**FINAL**

# Sampling Report

## Site Decommissioning Former UNC Manufacturing Facility

## New Haven, Connecticut

***Prepared for:***

**UNC Naval Products**
**20 Research Parkway, Unit E**
**Old Saybrook, Connecticut 06475**

***Prepared by:***

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

***Cabrera Services, Inc.***
**473 Silver Lane**
**East Hartford, CT**

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Cabrera Project No. 10-1007.00

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# LIST OF ACRONYMS AND ABBREVATIONS

| | |
|---|---|
| **ACM** | Asbestos-Containing material |
| **CABRERA** | Cabrera Services, Inc. |
| **CFR** | Code of Federal Regulation |
| **DCGL** | Derived Concentration Guideline Level |
| **EPA** | Environmental Protection Agency |
| **ISOCS** | In Situ Object Counting System |
| **kg** | kilogram |
| **LLRW** | Low Level radioactive Waste |
| **LLW** | Energy Solutions Low Level Waste |
| **mg** | milligrams |
| **NRC** | U.S. Nuclear Regulatory Commission |
| **ORISE** | Oak Ridge Institute for Science and Education |
| **pCi/g** | picocuries per gram |
| **PLM** | polarizing light microscopy |
| **QA/QC** | Quality Assurance/Quality Control |
| **RCRA** | Resource Conservation and Recovery Act |
| **SNM** | special nuclear material |
| **SVOC** | semi-volatile organic compounds |
| **TCLP** | Toxicity Characteristic Leaching Procedure |
| **µg/g** | micrograms per gram |
| **UHC** | underlying hazardous constituent |
| **UNC** | United Nuclear Corporation |
| **VOC** | volatile organic compound |
| **WAC** | waste acceptance criteria |

# 1.0 INTRODUCTION

Cabrera Services, Inc. (CABRERA) mobilized personnel to the United Nuclear Corporation (UNC) site located at 71 Shelton Avenue, New Haven, Connecticut from 29Mar10 to 01Apr10 for the purpose of collecting soil and sediment samples in order to (1) confirm asbestos covered piping in the South Trench; (2) characterize sediment in the Argyle Street/Shelton Avenue sewer; and (3) profile waste material that will be generated as a part of the site remediation at the proposed excavation area at the Decon Pit, the proposed excavation area at the X-Ray Read Room, and debris in the South Trench. A secondary sampling objective was to evaluate the uranium isotopic ratio consistency for use as a quick turn around time field Derived Concentration Guideline Level (DCGL) measurement during remediation.

Characterization samples were collected from each of the four areas in order to obtain results representative of the waste that is expected to be generated during remediation. The samples were packaged in accordance with applicable State and Federal regulations and submitted to GEL Laboratories, LLC for analysis. The analytical suite performed was based on information obtained from previous sampling events, site process knowledge, and waste acceptance criteria (WAC) requirements for the Energy Solutions Low Level Waste (LLW) disposal facility at Clive, Utah. Analyses included Resource Conservation and Recovery Act (RCRA) metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Pesticides/Herbicides, Reactive Sulfides, Reactive Cyanides, pH, and Isotopic Uranium by alpha spectroscopy. In addition, bulk asbestos analysis was performed on piping insulation samples obtained from the South Trench to determine the presence of Asbestos-Containing material (ACM).

The sampling strategy for each area, analytical results, and implications for site remediation are presented below. All figures referenced in this Sampling Report are contained in Appendix A. Tables 1 through 4 present positive data (i.e., detected concentrations) that were reported for each area as compared to the RCRA Toxicity Characteristic Leaching Procedure (TCLP) limits used to determine hazardous waste (40 Code of Federal Regulations [CFR] 261.24). The complete analytical data packages are included in Appendix B, along with summary data tables for each area.

# 2.0 CHARACTERIZATION AREAS

## 2.1 X-Ray Read Room

Results from previous investigations were used to define a proposed excavation area at the X-Ray Read Room, as shown on Figure 1. The concrete floor was removed from the excavation area and the concrete rubble was surveyed for radiological release and will be disposed offsite at a local landfill after remobilization for remediation. A mini excavator was used to create a small test pit at each sample location to a depth consistent with the reported depth of contamination from previous investigations. Sample UNC-WC-XY-001 was obtained by taking an aliquot of soil from one of each of the three test pit locations (4 feet in depth) as shown in Figure 1. Sample UNC-WC-XY-002 was collected at a depth of 9 feet from the test pit location at the northern portion of the X Ray Read Room, as shown in Figure 1. Table 1 presents a summary of the positive data that were reported for this area.

