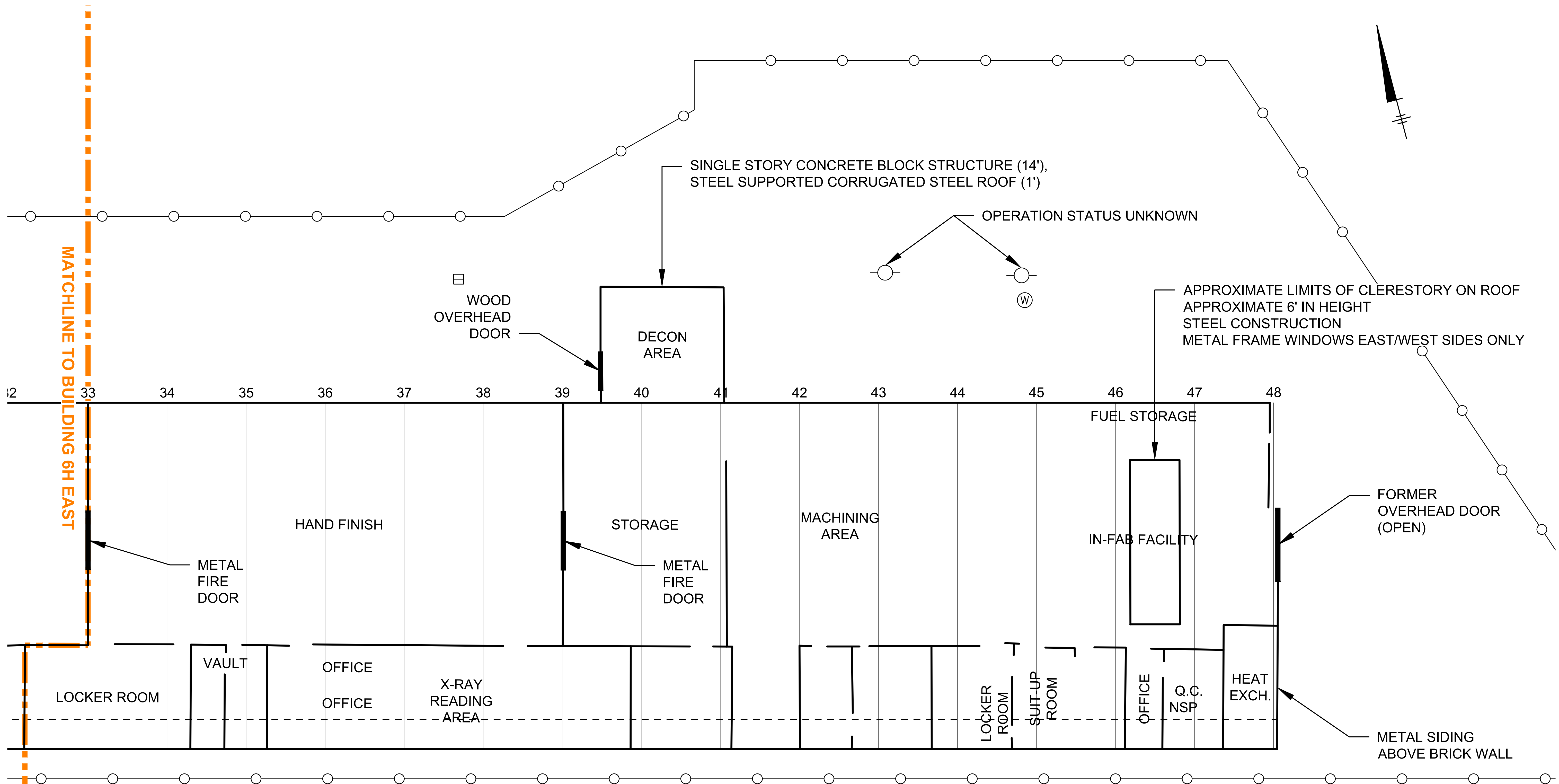
PICKLE AREA
X-RAY
VAC. ANNEAL
ELEMENT STORAGE
PRODUCTION
OFFICE
PACK
ASSEMBLY
CHEMISTRY
LAB
WOMEN
VAULT
LOCKERS
LEGEND
APPROXIMATE LIMITS OF TRENCH
CHAIN LINK FENCE
CATCH BASIN
FIRE HYDRANT
UTILITY POLE
UNDERGROUND ELECTRIC (APPROXIMATE)
OVERHEAD ELECTRIC
WATER VALVE BOX
0
20'
40'
GRAPHIC SCALE
FORMER UNC FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT
SITE LAYOUT, BUILDING 6H EAST
ARCADIS
Design & Consultancy for natural and built assets
FIGURE
3



LEGEND

- APPROXIMATE LIMITS OF TRENCH
- CHAIN LINK FENCE
- CATCH BASIN
- FIRE HYDRANT
- UTILITY POLE
- UNDERGROUND ELECTRIC (APPROXIMATE)
- OVERHEAD ELECTRIC
- WATER VALVE BOX

0 20' 40'
GRAPHIC SCALE

FORMER UNC FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT

SITE LAYOUT, BUILDING 3H

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

APPENDIX A

Building Characterization Survey

Sample Designation

Building Section
Floor (or W - Wall)
Systematic (or B - Biased, D - Duplicate)
Sample number
MMDD

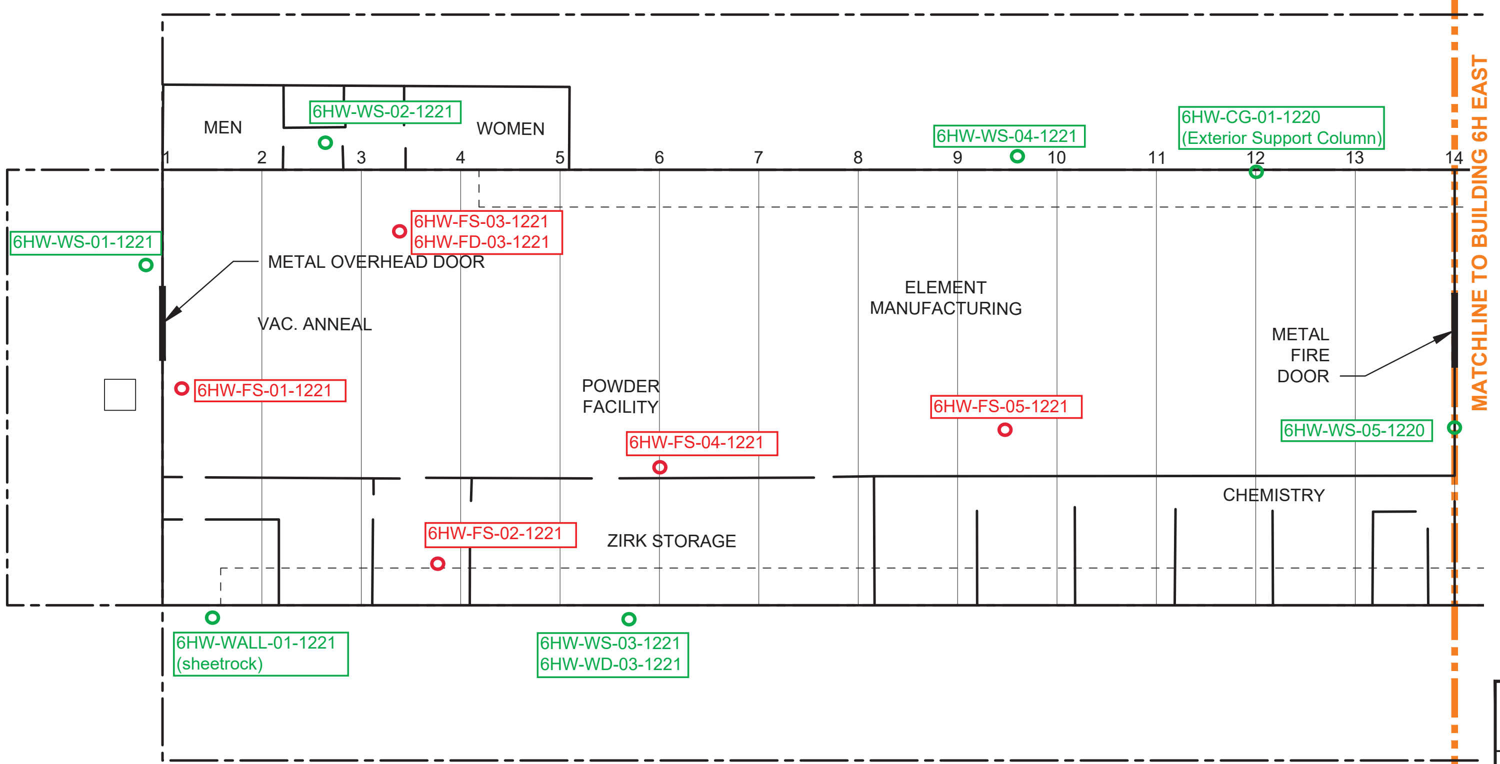
6HW-FS-01-1217

Additional Sample Designations

WALL - wall covering
CG - Caulking
R/RW - Built-up Roofing, Wood Roof Decking
WC - Waste Characterization
FD - Field Duplicate

LEGEND

- SYSTEMATIC SAMPLE LOCATION
- BIASED SAMPLE LOCATION
- NON–RADIATION SAMPLE LOCATION
- WALLS FOLDED OUT
- APPROXIMATE LIMITS OF TRENCH



NOTES:

1. SYSTEMATIC LOCATIONS ARE BASED ON MARSSIM GUIDANCE FOR SAMPLE LOCATIONS 9SEE SAMPLING PLAN FOR CALCULATIONS).
2. BIASED LOCATIONS ARE BASED ON THE RESULTS PRESENTED IN "SUPPLEMENTAL RADIOLOGICAL SURVEY REPORT BUILDINGS 3H/6H (FLOOR SURFACES) AND FORMER BUILDING 9H/10H/11H (SUBSURFACE SOILS) CABRERA SERVICES (OCTOBER 2017).
3. DUE TO ACCESS ISSUES, CHARACTERIZATION SAMPLING OF ALL TRENCHES WILL BE CONDUCTED DURING BUILDING REMOVAL ACTIVITIES ONCE THE TRENCH MATERIALS ARE PULLED AND BROUGHT TO THE GROUND LEVEL.

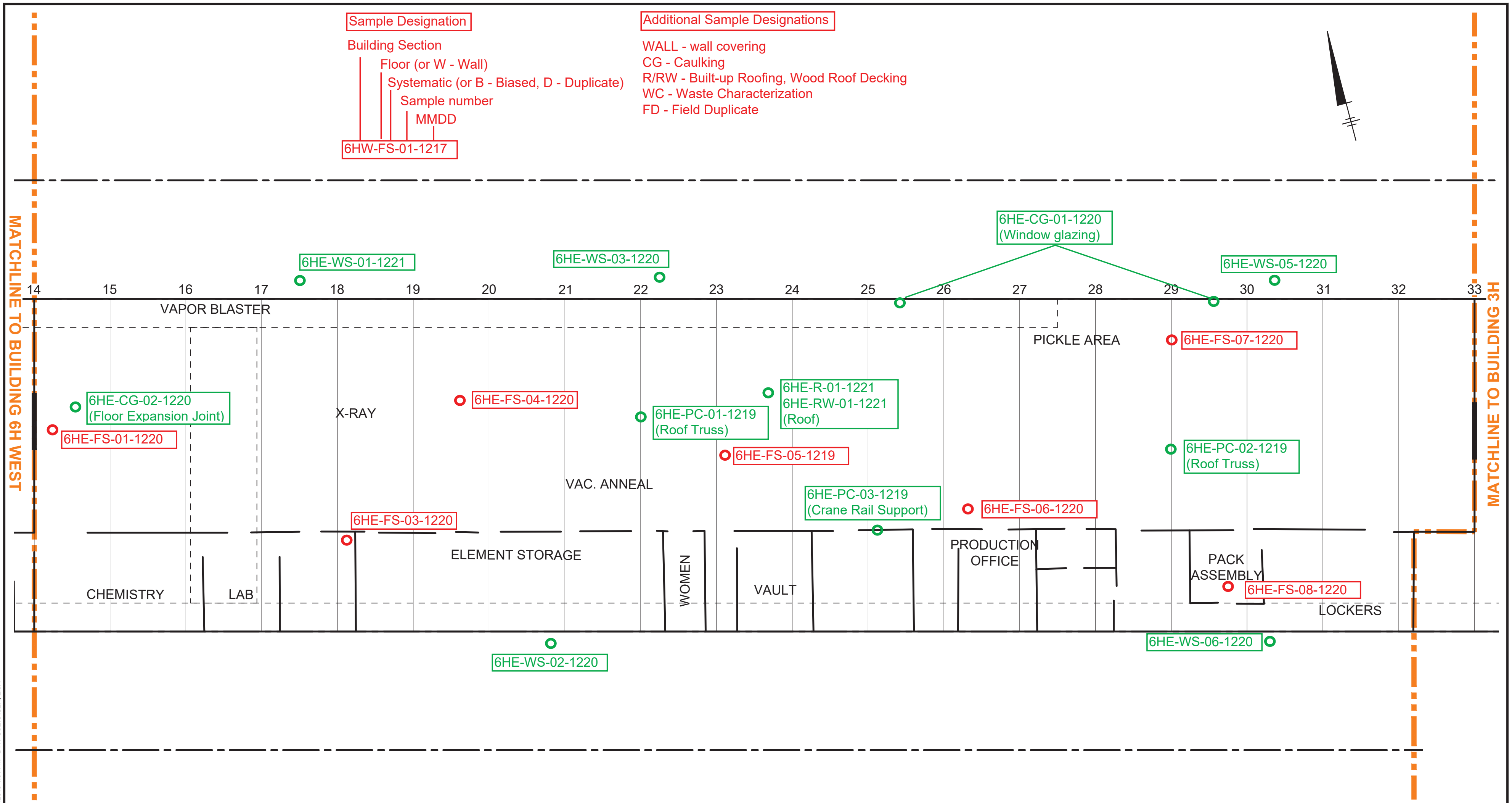
0 20' 40'
GRAPHIC SCALE

FORMER UNC FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT

APPENDIX A
BUILDING CHARACTERIZATION SURVEY
BUILDING 6H WEST

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1



LEGEND

- SYSTEMATIC SAMPLE LOCATION
- BIASED SAMPLE LOCATION
- NON–RADIATION SAMPLE LOCATION
- WALLS FOLDED OUT
- APPROXIMATE LIMITS OF TRENCH

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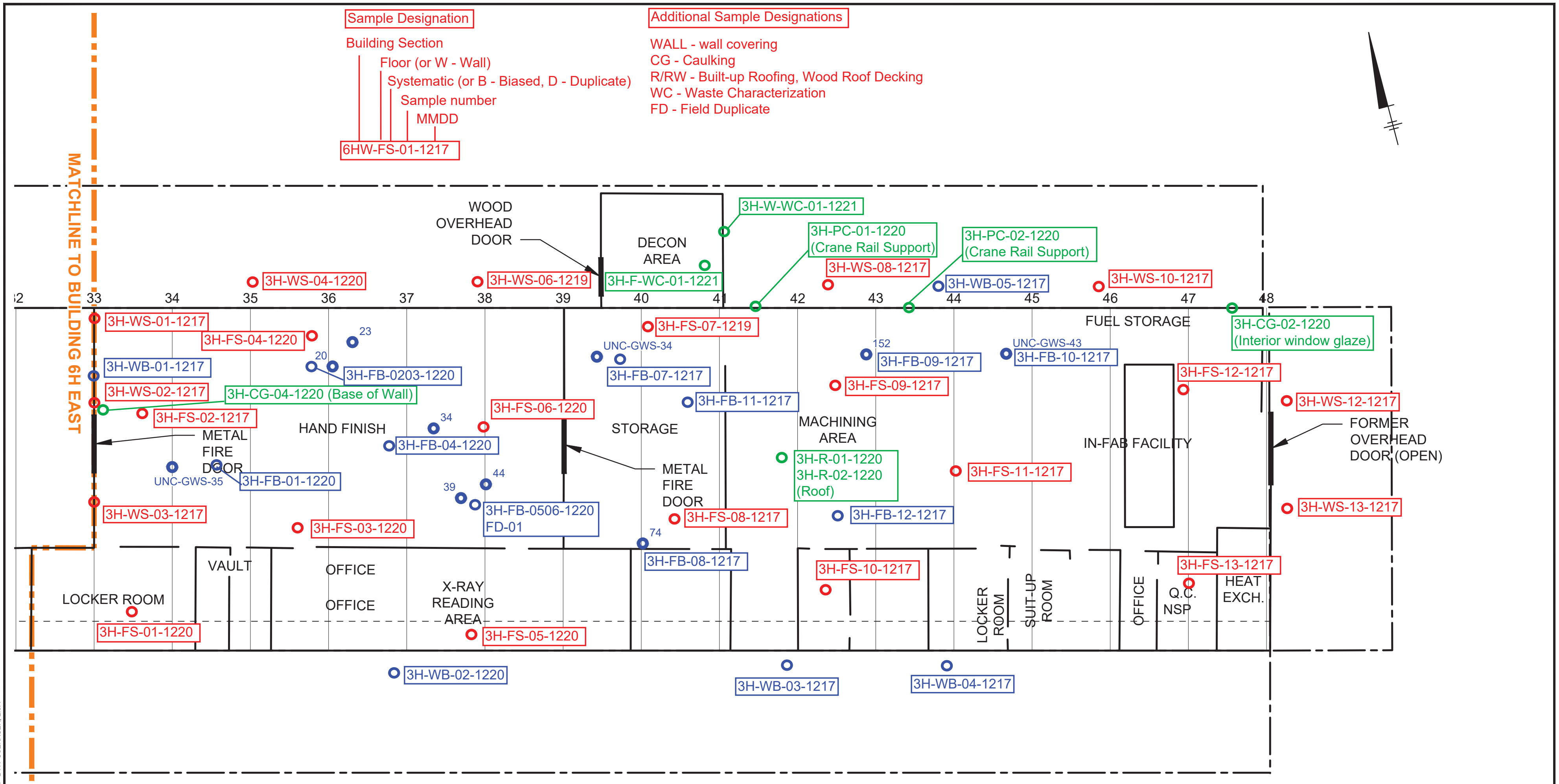
0 20' 40'
GRAPHIC SCALE

FORMER UNC FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT

APPENDIX A
BUILDING CHARACTERIZATION SURVEY
BUILDING 6H EAST

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2



LEGEND

- SYSTEMATIC SAMPLE LOCATION
- BIASED SAMPLE LOCATION
- NON–RADIATION SAMPLE LOCATION
- WALLS FOLDED OUT
- APPROXIMATE LIMITS OF TRENCH

NOTES:

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3. DUE TO ACCESS ISSUES, CHARACTERIZATION SAMPLING OF ALL TRENCHES WILL BE CONDUCTED DURING BUILDING REMOVAL ACTIVITIES ONCE THE TRENCH MATERIALS ARE PULLED AND BROUGHT TO THE GROUND LEVEL.

0 20' 40'
GRAPHIC SCALE

FORMER UNC FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT

APPENDIX A
BUILDING CHARACTERIZATION SURVEY
BUILDING 3H

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

CITY: SYRACUSE, NY DIV/GROUP: EBC-IMDV DB: L.POSENAUER PM/TM: R.GIAMPAOLO LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\ANA - GE CORP ENV PROGGE FMR UNC FACILITY NEW HAVEN CT\2019\ALL31350.2000\01-DWG\GE-UNC_FIG 1-2-3_BUILDING SAMPLES.dwg LAYOUT: 3 SAVED: 2/18/2019 4:01 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: C-LB-PDF
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/18/2019 4:01 PM BY: POSENAUER, LISA

Table A-1
Cleanup Plan
Appendix A - Building Characterization Survey
Radiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	3H-CG-02	3H-FB-01	3H-FB-04	3H-FB-07	3H-FB-08	3H-FB-09
Date Collected:	12/20/18	12/20/18	12/20/18	12/19/18	12/19/18	12/17/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.200 ±0.0863	0.495 ±0.149	0.300 ±0.109	0.249 ±0.0918	0.308 ±0.110	0.393 ±0.121
Uranium-234	0.506 ±0.142	48.7 ±4.33	1.46 ±0.259	1.67 ±0.272	11.7 ±1.18	0.592 ±0.151
Uranium-235	0.00525 U ±0.0223	2.37 ±0.388	0.0195 U ±0.0321	0.0675 ±0.0535	0.491 ±0.154	0.0212 U ±0.0301
Radiochem-Gamma Emitters						
Uranium-238	NA	0.0321 U G ±0.0990	0.467 U ±0.525	0.484 U ±0.432	-1.280 U G ±0.875	-0.24400 U ±0.713
Uranium-235	NA	2.64 ±0.518	0.135 U ±0.269	0.0404 U ±0.139	2.92 ±0.553	0.0580 U ±0.164
Radiochem-Gamma Emitters-TICs						
Actinium-228	NA	0.626 ±0.183	0.288 ±0.145	NA	0.524 ±0.148	0.487 ±0.113
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	NA	NA	NA	0.296 ±0.107	0.380 ±0.112	0.283 ±0.101
Lead-210	NA	NA	2.23 ±0.932	NA	NA	NA
Lead-212	NA	0.463 ±0.105	0.399 ±0.0898	NA	0.524 ±0.102	0.387 ±0.0767
Lead-214	NA	0.283 ±0.115	0.244 ±0.0897	NA	0.404 ±0.110	0.275 ±0.0738
Potassium-40	NA	6.45 ±1.36	6.91 ±1.22	6.98 ±1.26	8.20 ±1.35	4.53 ±0.864
Thallium-208	NA	0.169 ±0.0643	0.124 ±0.0459	0.175 ±0.0592	0.235 ±0.0684	0.121 ±0.0362

Location ID:	3H-FB-10	3H-FB-11	3H-FB-12	3H-FB-0203	3H-FB-0506	3H-FS-01
Date Collected:	12/17/18	12/19/18	12/18/18	12/20/18	12/19/18	12/20/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.490 ±0.135	0.266 ±0.109	0.803 ±0.173	0.179 ±0.0883	0.235 ±0.0919	NA
Uranium-234	0.376 ±0.118	6.44 ±0.750	98.5 ±8.46	0.535 ±0.158	0.868 ±0.186	NA
Uranium-235	0.0416 ±0.0418	0.293 ±0.127	4.41 ±0.553	0.0255 U ±0.0361	0.0285 U ±0.0363	NA
Radiochem-Gamma Emitters						
Uranium-238	0.161 U ±0.350	1.74 ±0.648	0.195 U ±0.323	0.223 U ±0.290	-0.0989000 U ±0.122	0.297 U ±0.444
Uranium-235	0.001930000 U ±0.0040	1.57 ±0.338	4.67 ±0.619	-0.12900 U ±0.364	0.167 U ±0.310	0.237 ±0.140
Radiochem-Gamma Emitters-TICs						
Actinium-228	0.453 ±0.143	0.559 ±0.269	0.478 ±0.190	0.531 ±0.139	0.411 ±0.192	0.614 ±0.181
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	0.247 ±0.0845	0.345 ±0.139	0.323 ±0.0886	0.292 ±0.0903	0.357 ±0.124	0.257 ±0.112
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	0.357 ±0.0853	0.414 ±0.101	0.336 ±0.0816	0.365 ±0.0744	0.407 ±0.0949	0.414 ±0.0932
Lead-214	0.338 ±0.0837	NA	0.346 ±0.0808	0.247 ±0.0750	0.393 ±0.125	0.269 ±0.0886
Potassium-40	4.70 ±1.02	6.42 ±1.37	5.54 ±1.05	5.28 ±0.965	5.52 ±1.06	6.54 ±1.36
Thallium-208	0.121 ±0.0450	0.149 ±0.0576	0.157 ±0.0528	0.177 ±0.0507	0.127 ±0.0505	0.222 ±0.0617