**TABLE 1: X-RAY ROOM**

| Sample No | Parameter | Lab Result* | Units | MDL | RCRA Limit mg/L (40CFR261.24) | ✓ Exceeds limit |
|---|---|---|---|---|---|---|
| UNC-WC-XY-001 | Barium | **0.521** | MG/L | *0.010* | 100 | |
| UNC-WC-XY-001 | Lead | **0.330** | MG/L | *0.033* | 5.0 | |
| UNC-WC-XY-001 | Uranium-233/234 | **162** | PCI/G | *16.6* | na** | |
| UNC-WC-XY-001 | Uranium-235/236 | **15.0** | PCI/G | *6.42* | na | |
| UNC-WC-XY-001 | Trichloroethylene | **0.014** | MG/L | *0.0025* | 0.5 | |
| UNC-WC-XY-001 | Tetrachloroethylene | **0.0103** | MG/L | *0.003* | 0.7 | |
| UNC-WC-XY-002 | Barium | **0.375** | MG/L | *0.010* | 100 | |
| UNC-WC-XY-002 | Lead | **0.214** | MG/L | *0.033* | 5.0 | |
| UNC-WC-XY-002 | Uranium-233/234 | **75.4** | PCI/G | *19.1* | na | |
| UNC-WC-XY-002 | Uranium-238 | **13.9** | PCI/G | *5.98* | na | |

* Only positive sample results are reported in the tables presented above. Estimated values, values of non detectable, or below the minimum detection levels are not reported and are included in Appendix B.
** na = not applicable

## 2.2 South Trench

Samples from the South Trench were collected from two separate media: debris and piping insulation. Existing access points were used to gain entry to the South Trench for sampling. Debris samples UNC-WC-TR-001, UNC-WC-TR-002, UNC-WC-TR-003 and UNC-WC-TR-004 were collected as show on Figure 2. Table 2 presents a summary of the positive data that were reported for this area.

Three samples of piping insulation were collected by ChemScope, Inc and analyzed determine if the piping insulation material is ACM. The ChemScope inspection and data report is included in Appendix C.

**TABLE 2: SOUTH TRENCH**

| Sample No | Parameter | Lab Result* | Units | MDL | RCRA Limit mg/L (40CFR261.24) | ✓ Exceeds limit |
|---|---|---|---|---|---|---|
| UNC-WC-TR-001 | Barium | **1.74** | MG/L | *0.010* | 100 | |
| UNC-WC-TR-001 | Cadmium | **0.218** | MG/L | *0.010* | 1.0 | |
| UNC-WC-TR-001 | Lead | **3.11** | MG/L | *0.033* | 5.0 | |
| UNC-WC-TR-001 | Uranium-233/234 | **66.0** | PCI/G | *5.68* | na | |
| UNC-WC-TR-002 | Barium | **0.938** | MG/L | *0.010* | 100 | |
| UNC-WC-TR-002 | Lead | **35.0** | MG/L | *0.033* | 5.0 | ✓ |
| UNC-WC-TR-002 | Uranium-233/234 | **32.9** | PCI/G | *12.7* | na** | |
| UNC-WC-TR-002 | Uranium-235/236 | **12.3** | PCI/G | *6.15* | na | |
| UNC-WC-TR-003 | Uranium-233/234 | **73.2** | PCI/G | *12.5* | na | |
| UNC-WC-TR-003 | Uranium-238 | **8.16** | PCI/G | *4.9* | na | |
| UNC-WC-TR-004 | Barium | **0.914** | MG/L | *0.010* | 100 | |
| UNC-WC-TR-004 | Lead | **0.385** | MG/L | *0.033* | 5.0 | |
| UNC-WC-TR-004 | Uranium-233/234 | **20.2** | PCI/G | *6.12* | na | |

* Only positive sample results are reported in the tables presented above. Estimated values, values of non detectable, or below the minimum detection levels are not reported and are included in Appendix B.
** na = not applicable

## 2.3 Argyle Street/Shelton Avenue Sewer Manhole

A grab sample (UNC-WC-SR-001) was collected from sediments and debris in the manhole in the sidewalk adjacent to Shelton Street inline with the Argyle Street sewer (Figure 2). CABRERA did not have site access to the Olin property sewer to collect waste profile samples of the soil. Table 3 presents a summary of the positive data that were reported for this area.