Location ID:	3H-FS-02	3H-FS-03	3H-FS-04	3H-FS-05	3H-FS-06	3H-FS-07
Date Collected:	12/20/18	12/20/18	12/20/18	12/20/18	12/20/18	12/19/18
Radiochem-Alpha Spectrometry						
Uranium-238	NA	NA	NA	NA	NA	NA
Uranium-234	NA	NA	NA	NA	NA	NA
Uranium-235	NA	NA	NA	NA	NA	NA
Radiochem-Gamma Emitters						
Uranium-238	-0.64900 U ±0.857	0.354 U ±0.377	0.473 U ±0.547	-0.17800 U G ±0.727	-1.510 U ±0.599	-0.44600 U ±0.472
Uranium-235	0.303 ±0.194	0.144 U ±0.139	-0.16300 U ±0.531	2.46 ±0.390	0.383 ±0.180	-0.10200 U ±0.225
Radiochem-Gamma Emitters-TICs						
Actinium-228	0.541 ±0.145	0.586 ±0.143	0.493 ±0.158	0.417 ±0.123	0.563 ±0.148	0.499 ±0.108
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	0.344 ±0.115	NA	0.473 ±0.131	0.250 ±0.0957	0.289 ±0.0912	0.388 ±0.104
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	0.462 ±0.0965	0.398 ±0.0914	0.471 ±0.0979	0.416 ±0.0816	0.372 ±0.0865	0.279 ±0.0765
Lead-214	0.329 ±0.101	0.301 ±0.109	0.341 ±0.121	0.348 ±0.0802	0.254 ±0.0861	0.323 ±0.0801
Potassium-40	7.42 ±1.26	6.36 ±1.21	7.49 ±1.28	8.10 ±1.25	5.33 ±1.10	6.64 ±1.20
Thallium-208	0.197 ±0.0608	0.171 ±0.0592	0.198 ±0.0530	0.140 ±0.0455	0.128 ±0.0540	0.140 ±0.0479

Table A-1
Cleanup Plan
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Radiological Characteristics
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New Haven, Connecticut

ARCADIS Design & Consultancy for natural and built assets

Location ID:	3H-FS-08	3H-FS-09	3H-FS-10	3H-FS-11	3H-FS-12	3H-FS-13
Date Collected:	12/19/18	12/18/18	12/18/18	12/17/18	12/17/18	12/17/18
Radiochem-Alpha Spectrometry						
Uranium-238	NA	NA	NA	NA	NA	NA
Uranium-234	NA	NA	NA	NA	NA	NA
Uranium-235	NA	NA	NA	NA	NA	NA
Radiochem-Gamma Emitters						
Uranium-238	0.515 U ±0.420	0.102 U ±0.410	0.394 U ±0.510	0.371 U ±0.488	0.137 U ±0.136	0.285 U ±0.379
Uranium-235	0.0390 U ±0.182	0.0840 U ±0.274	0.0823 U ±0.256	0.0824 U ±0.265	0.113 U ±0.0842	0.00533 U ±0.0161
Radiochem-Gamma Emitters-TICs						
Actinium-228	NA	0.653 ±0.150	0.425 ±0.155	0.366 ±0.175	NA	0.491 ±0.143
Bismuth-212	NA	NA	NA	NA	0.665 ±0.327	NA
Bismuth-214	0.299 ±0.127	0.347 ±0.113	0.388 ±0.121	NA	0.306 ±0.102	0.287 ±0.105
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	0.432 ±0.0967	0.398 ±0.0874	0.437 ±0.0937	0.255 ±0.0827	0.260 ±0.0700	0.443 ±0.0991
Lead-214	NA	0.290 ±0.0928	0.367 ±0.108	0.281 ±0.0883	0.347 ±0.0847	0.374 ±0.0975
Potassium-40	6.49 ±1.36	5.62 ±1.21	5.72 ±1.37	5.84 ±1.33	5.36 ±1.03	7.04 ±1.35
Thallium-208	0.170 ±0.0546	NA	0.221 ±0.0663	0.165 ±0.0507	0.127 ±0.0509	0.170 ±0.0619

Location ID:	3H-PC-01	3H-R-01	3H-R-02	3H-WB-01	3H-WB-02	3H-WB-03
Date Collected:	12/20/18	12/20/18	12/20/18	12/19/18	12/20/18	12/18/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.413 ±0.120	0.0391 U ±0.0372	0.0197 U ±0.0280	0.374 ±0.116	0.532 ±0.136	0.751 ±0.174
Uranium-234	49.9 ±4.37	0.0557 U ±0.0478	0.0495 U ±0.0462	3.84 ±0.478	60.0 ±5.21	1.04 ±0.209
Uranium-235	1.83 ±0.300	0.0154 U ±0.0300	0.0197 U ±0.0279	0.171 ±0.0870	2.52 ±0.372	0.00537 U ±0.0228
Radiochem-Gamma Emitters						
Uranium-238	NA	NA	NA	0.404 U ±0.466	1.02 U ±0.681	0.933 U ±0.649
Uranium-235	NA	NA	NA	0.0866 U ±0.206	3.62 ±0.520	-0.37800 U G ±0.445
Radiochem-Gamma Emitters-TICs						
Actinium-228	NA	NA	NA	0.916 ±0.210	1.19 ±0.239	1.69 ±0.390
Bismuth-212	NA	NA	NA	NA	1.46 ±0.695	2.44 ±0.882
Bismuth-214	NA	NA	NA	NA	0.717 ±0.155	1.15 ±0.254
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	NA	NA	NA	0.658 ±0.129	1.04 ±0.154	1.45 ±0.229
Lead-214	NA	NA	NA	0.504 ±0.121	0.792 ±0.157	1.27 ±0.276
Potassium-40	NA	NA	NA	14.0 ±2.12	16.4 ±2.40	27.2 ±3.90
Thallium-208	NA	NA	NA	0.320 ±0.0802	0.327 ±0.0823	0.556 ±0.127

Location ID:	3H-WB-04	3H-WB-05	3H-WS-01	3H-WS-02	3H-WS-03	3H-WS-04
Date Collected:	12/18/18	12/17/18	12/18/18	12/19/18	12/19/18	12/20/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.280 ±0.102	0.772 ±0.171	0.387 ±0.122	0.347 ±0.108	0.435 ±0.128	0.530 ±0.137
Uranium-234	0.383 ±0.119	0.661 ±0.156	9.14 ±0.942	13.1 ±1.27	1.67 ±0.279	0.781 ±0.171
Uranium-235	).002600000 U ±0.0052	0.0290 U ±0.0399	0.298 ±0.116	0.416 ±0.130	0.0537 ±0.0482	0.0147 U ±0.0286
Radiochem-Gamma Emitters						
Uranium-238	0.982 U ±0.587	0.655 U ±1.01	NA	NA	NA	NA
Uranium-235	0.158 U ±0.417	-0.10700 U G ±1.31	NA	NA	NA	NA
Radiochem-Gamma Emitters-TICs						
Actinium-228	1.20 ±0.231	1.63 ±0.400	NA	NA	NA	NA
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	1.02 ±0.193	1.07 ±0.300	NA	NA	NA	NA
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	1.24 ±0.202	1.57 ±0.264	NA	NA	NA	NA
Lead-214	1.07 ±0.188	1.19 ±0.298	NA	NA	NA	NA
Potassium-40	21.1 ±2.81	26.3 ±4.08	NA	NA	NA	NA
Thallium-208	0.443 ±0.0988	0.475 ±0.128	NA	NA	NA	NA

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Date Collected:	12/19/18	12/19/18	12/20/18	12/19/18	12/18/18	12/19/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.837 ±0.175	0.372 ±0.114	0.385 ±0.113	0.703 ±0.156	0.548 ±0.138	0.640 ±0.153
Uranium-234	0.831 ±0.174	3.34 ±0.433	0.480 ±0.126	0.964 ±0.187	0.931 ±0.187	0.665 ±0.158
Uranium-235	0.0355 U ±0.0383	0.0983 ±0.0645	0 U ±0.00462	0.0455 ±0.0409	0.0550 ±0.0473	0.0350 U ±0.0407
Radiochem-Gamma Emitters						
Uranium-238	NA	NA	NA	NA	NA	NA
Uranium-235	NA	NA	NA	NA	NA	NA
Radiochem-Gamma Emitters-TICs						
Actinium-228	NA	NA	NA	NA	NA	NA
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	NA	NA	NA	NA	NA	NA
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	NA	NA	NA	NA	NA	NA
Lead-214	NA	NA	NA	NA	NA	NA
Potassium-40	NA	NA	NA	NA	NA	NA
Thallium-208	NA	NA	NA	NA	NA	NA

Location ID:	3H-WS-11	3H-WS-12	3H-WS-13	6HE-FS-01	6HE-FS-02	6HE-FS-03
Date Collected:	12/19/18	12/18/18	12/18/18	12/20/18	12/21/18	12/20/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.843 ±0.184	0.404 ±0.122	0.208 ±0.0846	NA	NA	NA
Uranium-234	0.703 ±0.170	0.481 ±0.134	0.513 ±0.135	NA	NA	NA
Uranium-235	0.00527 U ±0.0224	0.0287 U ±0.0367	0.0198 U ±0.0280	NA	NA	NA
Radiochem-Gamma Emitters						
Uranium-238	NA	NA	NA	0.529 U ±0.561	0.328 U ±0.366	0.201 U ±0.374
Uranium-235	NA	NA	NA	-0.22800 U ±0.229	0 U ±0.120	0.0457 U ±0.271
Radiochem-Gamma Emitters-TICs						
Actinium-228	NA	NA	NA	0.541 ±0.193	0.617 ±0.149	0.554 ±0.175
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	NA	NA	NA	0.389 ±0.143	0.271 ±0.0823	NA
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	NA	NA	NA	0.516 ±0.113	0.484 ±0.0929	0.398 ±0.0971
Lead-214	NA	NA	NA	0.353 ±0.126	0.240 ±0.0751	0.272 ±0.109
Potassium-40	NA	NA	NA	6.86 ±1.35	8.06 ±1.32	6.01 ±1.25
Thallium-208	NA	NA	NA	0.183 ±0.0616	0.154 ±0.0424	0.175 ±0.0583

Location ID:	6HE-FS-04	6HE-FS-05	6HE-FS-06	6HE-FS-07	6HE-FS-08	6HE-PC-01
Date Collected:	12/20/18	12/19/18	12/20/18	12/20/18	12/20/18	12/19/18
Radiochem-Alpha Spectrometry						
Uranium-238	NA	NA	NA	NA	NA	0.101 ±0.0582
Uranium-234	NA	NA	NA	NA	NA	1.06 ±0.203
Uranium-235	NA	NA	NA	NA	NA	0.0667 ±0.0508
Radiochem-Gamma Emitters						
Uranium-238	0.432 ±0.243	0.360 U ±0.520	0.227 U ±0.314	0.343 U ±0.374	0.131 U ±0.520	NA
Uranium-235	-0.0314000 U ±0.0616	-0.23500 U ±0.274	0.0139 U ±0.0457	0.0612 U ±0.148	-0.14500 U ±0.463	NA
Radiochem-Gamma Emitters-TICs						
Actinium-228	0.475 ±0.114	0.542 ±0.188	0.490 ±0.153	0.607 ±0.174	0.722 ±0.158	NA
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	0.251 ±0.0920	NA	0.287 ±0.0898	0.281 ±0.116	0.490 ±0.129	NA
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	0.329 ±0.0742	0.515 ±0.107	0.333 ±0.0812	0.442 ±0.101	0.512 ±0.102	NA
Lead-214	0.214 ±0.0710	0.407 ±0.122	0.341 ±0.0956	0.300 ±0.104	0.276 ±0.0867	NA
Potassium-40	5.14 ±0.960	6.87 ±1.34	6.21 ±1.15	5.66 ±1.22	7.29 ±1.25	NA
Thallium-208	0.150 ±0.0359	0.150 ±0.0630	0.183 ±0.0536	0.185 ±0.0628	0.231 ±0.0759	NA

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Radiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	6HE-PC-03	6HE-WS-03	6H-R-01	6H-RW-01	6HW-FS-01	6HW-FS-02
Date Collected:	12/19/18	12/20/18	12/21/18	12/21/18	12/21/18	12/21/18
Radiochem-Alpha Spectrometry						
Uranium-238	0.145 ±0.0678	NA	0.658 ±0.190	0.0654 ±0.0453	NA	NA
Uranium-234	2.58 ±0.350	NA	1.03 ±0.244	0.0412 U ±0.0372	NA	NA
Uranium-235	0.0609 ±0.0483	NA	0.0420 U ±0.0535	).004660000 U ±0.0066	NA	NA
Radiochem-Gamma Emitters						
Uranium-238	NA	0.988 U ±0.735	NA	NA	0.275 U ±0.460	0.369 U ±0.401
Uranium-235	NA	-0.0218000 U ±0.0389	NA	NA	0 U ±0.168	0.0522 U ±0.129
Radiochem-Gamma Emitters-TICs						
Actinium-228	NA	1.43 ±0.291	NA	NA	0.421 ±0.125	0.521 ±0.175
Bismuth-212	NA	NA	NA	NA	NA	NA
Bismuth-214	NA	0.816 ±0.223	NA	NA	0.378 ±0.112	0.329 ±0.119
Lead-210	NA	NA	NA	NA	NA	NA
Lead-212	NA	1.32 ±0.225	NA	NA	0.344 ±0.0872	0.354 ±0.0979
Lead-214	NA	0.959 ±0.212	NA	NA	0.333 ±0.101	NA
Potassium-40	NA	21.2 ±3.20	NA	NA	6.22 ±1.14	5.64 ±1.20
Thallium-208	NA	0.470 ±0.126	NA	NA	0.168 ±0.0622	0.143 ±0.0710

Location ID:	6HW-FS-03	6HW-FS-04	6HW-FS-05	6HW-WALL-01
Date Collected:	12/21/18	12/21/18	12/21/18	12/21/18
Radiochem-Alpha Spectrometry				
Uranium-238	NA	NA	NA	0.109 ±0.0684
Uranium-234	NA	NA	NA	0.144 ±0.0765
Uranium-235	NA	NA	NA	0.00605 U ±0.0257
Radiochem-Gamma Emitters				
Uranium-238	-0.17500 U ±0.621	0.640 U ±0.586	-0.25400 U ±0.513	NA
Uranium-235	-0.0298000 U ±0.0549	-0.21500 U ±0.292	0.0262 U ±0.144	NA
Radiochem-Gamma Emitters-TICs				
Actinium-228	0.404 ±0.146	0.435 ±0.214	NA	NA
Bismuth-212	0.918 ±0.339	NA	NA	NA
Bismuth-214	0.280 ±0.0911	0.254 ±0.101	0.307 ±0.0970	NA
Lead-210	NA	NA	NA	NA
Lead-212	0.377 ±0.0780	0.426 ±0.0932	0.336 ±0.0796	NA
Lead-214	0.210 ±0.0654	0.422 ±0.105	0.284 ±0.0709	NA
Potassium-40	6.02 ±1.06	5.94 ±1.19	5.25 ±1.03	NA
Thallium-208	0.137 ±0.0471	0.105 ±0.0457	NA	NA

ARCADIS Design & Consultancy for natural and built assets

Notes:

1. All samples were collected by Arcadis on the dates indicated and submitted to Test America Laboratories for analysis.
2. Sample analysis was conducted using the following Methods:
   Isotopic Uranium (Alpha Spectrometry): Method A-01-R
   Cesium-137 & Other Gamma Emmitters (GS): Method GA-01-R
3. NA = Constituent was not analyzed.
4. ND = Analyte not detected at a concentration greater than the Practical Quantitation Limit (PQL). PQL denotes lowest reportable analyte concentration
5. Units: pCi/g = average picocuries per gram
6. Sample ID Nomenclature: BUILDING - (FLOOR) - MEDIA - NUMBER (##) - DATE (MMYY)
7. Laboratory Qualifiers:
   U Result is less than the sample detection limit.
   G The Sample Method Detectable Concentration is greater than the requested Reporting Limit.

Building IDs:	Media IDs (where applicable):
3H: Building 3H	FB: Floor/Biased
6H: Building 6H	FS: Floor/Systematic
6HE: Building 6H - Eastside	F-WC: Floor/Waste Characterization
6HW: Building 6H - Westside	WB: Wall/Biased
	WS: Wall/Systematic
	W-WC: Wall/Waste Characterization
	WALL: Wall
	PC: Paint Chip
	CG: Caulk
	R: Roof
	RW: Roof/Wood

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	3H-CG-02	3H-CG-03	3H-CG-04	3H-FB-07	3H-FB-0506	3H-FS-02	3H-FS-11	3H-F-WC-01	3H-PC-01
Date Collected:	12/20/18	12/21/18	12/20/18	12/19/18	12/19/18	12/20/18	12/17/18	12/21/18	12/20/18
PCBs									
Aroclor 1016	0.66 U	2.1 U	28 U	0.59 U	0.24 U	1.2 U	0.24 U	0.59 U	3.1 U
Aroclor 1221	0.93 U	2.9 U	40 U	0.84 U	0.34 U	1.7 U	0.34 U	0.84 U	4.4 U
Aroclor 1232	0.66 U	2.1 U	28 U	0.59 U	0.24 U	1.2 U	0.24 U	0.59 U	3.1 U
Aroclor 1242	0.66 U	2.1 U	28 U	0.59 U	0.24 U	1.2 U	0.24 U	0.59 U	3.1 U
Aroclor 1248	0.66 U	2.1 U	28 U	2.4	0.24 U	1.2 U	0.24 U	0.59 U	3.1 U
Aroclor 1254	3.3	5	140	0.59 U	0.24 U	6.9	1.6	3.4	14
Aroclor 1260	0.66 U	2.1 U	28 U	0.59 U	0.24 U	1.2 U	0.24 U	0.59 U	3.1 U
Aroclor 1262	0.66 U	2.1 U	28 U	0.59 U	0.65	1.2 U	0.24 U	0.59 U	3.1 U
Aroclor 1268	0.66 U	2.1 U	28 U	0.59 U	0.24 U	1.2 U	0.24 U	0.59 U	3.1 U
Total PCBs	3.3	5	140	2.4	0.65	6.9	1.6	3.4	14
Volatile Organics									
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,1,2-trichloro-1,2,2-trifluoroethane	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	0.49 U	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	0.03	NA	NA	NA
Bromochloromethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
CFC-11	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
CFC-12	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA

Location ID:	3H-CG-02	3H-CG-03	3H-CG-04	3H-FB-07	3H-FB-0506	3H-FS-02	3H-FS-11	3H-F-WC-01	3H-PC-01
Date Collected:	12/20/18	12/21/18	12/20/18	12/19/18	12/19/18	12/20/18	12/17/18	12/21/18	12/20/18
Chlorobenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Chlorodibromomethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	0.0025 U	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Cyclohexane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Dichloromethane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
m,p-Xylene	NA	NA	NA	NA	NA	0.0012 J	NA	NA	NA
Methyl Acetate	NA	NA	NA	NA	NA	0.0099 U	NA	NA	NA
Methyl N-Butyl Ketone (2-Hexanon	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Methylcyclohexane	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
o-Xylene	NA	NA	NA	NA	NA	0.00083 J	NA	NA	NA
Styrene (Monomer)	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	0.0025 U	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	0.0004 J	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	0.0049 U	NA	NA	NA
Methyl-tert-butylether	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Semivolatile Organics									
1,1-Biphenyl	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,2-Diphenylhydrazine	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,3-Dinitrobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	0.61 U	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,2-Oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,3,4,6-Tetrachlorophenol	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	3H-CG-02	3H-CG-03	3H-CG-04	3H-FB-07	3H-FB-0506	3H-FS-02	3H-FS-11	3H-F-WC-01	3H-PC-01
Date Collected:	12/20/18	12/21/18	12/20/18	12/19/18	12/19/18	12/20/18	12/17/18	12/21/18	12/20/18
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,6-Dichlorophenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2-Methyl-4,6-dinitrophenol	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
3,3-Dichlorobenzidine	NA	NA	NA	NA	NA	0.61 U	NA	NA	NA
3-Methylphenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
4-Chloro-3-Methylphenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	3.1 U	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	3H-CG-02	3H-CG-03	3H-CG-04	3H-FB-07	3H-FB-0506	3H-FS-02	3H-FS-11	3H-F-WC-01	3H-PC-01
Date Collected:	12/20/18	12/21/18	12/20/18	12/19/18	12/19/18	12/20/18	12/17/18	12/21/18	12/20/18
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	0.15 J	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	0.61 U	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Di-n-butyl phthalate	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Di-n-octyl phthalate	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Diphenylamine	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Famphur	NA	NA	NA	NA	NA	0.61 U	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	0.058 J	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Hexachloro-1,3-butadiene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
n-Hexadecane	NA	NA	NA	NA	NA	0.048 J	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
n-Nitrosodi-n-propylamine	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
N-nitrosodiphenylamine	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
p-Chloroaniline	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	1.5 U	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	0.028 J	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	0.31 U	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	0.042 J	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	0.61 U	NA	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

ARCADIS Design & Consultancy for natural and built assets

Location ID:	3H-CG-02	3H-CG-03	3H-CG-04	3H-FB-07	3H-FB-0506	3H-FS-02	3H-FS-11	3H-F-WC-01	3H-PC-01
Date Collected:	12/20/18	12/21/18	12/20/18	12/19/18	12/19/18	12/20/18	12/17/18	12/21/18	12/20/18
Inorganics									
Arsenic	NA	NA	NA	1.7 J	1.6 J	1.6 J	1.9	3.1	39 J
Barium	NA	NA	NA	40	41	42	54	56	290 J
Cadmium	NA	NA	NA	0.91 U	0.84 U	0.84 U	0.94 U	0.87 J	49 U
Chromium	NA	NA	NA	12	13	21	16	28	1,800
Lead	NA	NA	NA	11	5.0	2.9	2.7	13	57,000
Mercury	NA	NA	NA	0.028 J	0.017 J	0.030 J	0.039 U	0.020 J	18
Selenium	NA	NA	NA	2.7 U	2.5 U	2.5 U	2.8 U	2.7 U	150 U
Silver	NA	NA	NA	1.8 U	1.7 U	1.7 U	1.9 U	1.8 U	97 U
Inorganics-TCLP									
Arsenic	NA	NA	NA	0.50 U	0.50 U [0.50 U]	NA	0.50 U	NA	NA
Barium	NA	NA	NA	0.28 J	0.23 J [0.24 J]	NA	0.41 J	NA	NA
Cadmium	NA	NA	NA	0.10 U	0.10 U [0.0021 J]	NA	0.10 U	NA	NA
Chromium	NA	NA	NA	0.039 J	0.034 J [0.041 J]	NA	0.092 J	NA	NA
Lead	NA	NA	NA	0.50 U	0.50 U [0.50 U]	NA	0.50 U	NA	NA
Mercury	NA	NA	NA	0.0020 U	0.0020 U [0.0020 U]	NA	0.0020 U	NA	NA
Selenium	NA	NA	NA	0.10 U	0.10 U [0.10 U]	NA	0.10 U	NA	NA
Silver	NA	NA	NA	0.50 U	0.50 U [0.50 U]	NA	0.50 U	NA	NA
VOCs-TCLP									
1,1-Dichloroethene	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
1,2-Dichloroethane	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
2-Butanone (MEK)	NA	NA	NA	0.10 U	0.10 U	NA	0.10 U	NA	NA
Carbon Tetrachloride	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
Chlorobenzene	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
Chloroform	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
Tetrachloroethene	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
Trichloroethene	NA	NA	NA	0.010 U	0.010 U	NA	0.010 UF1	NA	NA
Vinyl chloride	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
Benzene	NA	NA	NA	0.010 U	0.010 U	NA	0.010 U	NA	NA
SVOCs-TCLP									
1,4-Dichlorobenzene	NA	NA	NA	0.020 U	0.020 U	NA	0.020 U	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	0.025 U	0.025 U	NA	0.025 U	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA
2-Methylphenol	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA
4-Methylphenol	NA	NA	NA	0.0034 J	0.0016 J	NA	0.016 J	NA	NA
Hexachloro-1,3-butadiene	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA
Hexachlorobenzene	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