**TABLE 3: ARGYLE STREET/SHELTON AVENUE SEWER MANHOLE**

| Sample No | Parameter | Lab Result* | Units | MDL | RCRA Limit mg/L (40CFR261.24) | ✓ Exceeds limit |
|---|---|---|---|---|---|---|
| UNC-WC-SR-001 | Barium | **1.21** | MG/L | *0.010* | 100 | |
| UNC-WC-SR-001 | Lead | **1.66** | MG/L | *0.033* | 5.0 | |
| UNC-WC-SR-001 | Uranium-233/234 | **30.4** | PCI/G | *17.2* | na** | |
| UNC-WC-SR-001 | Uranium-238 | **5.39** | PCI/G | *5.39* | na | |

* Only positive sample results are reported in the tables presented above. Estimated values, values of non detectable, or below the minimum detection levels are not reported and are included in Appendix B.
** na = not applicable

## 2.4 Former Decon Pit

Results from previous investigations were used to define a proposed excavation area at the Former Decon Pit, as shown on Figure 3. The concrete floor was removed from the excavation area and will be disposed offsite at a local landfill after remobilization for remediation. A mini excavator was used to create a small test pit at each sample location to a depth consistent with the reported depth of contamination from previous investigations. Sample UNC-WC-DR-001 was obtained by taking an aliquot of soil from one of each of the two test pit locations (3 feet in depth) as shown in Figure 3. Table 4 presents a summary of the positive data that were reported for this area.

**TABLE 4: DECON PIT**

| Sample No | Parameter | Lab Result* | Units | MDL | RCRA Limit mg/L (40CFR261.24) | ✓ Exceeds limit |
|---|---|---|---|---|---|---|
| UNC-WC-DR-001 | Trichloroethylene | **0.0438** | MG/L | *0.0025* | 0.5 | |
| UNC-WC-DR-001 | Tetrachloroethylene | **0.0229** | MG/L | *0.003* | 0.7 | |
| UNC-WC-DR-001 | Uranium-233/234 | **199** | PCI/G | *15.1* | na** | |

* Only positive sample results are reported in the tables presented above. Estimated values, values of non detectable, or below the minimum detection levels are not reported and are included in Appendix B.
** na = not applicable

# 3.0 SAMPLING RESULTS

## 3.1 RCRA Metals

With the exception of sample UNC-WC-TR-002 from the South Trench, none of the metals results exceeded the RCRA hazardous waste limits for toxicity. The results of the lead analysis for sample UNC-WC-TR-002 exceeds the toxicity limit of 40 CFR 261.24 and would therefore be classified as a D008 characteristic hazardous waste. If the material is assigned a waste code it must also be evaluated for underlying hazardous constituents (UHCs). It is of note that the cadmium results from UNC-WC-TR-001 exceeds the treatment standards of 40 CFR 268.40 and would be considered an UHC if the material were designated as a D008 waste. Based on these sample results some portion of the waste generated in the vicinity of these samples will likely be a radioactive and RCRA mixed waste and may require that cadmium be reported as a UHC.

## 3.2 Organics

Samples from the X Ray Read Room (UNC-WC-XY-001) and the Former Decon Pit (UNC-WC-DR-001) contained positive results for the VOC constituents trichloroethylene and tetrachlorethylene. However, as shown in Tables 1 and 4, none of the detected concentrations exceeded the RCRA hazardous waste limits for toxicity.