ARCADIS Design & Consultancy for natural and built assets

Location ID:	3H-CG-02	3H-CG-03	3H-CG-04	3H-FB-07	3H-FB-0506	3H-FS-02	3H-FS-11	3H-F-WC-01	3H-PC-01
Date Collected:	12/20/18	12/21/18	12/20/18	12/19/18	12/19/18	12/20/18	12/17/18	12/21/18	12/20/18
Hexachloroethane	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA
Nitrobenzene	NA	NA	NA	0.050 U	0.050 U	NA	0.050 U	NA	NA
Pentachlorophenol	NA	NA	NA	0.25 U	0.25 U	NA	0.25 U	NA	NA
Pyridine	NA	NA	NA	0.10 U	0.10 U	NA	0.10 U	NA	NA
PCBs-TCLP									
Aroclor 1016	NA	NA	NA	0.01 U	0.01 U [0.01 UF1]	NA	0.01 U	NA	NA
Aroclor 1221	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.01 U	NA	NA
Aroclor 1232	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.01 U	NA	NA
Aroclor 1242	NA	NA	NA	0.01 U	0.01 U [0.018]	NA	0.01 U	NA	NA
Aroclor 1248	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.0069 Jp	NA	NA
Aroclor 1254	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.01 U	NA	NA
Aroclor 1260	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.01 U	NA	NA
Aroclor 1262	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.01 U	NA	NA
Aroclor 1268	NA	NA	NA	0.01 U	0.01 U [0.01 U]	NA	0.01 U	NA	NA
Total PCBs	NA	NA	NA	0.01 U	0.01 U [0.018]	NA	0.0069 Jp	NA	NA

Location ID:	3H-PC-02	3H-R-01	3H-R-02	3H-WS-03	3H-WS-04	3H-WS-07	3H-WS-10	3H-W-WC-01	6HE-CG-01
Date Collected:	12/19/18	12/20/18	12/20/18	12/19/18	12/20/18	12/20/18	12/19/18	12/21/18	12/20/18
PCBs									
Aroclor 1016	NA	0.16 U	0.061 U	0.65 U	0.06 U	0.06 UF2	0.065 UF1	0.24 U	1.3 U
Aroclor 1221	NA	0.22 U	0.087 U	0.93 U	0.085 U	0.086 U	0.092 U	0.35 U	1.8 U
Aroclor 1232	NA	0.16 U	0.061 U	0.65 U	0.06 U	0.06 U	0.065 U	0.24 U	1.3 U
Aroclor 1242	NA	0.16 U	0.061 U	0.65 U	0.06 U	0.06 U	0.065 U	0.24 U	1.3 U
Aroclor 1248	NA	0.29	0.061 U	0.65 U	0.06 U	0.06 U	0.065 U	0.24 U	1.3 U
Aroclor 1254	NA	0.16 U	0.061 U	0.86	0.092	0.068	0.21	1.5	5
Aroclor 1260	NA	0.16 U	0.061 U	0.65 U	0.06 U	0.06 UF2	0.065 UF1	0.24 U	1.3 U
Aroclor 1262	NA	0.16 U	0.061 U	0.65 U	0.06 U	0.06 U	0.065 U	0.24 U	1.3 U
Aroclor 1268	NA	0.16 U	0.061 U	0.65 U	0.06 U	0.06 U	0.065 U	0.24 U	1.3 U
Total PCBs	NA	0.29	0.061 U	0.86	0.092	0.068	0.21	1.5	5
Inorganics									
Arsenic	NA	NA	460	0.87 J	2.1	22	2.2	NA	NA
Barium	NA	NA	6.0 J	120	46	7,300	54	NA	NA
Cadmium	NA	NA	2.3 U	0.48 U	0.14 J	3.0 J	0.23 J	NA	NA
Chromium	NA	NA	1,400	19	6.9	31	6.8	NA	NA
Lead	NA	NA	5.8	16	11	780	10	NA	NA
Mercury	NA	NA	0.074	0.15	0.069	0.28	0.023 J	NA	NA
Selenium	NA	NA	1.2 J	1.5 U	1.3 U	26 U	1.3 U	NA	NA
Silver	NA	NA	1.9 U	0.97 U	0.90 U	18 U	0.86 U	NA	NA

Location ID:	3H-PC-02	3H-R-01	3H-R-02	3H-WS-03	3H-WS-04	3H-WS-07	3H-WS-10	3H-W-WC-01	6HE-CG-01
Date Collected:	12/19/18	12/20/18	12/20/18	12/19/18	12/20/18	12/20/18	12/19/18	12/21/18	12/20/18
Inorganics-TCLP									
Arsenic	0.50 U	NA	0.46 J	NA	NA	0.50 U	0.50 U	NA	NA
Barium	0.026 JB	NA	0.092 JB	NA	NA	0.38 JB	0.22 JB	NA	NA
Cadmium	0.22	NA	0.10 U	NA	NA	0.0020 J	0.10 U	NA	NA
Chromium	0.022 J	NA	0.87	NA	NA	0.013 J	0.0046 J	NA	NA
Lead	220	NA	0.50 U	NA	NA	0.014 J	0.50 U	NA	NA
Mercury	0.0017 J	NA	0.0020 U	NA	NA	0.0020 U	0.0020 U	NA	NA
Selenium	0.10 U	NA	0.10 U	NA	NA	0.10 U	0.10 U	NA	NA
Silver	0.50 U	NA	0.50 U	NA	NA	0.50 U	0.50 U	NA	NA
VOCs-TCLP									
1,1-Dichloroethene	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
1,2-Dichloroethane	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
2-Butanone (MEK)	0.10 U	NA	0.10 U	NA	NA	0.10 U	0.10 U	NA	NA
Carbon Tetrachloride	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
Chlorobenzene	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
Chloroform	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
Tetrachloroethene	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
Trichloroethene	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
Vinyl chloride	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
Benzene	0.010 U	NA	0.010 U	NA	NA	0.010 U	0.010 U	NA	NA
SVOCs-TCLP									
1,4-Dichlorobenzene	0.020 U	NA	0.020 U	NA	NA	0.020 U	0.020 U	NA	NA
2,4,5-Trichlorophenol	0.050 U	NA	0.050 U	NA	NA	0.050 UF1	0.050 U	NA	NA
2,4,6-Trichlorophenol	0.025 U	NA	0.025 U	NA	NA	0.025 UF1	0.025 U	NA	NA
2,4-Dinitrotoluene	0.050 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA	NA
2-Methylphenol	0.050 U	NA	0.050 U	NA	NA	0.050 UF1F2	0.050 U	NA	NA
4-Methylphenol	0.050 U	NA	0.0060 J	NA	NA	0.050 UF1F2	0.050 U	NA	NA
Hexachloro-1,3-butadiene	0.050 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA	NA
Hexachlorobenzene	0.050 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA	NA
Hexachloroethane	0.050 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA	NA
Nitrobenzene	0.050 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA	NA
Pentachlorophenol	0.25 U	NA	0.25 U	NA	NA	0.25 UF1	0.25 U	NA	NA
Pyridine	0.10 U	NA	0.10 U	NA	NA	0.10 U	0.10 U	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

ARCADIS Design & Consultancy for natural and built assets

Location ID:	3H-PC-02	3H-R-01	3H-R-02	3H-WS-03	3H-WS-04	3H-WS-07	3H-WS-10	3H-W-WC-01	6HE-CG-01
Date Collected:	12/19/18	12/20/18	12/20/18	12/19/18	12/20/18	12/20/18	12/19/18	12/21/18	12/20/18
PCBs-TCLP									
Aroclor 1016	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1221	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1232	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1242	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1248	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1254	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1260	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1262	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Aroclor 1268	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA
Total PCBs	0.01 U	NA	0.01 U	NA	NA	0.01 U	0.01 U	NA	NA

Location ID:	6HE-CG-02	6HE-FS-05	6HE-FS-07	6HE-PC-01	6HE-PC-02	6HE-PC-03	6HE-WS-01	6HE-WS-02	6HE-WS-05
Date Collected:	12/20/18	12/19/18	12/20/18	12/19/18	12/19/18	12/19/18	12/21/18	12/20/18	12/20/18
PCBs									
Aroclor 1016	0.15 U	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Aroclor 1221	0.22 U	0.35 U	0.084 U	4.4 U	4.7 U	2.3 U	0.084 U	0.085 U	0.33 U
Aroclor 1232	0.15 U	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Aroclor 1242	0.15 U	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Aroclor 1248	0.26	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Aroclor 1254	0.15 U	1.1	0.26	16	17	6.4	0.16	0.011 Jp	0.81
Aroclor 1260	0.15 U	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Aroclor 1262	0.15 U	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Aroclor 1268	0.15 U	0.25 U	0.059 U	3.1 U	3.3 U	1.6 U	0.059 U	0.06 U	0.23 U
Total PCBs	0.26	1.1	0.26	16	17	6.4	0.16	0.011 Jp	0.81
Inorganics									
Arsenic	NA	1.6 J	1.6 J	98 U	NA	NA	NA	NA	NA
Barium	NA	44	46	490 U	NA	NA	NA	NA	NA
Cadmium	NA	0.91 U	0.94 U	49	NA	NA	NA	NA	NA
Chromium	NA	16	15	470	NA	NA	NA	NA	NA
Lead	NA	2.3	17	68,000	NA	NA	NA	NA	NA
Mercury	NA	0.019 J	0.024 J	12	NA	NA	NA	NA	NA
Selenium	NA	2.7 U	2.8 U	150 U	NA	NA	NA	NA	NA
Silver	NA	1.8 U	1.9 U	98 U	NA	NA	NA	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	6HE-CG-02	6HE-FS-05	6HE-FS-07	6HE-PC-01	6HE-PC-02	6HE-PC-03	6HE-WS-01	6HE-WS-02	6HE-WS-05
Date Collected:	12/20/18	12/19/18	12/20/18	12/19/18	12/19/18	12/19/18	12/21/18	12/20/18	12/20/18
Inorganics-TCLP									
Arsenic	NA	0.50 U	0.50 U	NA	NA	NA	NA	NA	NA
Barium	NA	0.30 J	0.23 J	NA	NA	NA	NA	NA	NA
Cadmium	NA	0.10 U	0.10 U	NA	NA	NA	NA	NA	NA
Chromium	NA	0.0081 J	0.064 J	NA	NA	NA	NA	NA	NA
Lead	NA	0.50 U	0.50 U	NA	NA	NA	NA	NA	NA
Mercury	NA	0.0020 U	0.0020 U	NA	NA	NA	NA	NA	NA
Selenium	NA	0.10 U	0.10 U	NA	NA	NA	NA	NA	NA
Silver	NA	0.50 U	0.50 U	NA	NA	NA	NA	NA	NA
VOCs-TCLP									
1,1-Dichloroethene	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	0.10 U	0.10 U	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
Chloroform	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
Benzene	NA	0.010 U	0.010 U	NA	NA	NA	NA	NA	NA
SVOCs-TCLP									
1,4-Dichlorobenzene	NA	0.020 U	0.020 U	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	0.025 U	0.025 U	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
Hexachloro-1,3-butadiene	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	0.050 U	0.050 U	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	0.25 U	0.25 U	NA	NA	NA	NA	NA	NA
Pyridine	NA	0.10 U	0.10 U	NA	NA	NA	NA	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	6HE-CG-02	6HE-FS-05	6HE-FS-07	6HE-PC-01	6HE-PC-02	6HE-PC-03	6HE-WS-01	6HE-WS-02	6HE-WS-05
Date Collected:	12/20/18	12/19/18	12/20/18	12/19/18	12/19/18	12/19/18	12/21/18	12/20/18	12/20/18
PCBs-TCLP									
Aroclor 1016	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1221	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1232	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1242	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1248	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1254	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1260	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1262	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Aroclor 1268	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA
Total PCBs	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA

Location ID:	6HE-WS-06	6H-R-01	6H-RW-01	6HW-CG-01	6HW-FS-03	6HW-FS-05	6HW-WALL-01	6HW-WS-01	6HW-WS-02
Date Collected:	12/20/18	12/21/18	12/21/18	12/20/18	12/21/18	12/21/18	12/21/18	12/21/18	12/21/18
PCBs									
Aroclor 1016	0.059 U	1.6 U	0.26 U	0.3 U	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Aroclor 1221	0.084 U	2.2 U	0.37 U	0.43 U	0.34 U [1.8 U]	0.085 U	0.19 U	0.092 U	0.12 U
Aroclor 1232	0.059 U	1.6 U	0.26 U	0.3 U	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Aroclor 1242	0.059 U	1.6 U	0.26 U	0.3 U	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Aroclor 1248	0.059 U	1.4 J	0.26 U	0.89	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Aroclor 1254	0.05 J	1.6 U	0.88	0.3 U	1.5 [7.7]	0.43	0.21	0.098 p	0.53
Aroclor 1260	0.059 U	1.6 U	0.26 U	0.3 U	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Aroclor 1262	0.059 U	1.6 U	0.26 U	0.3 U	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Aroclor 1268	0.059 U	1.6 U	0.26 U	0.3 U	0.24 U [1.3 U]	0.06 U	0.13 U	0.065 U	0.085 U
Total PCBs	0.05 J	1.4 J	0.88	0.89	1.5 [7.7]	0.43	0.21	0.098 p	0.53
Inorganics									
Arsenic	3.9	0.96 U	340	NA	2.5 J [2.1]	1.7	4.5 U	2.8	3.9
Barium	1,200	13	24 U	NA	41 [24]	19	11 J	280	940
Cadmium	0.90 U	0.48 U	2.4 U	NA	0.94 U [0.48 U]	0.42 U	2.2 U	0.32 J	0.27 J
Chromium	16	7.9	1,700	NA	18 [8.8]	6.8	1.4 J	13	29
Lead	62	75	21	NA	1.2 J [0.27 J]	0.41 J	1.7 J	73	270
Mercury	0.14	0.039 U	0.24	NA	0.064 [0.048]	0.057	0.23	0.14	0.22
Selenium	2.7 U	1.4 U	7.3 U	NA	2.8 U [1.4 U]	1.3 U	6.7 U	2.8 U	1.4 U
Silver	1.8 U	0.96 U	4.9 U	NA	1.9 U [0.96 U]	0.84 U	4.5 U	1.9 U	0.95 U

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Appendix A - Building Characterization Survey
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New Haven, Connecticut

Location ID:	6HE-WS-06	6H-R-01	6H-RW-01	6HW-CG-01	6HW-FS-03	6HW-FS-05	6HW-WALL-01	6HW-WS-01	6HW-WS-02
Date Collected:	12/20/18	12/21/18	12/21/18	12/20/18	12/21/18	12/21/18	12/21/18	12/21/18	12/21/18
Inorganics-TCLP									
Arsenic	0.50 U	NA	NA	NA	NA	0.50 U	NA	NA	NA
Barium	0.48 JB	NA	NA	NA	NA	0.29 J	NA	NA	NA
Cadmium	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA
Chromium	0.0080 J	NA	NA	NA	NA	0.020 J	NA	NA	NA
Lead	0.014 J	NA	NA	NA	NA	0.50 U	NA	NA	NA
Mercury	0.0020 U	NA	NA	NA	NA	0.0020 U	NA	NA	NA
Selenium	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA
Silver	0.50 U	NA	NA	NA	NA	0.50 U	NA	NA	NA
VOCs-TCLP									
1,1-Dichloroethene	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
1,2-Dichloroethane	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
2-Butanone (MEK)	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA
Carbon Tetrachloride	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
Chlorobenzene	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
Chloroform	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
Tetrachloroethene	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
Trichloroethene	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
Vinyl chloride	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
Benzene	0.010 U	NA	NA	NA	NA	0.010 U	NA	NA	NA
SVOCs-TCLP									
1,4-Dichlorobenzene	0.020 U	NA	NA	NA	NA	0.020 U	NA	NA	NA
2,4,5-Trichlorophenol	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
2,4,6-Trichlorophenol	0.025 U	NA	NA	NA	NA	0.025 U	NA	NA	NA
2,4-Dinitrotoluene	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
2-Methylphenol	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
4-Methylphenol	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
Hexachloro-1,3-butadiene	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
Hexachlorobenzene	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
Hexachloroethane	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
Nitrobenzene	0.050 U	NA	NA	NA	NA	0.050 U	NA	NA	NA
Pentachlorophenol	0.25 U	NA	NA	NA	NA	0.25 U	NA	NA	NA
Pyridine	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	6HE-WS-06	6H-R-01	6H-RW-01	6HW-CG-01	6HW-FS-03	6HW-FS-05	6HW-WALL-01	6HW-WS-01	6HW-WS-02
Date Collected:	12/20/18	12/21/18	12/21/18	12/20/18	12/21/18	12/21/18	12/21/18	12/21/18	12/21/18
PCBs-TCLP									
Aroclor 1016	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1221	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1232	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1242	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1248	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1254	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1260	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1262	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Aroclor 1268	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA
Total PCBs	0.01 U	NA	NA	NA	NA	0.01 U	NA	NA	NA

Location ID:	6HW-WS-03	6HW-WS-04	6HW-WS-05	6HW-WS-06
Date Collected:	12/21/18	12/21/18	12/20/18	12/21/18
PCBs				
Aroclor 1016	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Aroclor 1221	8.6 U [8.4 U]	0.09 U	0.094 U	0.089 U
Aroclor 1232	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Aroclor 1242	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Aroclor 1248	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Aroclor 1254	25 [21]	0.099 p	0.52	0.03 Jp
Aroclor 1260	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Aroclor 1262	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Aroclor 1268	6 U [5.9 U]	0.063 U	0.066 U	0.062 U
Total PCBs	25 [21]	0.099 p	0.52	0.03 Jp
Inorganics				
Arsenic	2.8 [2.8]	2.8	3.7	1.6
Barium	1,000 [320]	820	72	290
Cadmium	0.98 U [0.91 U]	0.31 J	0.97 U	0.50 U
Chromium	11 [8.7]	14	19	5.2
Lead	64 [14]	59	71	150
Mercury	0.18 [0.095]	0.10	0.14	0.024 J
Selenium	2.9 U [2.7 U]	1.5 U	2.9 U	1.5 U
Silver	2.0 U [1.8 U]	0.98 U	1.9 U	1.0 U

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

ARCADIS Design & Consultancy for natural and built assets

Location ID:	6HW-WS-03	6HW-WS-04	6HW-WS-05	6HW-WS-06
Date Collected:	12/21/18	12/21/18	12/20/18	12/21/18
Inorganics-TCLP				
Arsenic	0.50 U [0.50 U]	0.50 U	NA	0.50 U
Barium	0.43 JB [0.43 JB]	0.22 JB	NA	0.59 JB
Cadmium	0.10 U [0.10 U]	0.10 U	NA	0.10 U
Chromium	0.017 J [0.027 J]	0.0076 J	NA	0.015 J
Lead	0.017 J [0.022 J]	0.50 U	NA	3.1
Mercury	0.0020 U [0.0020 U]	0.0020 U	NA	0.0020 U
Selenium	0.10 U [0.10 U]	0.10 U	NA	0.10 U
Silver	0.50 U [0.50 U]	0.50 U	NA	0.50 U
VOCs-TCLP				
1,1-Dichloroethene	0.010 U [0.010 U]	0.010 U	NA	0.010 U
1,2-Dichloroethane	0.010 U [0.010 U]	0.010 U	NA	0.010 U
2-Butanone (MEK)	0.10 U [0.10 U]	0.10 U	NA	0.10 U
Carbon Tetrachloride	0.010 U [0.010 U]	0.010 U	NA	0.010 U
Chlorobenzene	0.010 U [0.010 U]	0.010 U	NA	0.010 U
Chloroform	0.010 U [0.010 U]	0.010 U	NA	0.010 U
Tetrachloroethene	0.010 U [0.010 U]	0.010 U	NA	0.010 U
Trichloroethene	0.010 U [0.010 U]	0.010 U	NA	0.010 U
Vinyl chloride	0.010 U [0.010 U]	0.010 U	NA	0.010 U
Benzene	0.010 U [0.010 U]	0.010 U	NA	0.010 U
SVOCs-TCLP				
1,4-Dichlorobenzene	0.020 U [0.020 U]	0.020 U	NA	0.020 U
2,4,5-Trichlorophenol	0.050 U [0.050 U]	0.050 U	NA	0.050 U
2,4,6-Trichlorophenol	0.025 U [0.025 U]	0.025 U	NA	0.025 U
2,4-Dinitrotoluene	0.050 U [0.050 U]	0.050 U	NA	0.050 U
2-Methylphenol	0.050 U [0.050 U]	0.050 U	NA	0.050 U
4-Methylphenol	0.050 U [0.050 U]	0.050 U	NA	0.050 U
Hexachloro-1,3-butadiene	0.050 U [0.050 U]	0.050 U	NA	0.050 U
Hexachlorobenzene	0.050 U [0.050 U]	0.050 U	NA	0.050 U
Hexachloroethane	0.050 U [0.050 U]	0.050 U	NA	0.050 U
Nitrobenzene	0.050 U [0.050 U]	0.050 U	NA	0.050 U
Pentachlorophenol	0.25 U [0.25 U]	0.25 U	NA	0.25 U
Pyridine	0.10 U [0.10 U]	0.10 U	NA	0.10 U

Table A-2
Cleanup Plan
Appendix A - Building Characterization Survey
Nonradiological Characteristics
General Electric Company - Former UNC Facility
New Haven, Connecticut

Location ID:	6HW-WS-03	6HW-WS-04	6HW-WS-05	6HW-WS-06
Date Collected:	12/21/18	12/21/18	12/20/18	12/21/18
PCBs-TCLP				
Aroclor 1016	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1221	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1232	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1242	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1248	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1254	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1260	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1262	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Aroclor 1268	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Total PCBs	0.01 U [0.01 U]	0.01 U	NA	0.01 U

Notes:

1. All samples were collected by Arcadis on the dates indicated and submitted to Test America Laboratories for analysis.
2. Sample analysis was conducted using the following Methods:
   - Total VOCs: United States Environmental Protection Agency (USEPA) SW-846 Method 8260
   - Total SVOCs: USEPA SW-846 Method 8270
   - Total Inorganics: USEPA SW-846 Method 6010
   - PCBs: USEPA SW-846 Method 8082
   - Total Mercury: USEPA SW-846 Method 7470
   - TCLP VOCs: USEPA SW-846 Method 1311:Toxicity Characteristic Leaching Procedure and Method 8260
   - TCLP SVOCs: USEPA SW-846 Method 1311 and Method 8270
   - TCLP Inorganics:USEPA SW-846 Method 1311 and Method 6010
   - TCLP PCBs: USEPA SW-846 Method 1311 and Method 8082
3. NA = Constituent was not analyzed.
4. ND = Analyte not detected at a concentration greater than the Practical Quantitation Limit (PQL). PQL denotes lowest reportable analyte concentration.
5. Units: mg/kg = milligram per kilogram
6. [ ] = Duplicate sample results.
7. Laboratory Qualifiers:
   - B Denotes analyte observed in associated method blank. Analyte concentration should be considered as estimated.
   - F1 MS and/or MSD Recovery is outside acceptance limits.
   - F2 MS/MSD RPD exceeds control limits.
   - J Denotes an estimated concentration. The concentration result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
   - p The Relative Percent Difference (%RPD) between the primary and confirmation column/detector is >40%. The lower value has been reported.
   - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
8. Sample ID Nomenclature: BUILDING - (FLOOR) - MEDIA - NUMBER (##) - DATE (MMYY)

Building IDs:	Media IDs (where applicable):
3H: Building 3H	FB: Floor/Biased
6H: Building 6H	FS: Floor/Systematic
6HE: Building 6H - Eastside	F-WC: Floor/Waste Characterization
6HW: Building 6H - Westside	WB: Wall/Biased
	WS: Wall/Systematic
	W-WC: Wall/Waste Characterization
	WALL: Wall
	PC: Paint Chip
	CG: Caulk
	R: Roof
	RW: Roof/Wood

APPENDIX B

Community Air Monitoring Plan

General Electric Company

APPENDIX B – COMMUNITY AIR MONITORING PLAN

Cleanup Plan

Former United Nuclear Corporation

Naval Products Facility

New Haven, Connecticut

May 7, 2019

CONTENTS

FIGURE

ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
Arcadis	Arcadis U.S., Inc.
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
cpm	counts per minute
dpm	disintegration per minute
HEU	highly enriched uranium
lpm	liters per minute
MDC	minimum detectable concentration
MDCR	minimum detectable count rate
NRC	United States Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
PM_{10}	particulates less than 10 microns in diameter
QC	quality control
RSO	radiation safety officer
site	former United Nuclear Corporation Naval Products Facility, located in New Haven, Connecticut
USEPA	United States Environmental Protection Agency
µCi	microCuries
µCi/mL	microCuries per milliliter
$\mu g/m^3$	micrograms per cubic meter

1 INTRODUCTION

On behalf of General Electric Company, Arcadis U.S., Inc. (Arcadis) prepared this Community Air Monitoring Plan (CAMP) as Appendix B to the Cleanup Plan for the former United Nuclear Corporation Naval Products Facility, located in New Haven, Connecticut (site). The site is located at 71 Shelton Avenue, within the Newhallville neighborhood and the Winchester Repeating Arms Historic District. The neighborhood can be categorized as mixed use, residential and commercial structures with a recreational corridor.