## 3.3 Hazardous Characteristics

All soil and sediment samples were analyzed for chemical properties to determine the presence of the following RCRA hazardous characteristics:

- Ignitable –flashpoint <140º F
- Corrosive – Aqueous solutions of pH ≤ 2 or ≥ 12.5
- Reactive – Normally unstable or explosive, reacts violently with water, or may release a toxic gas on contact with water (e.g., certain cyanide or sulfide-containing compounds)

As shown in the data summary tables presented in Appendix B, none of the samples exhibited the hazardous characteristics listed above. Flashpoints were reported as non-detect (detection limit of 75 º F) for all samples; corrosivity values ranged from 6.8 to 9.2; and reactive releasable cyanide and sulfide results were less than the regulatory limits of 250 milligrams (mg) per kilogram (kg) and 500 (mg)/kg, respectively.

Samples were also analyzed for the presence of free liquids in accordance with 40 CFR 264.314 and 265.314. All results were reported as non-detect.

The RCRA hazardous characteristic of toxicity is discussed in the above sections for metals and organics and presented in Table 1 through 4.

### 3.4 Uranium

While the waste is considered Low Level radioactive Waste (LLRW), analytical results confirm that the waste includes radionuclides that are considered special nuclear material (SNM). The U.S. Nuclear Regulatory Commission (NRC) defines SNM as:

> *(1) Plutonium, Uranium- 233, Uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission, pursuant to the provisions of section 51 of the act, determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing but does not include source material.*

As such, the appropriate waste certificates required by Energy Solutions will be submitted with each shipment.

### 3.5 Asbestos

As detailed in the ChemScope inspection and data report (Appendix C), ACM was detected in each of the three piping insulation samples. Materials which contain greater than 1% asbestos by polarizing light microscopy (PLM) analysis are considered to be ACM under Environmental Protection Agency (EPA) and the State of Connecticut regulations. The inspection indicated that there are three pipe runs that contain ACM pipe insulation. Sample analysis indicated that the pipe insulation contained between 1% and 75% asbestos. The inspection also estimated approximately 2,400 lineal feet of 8 inch and 4 inch ACM covered piping.

# 4.0 QA/QC RESULTS

A verification of the analytical data quality was performed and is documented in Appendix D. Data completeness, general quality assurance, and usability were evaluated and potential data integrity concerns were identified.

The only data quality issue noted is the secondary sampling objective for the uranium analyses and the usability as DCGL measurements during remediation. Initial analytical results reported total uranium in mass/mass units (i.e., micrograms per gram [µg/g]). The data validation report noted that isotopic uranium ratios are necessary, and all results should be reported as activity/mass (i.e., picocuries per gram [pCi/g], in order to be useful in DCGL comparisons to the site remediation goal of 30 pCi/g. In addition, radiological analyses (and associated QC analyses) did not meet the standard detection limits due to limited sample volume.

Based upon the data quality report recommendation and follow up discussions with the laboratory, sufficient aliquot will be used to assure a MDC of 0.5 pCi/g. Sample analysis will be limited to gamma spectroscopy. A corrected data package was received that reported isotopic uranium based upon alpha spectroscopy, and is included in the Appendix B dataset. The isotopic uranium data has been incorporated into Tables 1 through 4.

# 5.0 SUMMARY AND IMPLICATIONS FOR DECOMMISSIONING

Based on the waste characterization results, it is anticipated that some mixed waste (RCRA and LLRW) will be generated during remediation of the South Trench area. SNM will also require handling and disposal as a result of remediation activities.

In the approved Decontamination and Decommissioning Plan, the ratio correction factor to be applied is 27 (i.e. 27xU235 [pCi/g] to derive U234). This correction factor was based on historical information from the material processed/handled on site . The U235 activity will be determined via gamma spectroscopy. The QC MDC issues noted in Section 4 will be resolved by ensuring a sufficient sample quantity and laboratory analysis method during remediation.

Based on this analysis, the application of this conservative approach coupled with the use of the In Situ Object Counting System (ISOCS™) will be effective for use in field-based decision making relative to remediation. It is recommended that periodic off-site gamma spectroscopy sample analyses be conducted to provide supplemental data to demonstrate that the approach is maintaining functionality. Larger aliquot size and increased homogenization in the field prior to lab submittal is also recommended to enhance data quality.

The planned decommissioning activities will be influenced by the waste types defined by the Department of Energy disposal contract with EnergySolutions. Soil-like and debris-like waste types are expected with an assumed preference to ship as much of the waste volume as soil-like as possible to avoid the higher disposal cost of debris. The percent debris and the percent moisture limitations in the soil-like waste type will be critical to minimize debris cost surcharges.