The site was once owned by the UNC Naval Products and was licensed under United States Nuclear Regulatory Commission (NRC) License No. SNM-368. Primary activities performed under the license were the fabrication of nuclear fuel components for the United States Government. Nuclear material used for the work consistent primary of highly enriched uranium (HEU). Historical operations at the site, including naval nuclear fuels research and production, leached uranium contamination into building surfaces and soil underlying portions of Buildings 3H and 6H.

Decontamination and decommissioning of the site was performed from 1973 through 1976 and the site was officially removed from its radioactive materials license (SNM-368) in 1976. Since 1996, numerous radiological surveys and soil characterization efforts have been conducted at the site. Radiological contamination was identified within the buildings and soil under the buildings. Friable and nonfriable asbestos were also identified in the buildings.

As part of the Cleanup Plan developed for the site, Buildings 3H and 6H will be deconstructed and demolished. The radiologically contaminated soil will be excavated. The building and soil will be shipped to disposal facilities that can accept these wastes. The remaining soil will be measured and sampled for radioactivity to verify that the soil meets site-specific cleanup criteria.

During the cleanup activities at the site, methods will be implemented to reduce dust emissions and ensure proper precautions are taken to protect the surrounding community and workers at the site. This CAMP addresses airborne radioactivity monitoring, dust monitoring, and asbestos abatement monitoring that will be performed to monitor and protect the surrounding community during the cleanup activities at the site.

1.1 Project Objectives

The primary objectives of this CAMP are:

- Protect the surrounding community and environment
- Evaluate the effectiveness of dust-suppression controls
- Identify when additional controls are required
- Document the results.

1.2 Program Overview

Monitoring will be conducted per this CAMP as outlined below:

- Airborne radioactivity monitoring will be conducted using fixed-location air samplers at six locations along the perimeter of the site. The air samplers will run continuously during cleanup activities. The radiation safety officer (RSO) will investigate air samples that exceed the action level and will determine if additional controls are required to reduce the airborne effluent.
- Dust monitoring will be performed during potential dust-generating activities to verify the general effectiveness of routine control measures. Real-time air monitoring will be conducted at representative locations around the work area perimeter, for airborne particulates less than 10 microns in diameter (PM_{10}). The monitoring results will also be used, if necessary, to initiate additional mitigating measures, including the possible cessation of dust-generating work activities.
- Perimeter asbestos air monitoring will be conducted by third party in accordance with the Occupational Safety and Health Administration (OSHA) Safety and Health Regulations for Construction at 29 Code of Federal Regulations (CFR) 1926.1101. Migration of airborne asbestos from the regulated area will be verified by perimeter area and surveillance monitoring.

2 CONSTITUENTS OF INTEREST

The constituents of interest are presented in the following sections.

2.1 Uranium

HEU is the primary constituent of concern at the site. HEU comprises uranium-234, uranium-235, and uranium-238. HEU comprises a higher percentage of uranium-235 compared with natural uranium. When uranium is enriched to create HEU, the process separates uranium from its daughter products. Unlike natural uranium, HEU is not in secular equilibrium with its daughter products, and monitoring for the daughter products is not necessary.

The airborne effluent limits to control dose to the public are presented in 10 CFR 20, Appendix B, Table 2, Column 1. These concentration values are equivalent to the radionuclide concentrations, which, if inhaled or ingested continuously throughout a year, would produce a total effective dose equivalent of 50 millirem. The effluent concentrations are dependent on the solubility class (D, W, or Y), which is dependent on the chemical composition of the uranium and related transport and retention behavior in bodily tissues and organs. Class Y uranium has the most restrictive limits; these limits are presented in Table 1.

Table 1. Uranium Air Effluent Limits

Radionuclide	Air Effluent Limits (µCi/mL)
U-234 Class Y	5E-14
U-235 Class Y	6E-14
U-238 Class Y	6E-14

Note:
µCi/mL = microCuries per milliliter

2.2 Dust Emissions

Fugitive dust (including silica dust) emissions generated at the site during planned remedial activities have the potential to cause health risks if they are inhaled by the surrounding community, if not properly suppressed. Several of the planned remedial activities associated with the deconstruction and demolition of site buildings have the potential for generating airborne fugitive dust emissions, including:

- Demolishing site buildings for off-site disposal, including uranium-contaminated site buildings constructed with concrete (floors), concrete masonry (walls), and wood/asphalt (roof decking/overlay).
- Excavating potentially uranium-impacted soil.
- Handling building debris and soil, including separating, sizing, temporarily on-site stockpiling, and loading.
- Temporary stockpiling and placing of backfill material imported from off-site sources as part of site preparation and restoration activities.
- Project vehicular traffic.

2.3 Asbestos

Asbestos is another constituent of concern at the site, and a known carcinogen. Asbestos was detected in several building materials including friable insulation and window glazing, nonfriable roofing materials, transite wall covering, floor tile, and mastics among others. When disturbed, friable asbestos-containing material (ACM) fibers become airborne and can potentially be inhaled during removal operations. ACM abatement will comply with OSHA, United States Environmental Protection Agency (USEPA), and Connecticut Department of Energy and Environmental Protection regulations for asbestos abatement. Abatement will be conducted by a Connecticut-licensed asbestos contractor. Air monitoring will be conducted by a third-party contractor.

3 COMMUNITY MONITORING

3.1 Airborne Radioactivity

Airborne radioactivity monitoring will be performed using fixed-location air monitors at the boundary of the site. These sample locations will be fixed throughout the cleanup. These air samples will be collected during cleanup activities at the site and analyzed for uranium.

3.1.1 Equipment

Airborne radioactivity monitoring will be performed using high-volume air samplers (i.e., 40 to 100 liters per minute [lpm]). The air will be drawn through a 47-millimeter filter, or filter specified by air sample manual. Air filters will be analyzed using a Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter). The following equipment is needed for sample collection, handling, and analysis:

- High-volume air sampler (40 to 100 lpm)
- Calibrated flow meter (within previous 12 months), to measure flow rate

- Air filters (47 millimeter or as specified by air sampler manual)
- Sample envelopes or sealable bags (e.g., Ziploc®), for filter handling
- Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter) to analyze air filters
- Air filter form to document collection times, flow rates, analysis results.

An electrical source (or generator, battery) is required to continuously run the air sampler, and to use the Ludlum 2929 with 43-10-1 alpha/beta counter (or equivalent).

The Ludlum 2929 with 43-10-1 alpha/beta counter (or equivalent) will be calibrated at least annually, after repair, or when the instrument fails an operational check and requires servicing. Quality control (QC) operational checks will be performed daily prior to using the instrument. The QC operational checks will include a visual inspection for signs of damage, a source check by measuring a radioactive check source, and a background check. Daily source and background checks will be compared with this acceptance criteria to verify instrument operability. If the QC operational check fails, the instrument will be removed from service. QC operational checks will be recorded and documented on an instrument QC operational check form.

3.1.2 Locations and Frequency

The approximate sample locations are presented on Figure 1. Six sample locations will be located at the boundary of the site to monitor for potential airborne radioactivity released offsite to the public. These locations were selected to surround the site and account for changing wind conditions. The location of the samplers will be fixed throughout the project.

Air samples will be collected and analyzed after a run time of approximately 24 to 48 hours. The required run time will be determined per Section 3.1.3 to obtain adequate sample volume to meet the required minimum detectable concentration (MDC). The air samplers will run continuously during cleanup activities at the site. In addition, during times where there is an increased potential for airborne radioactivity, additional samples will be collected over an approximate 8- to 10-hour workday and analyzed. The activities that will warrant this additional sampling include deconstruction and material processing related to the building walls, at- and below-grade concrete slab, and removal of underlying soils.

3.1.3 Sample Collection

The start and stop times for the air samplers will be documented. The sampler flow rate will be recorded when the air sampler is turned on/off. The average flow rate during the sample collection period will be calculated by averaging the sampler flow rates measured throughout the sample collection period. The flow rate is expected to remain consistent throughout the sample collection period. An inconsistent flow rate may indicate an issue with the sampler, which may then need to be replaced.

Air filters will be removed carefully, taking care to prevent cross-contamination, and placed in the sample envelope or sealable bags (e.g., Ziploc®). The sample ID, collection date, and sampler name (at a minimum) will be recorded on the sample envelope or sealable bag. The start/stop times and flow rates discussed previously will also be recorded on the sample envelope, sealable bag, log (or equivalent) that is traceable to the air sample.

3.1.4 Sample Analysis

Uranium emits an alpha particle when it decays. The air filters will be analyzed onsite for alpha activity using a Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter). The air filter will be carefully removed from the sample envelope or sealable bag, placed in the Ludlum 2929 with 43-10-1 (or equivalent alpha/beta counter), and counted. The alpha concentration will be calculated per the following equation and compared with the most-restrictive uranium effluent limit from Table 1 (i.e., 5E-14 µCi/mL for U-234):

$$Alpha\ Concentration\ \left(\frac{\mu Ci}{ml}\right) = \frac{(G - B)}{\epsilon_i\ x\ \epsilon_C\ x\ F\ x\ T\ \ x\ 1000\ x\ 2.22E6}$$

Where:

G = gross alpha counts per minute (cpm)
B = background alpha cpm
ϵ_i = alpha instrument efficiency (cpm per disintegration per minute [dpm])
ϵ_c = filter collection efficiency
F = average sampler flow rate (lpm)
T = sample collection time (minutes)
1,000 = conversion from milliliters to liters (1,000 milliliters per liter)
2.22E6 = conversion from dpm to microCuries (µCi [2.22E6 dpm/µCi]).

The presence of naturally occurring radon progeny in the air may contribute to the measured alpha concentration on the filters. Per 10 CFR 20.1101, contribution of naturally occurring radon and progeny is excluded from the monitoring of air emissions. While initial screening measurements of the air filters will be performed to identify an adverse condition, the final measurement to verify compliance with the uranium effluent limit may be delayed nominally 7 days to allow for the decay of radon progeny.

The air filter analysis will be documented on an air sample form. The form will include:

- The sample ID, collection date, sampler name, start/stop times, and flow rates.
- The calibration date, alpha efficiency, alpha background cpm, and alpha background count time for the Ludlum 2929 with 43-10-1 (or equivalent).
- Alpha results, including alpha cpm and sample count time.
- Alpha concentration, fraction of the limit, and MDC (as discussed below).

If the air filter is counted multiple times (to allow for radon decay), the results for each measurement should be included on the form, with the final count identified.

3.1.5 Action Level

An action level is established to identify adverse conditions and determine when additional controls are required. The action level will be established at 20 percent of the uranium effluent limit, or 1E-14 µCi/mL. This action level of 20 percent of the uranium effluent limit is consistent with 10 CFR 20.1101(d) and 40 CFR 61 Subpart H, to maintain doses to the public as less than 10 mrem per year.

When the alpha concentration for an air filter exceeds the action level, the RSO will perform an investigation to determine the cause of the elevated air sample, considering the cleanup activities performed during the sample collection. The RSO will prescribe additional controls, as needed, to reduce the air effluent. The RSO may also direct isotopic analysis of the air filter (i.e., alpha spectroscopy using an offsite laboratory) to determine the uranium isotopic concentrations.

3.1.6 Detection Limit

The detection limit for the sample analysis is referred to as the MDC. The MDC must be less than the action level (1E-14 µCi/mL). The MDC is calculated as follows:

$$Minimum\ Detectable\ Concentration\ (MDC)\ \left(\frac{\mu Ci}{ml}\right) = \frac{MDCR\ (cpm)}{\epsilon_i\ x\ \epsilon_C\ x\ F\ x\ T\ x\ 1000\ x\ 2.22E6}$$

The same factors apply as presented for the alpha concentration calculation above, and the instrument minimum detectable count rate (MDCR) is calculated as:

$$MDCR\ (cpm) = \frac{2.71}{t_G} + 3.29\sqrt{\frac{B}{t_b} + \frac{B}{t_G}}$$

Where:

B = background alpha cpm

t_G = sample count time (minutes)

t_B = background count time (minutes).

3.2 Dust Emissions

Ambient air monitoring will be performed during building demolition, demolition debris sizing, soil excavation, debris and soil load-out, and other potential dust-generating activities. Monitoring stations will be positioned at representative locations around the work area perimeter. Real-time air monitoring will be conducted for airborne PM_{10}.

3.2.1 Equipment

Monitoring for PM_{10} will be performed at the locations described in Section 3.2.2. The following portable equipment (or equivalent) will be used:

- *PM_{10}*. TSI 8530 DustTrak aerosol monitor, fitted with a 10.0-micron inlet nozzle, with operating/recording software.
- *Ambient air polychlorinated biphenyls*. Sampling pump, sampling cartridge, granular sorbent media filter (quartz-fiber pre-filter), and polyurethane foam cylinders.
- Environmental enclosure with audible and visual alarms for PM_{10} monitors (tripod mounted).
- Meteorological station (Lufft WS 500 or equivalent) with operating/recording software to measure, at a minimum, wind speed, wind direction, relative humidity, rainfall, and ambient temperature.
- Wireless communications to phones, beepers or radios for PM_{10} alarms.

Calibration of the instrumentation will occur in accordance with each of the equipment manufacturer’s requirements and be recorded in the field activity logbook. Measures to protect the field equipment during periods of heavy precipitation will be implemented, such as tents and umbrellas.

3.2.2 Monitoring Locations

3.2.2.1 Meteorological Station

The meteorological monitoring system will be deployed north of the site at the location shown on Figure 1 in accordance with siting criteria established by the USEPA for meteorological monitoring systems (Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV - Meteorological Measurements [USEPA 1989]). Use of this guideline enables the meteorological monitoring system to provide representative observations of the local meteorological conditions.

Meteorological monitoring data will be recorded and archived electronically, and will be available for review as needed. Readings will be available throughout the workday to determine if there is a change in wind direction.

3.2.2.2 Perimeter Monitoring

Several anticipated PM_{10} perimeter monitoring stations are shown on Figure 1. Each day, five of the six locations will be selected considering site conditions based on the anticipated location of daily project activities. These locations were selected considering site conditions, the scope and location of project activities, and location of potential off-site residential and commercial receptors.

If wind direction shifts during the work day for an extended period of time (greater than 50 percent of the daily monitoring duration), such that the designated upwind and downwind locations no longer fall within acceptable guidelines (+/- 60-degree compass change from the original wind direction), the PM_{10} monitoring stations will be redesignated so that the upwind and downwind locations are maintained, and the data and related evaluations can be maintained. Air monitoring location changes will be documented in a field logbook.

3.2.3 Action Levels

Section 3.2.4 describes the routine dust control activities that will be implemented during the remedial actions. The results of the air monitoring activities described in this CAMP will be used to verify the general effectiveness of the routine control measures. The monitoring results will also be used, if necessary, to initiate additional mitigating measures, including the possible cessation of dust-generating work activities. The implementation of additional mitigating measures will be based on exceedance of the action levels summarized below.

The following PM_{10} action levels and responses will be implemented during remedial actions:

- If the average ambient air PM_{10} concentration at a downwind station exceeds 100 micrograms per cubic meter ($\mu g/m^3$) above the background (upwind) concentration for the 15-minute average, or if airborne dust is visually observed leaving the work area, potential source(s) of the exceedance will be identified, and additional mitigation measures will be evaluated and employed as needed. Work activities and air monitoring may continue following implementation of dust-suppression measures, provided that:
    - The downwind PM_{10} concentration does not exceed 150 $\mu g/m^3$ above the background (upwind) concentration (15-minute average).

  - No visible dust is observed migrating from the work area.

- If, after implementation of dust suppression measures, the downwind PM_{10} concentration is greater than 150 µg/m^3 above the background (upwind) concentration (15-minute average), work activities will be stopped and re-evaluated. Work activities will resume only if dust-suppression measures and other corrective actions are successful in reducing the downwind PM_{10} concentration to less than 150 µg/m^3 above the background concentration (15-minute average) and no visible dust is observed migrating from the work area.

3.2.4 Emission Control Measures

The Demolition Contractor will be required to submit a detailed plan that describes several aspects of the project, including the proposed emission control measures.

The Demolition Contractor will provide and maintain sufficient materials, equipment, and personnel on site to implement emission control measures for the duration of the Project. Materials and equipment to support the implementation of emission control measures include:

- Clean potable water from a GE-approved source
- Pressure washers and spray wands
- Multiple water storage tanks, each with a minimum capacity of 150 gallons.

The Demolition Contractor is responsible for maintaining, in the immediate vicinity of the work, a supply of clean water and means of storage/dispersion (e.g., portable water tanks, pressure washers, sprayers) such that water and/or dust and odor suppressants can be applied as needed.

As needed and/or as directed by GE, the following measures may be implemented to prevent and control exceedances of action levels during remedial actions:

3.2.4.1 Standard Practices

The following activities will be implemented by the Demolition Contractor as part of its routine, standard practices and procedures. In the event of an action level exceedance, these measures will be reviewed to identify additional, expanded, and/or modified application of these measures.

- Maintain all excavations, stockpiles, access roads, and other work areas to minimize the generation of dust.
- Perform general housekeeping practices to control dust and tracking of materials.
- Excavate, load, handle, and backfill materials in a manner that minimizes the generation of dust (e.g., limit area of open excavation or stockpile size).
- Remove soil and debris from temporary access roads and active haul routes. Sweep paved areas that are used or disturbed by remediation activities or material transport activities.
- Apply water (depending on weather conditions) to areas of potential dust generation, such as access roads, active haul routes, open excavations, and exposed material piles.
- Limit vehicles to paved or gravel-covered areas and restrict vehicle speeds on temporary access roads and active haul routes.

- Construct and operate a vehicle cleaning pad.
- Cover waste material stockpiles with polyethylene liners. Stockpiles will be securely covered (during both working and nonworking hours) except when materials are actively being added to or removed from the stockpile.
- Depending on weather conditions, thoroughly wet open excavations and soil-covered backfilled areas to minimize dust generation.

3.2.4.2 Additional Mitigation Measures

If all of the measures identified have been implemented to the extent feasible and additional measures are needed to further mitigate airborne PM_{10}, the following activities will be considered:

- Use perimeter water spray and water cannons (misters) to increase dust suppression.
- Reduce surface area of exposed materials.
- Modify the area, sequence, and rate of removal activities, or specific methods.
- Modify area, sequence, and rate of excavation/material handling activities, or specific methods.

3.3 Asbestos

Perimeter asbestos air monitoring will be conducted by a third party in accordance with the OSHA Safety and Health Regulations for Construction at 29 CFR 1926.1101. Migration of airborne asbestos from the regulated area will be verified by perimeter area surveillance during each work shift at each boundary of the regulated area, showing no visible asbestos dust; and perimeter area monitoring showing that clearance levels contained in 40 CFR Part 763, Subpart E, of the USEPA Asbestos in Schools Rule are met, or that perimeter area levels, measured by phase contrast microscopy are no more than background levels representing the same area before the asbestos work began.

4 DOCUMENTATION

The following documents will be generated during the implementation of this CAMP:

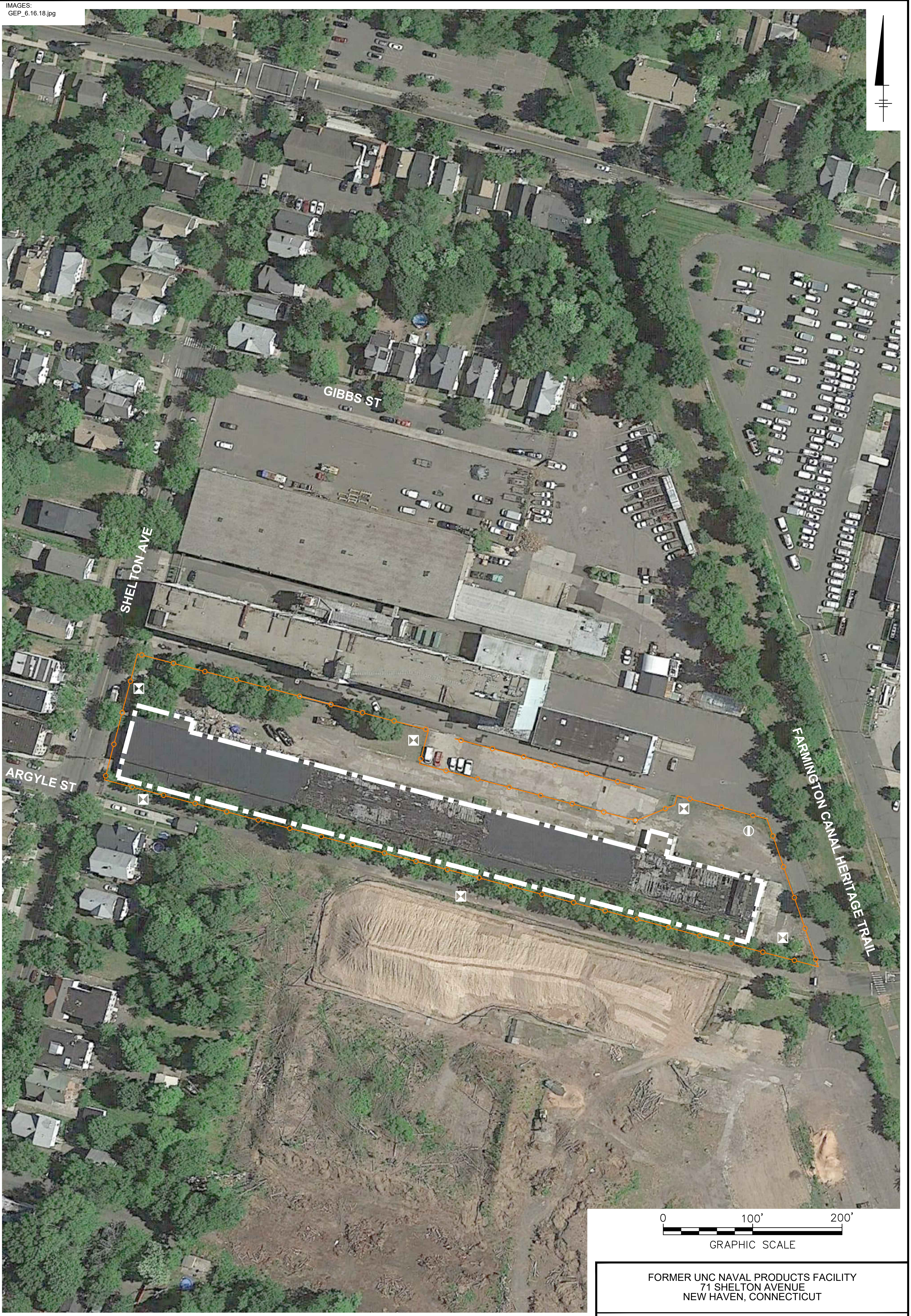
- Air sample forms
- Instrument QC operational check/calibration forms.

These documents will be retained and available for regulatory review, if requested.

FIGURE

CITY: SYRACUSE, NY DIV/GROUP: EBC-IM/DV DB: L.POSENAUER PM/TM: R.GIAMPAOLO LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\ANA - GE CORP ENV PROG\GE FMR UNC FACILITY NEW HAVEN CT\2019\ALL31350.2000\01-DWG\GE-UNC_CAMP_FIG 1_SITE LOCATION MAP.dwg LAYOUT: 1 SAVED: 2/25/2019 9:28 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: C-PB-PDF
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/25/2019 9:57 AM BY: POSENAUER, LISA

IMAGES:
GEP_6.16.18.jpg



LEGEND:
FACILITY BUILDING LIMITS
PERIMETER FENCE / PROPERTY BOUNDARY
BOUNDARY AIR SAMPLE LOCATION
METEOROLOGICAL STATION

FORMER UNC NAVAL PRODUCTS FACILITY
71 SHELTON AVENUE
NEW HAVEN, CONNECTICUT

COMMUNITY AIR MONITORING PLAN
BOUNDARY AIR SAMPLE LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

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