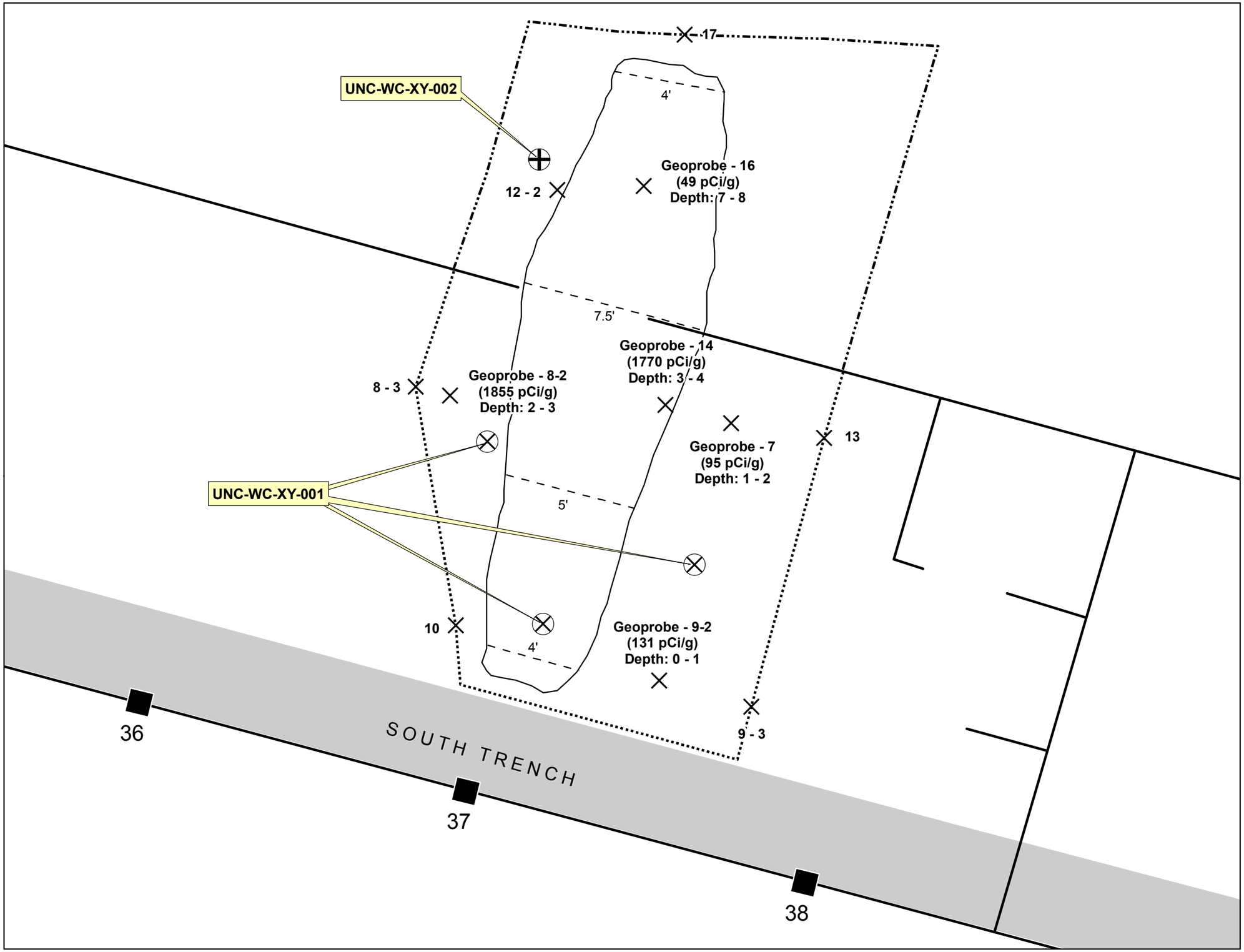
On site management of debris, especially oversized debris as defined by EnergySolutions is uncertain. The presence of subsurface equipment footers inside the building, the manhole structures associated with the Argyle Street Sewer removal, and disposal of piping from the South Trench are all potential oversized debris waste issues. The ability to decontaminate and radiologically release these large concrete features is uncertain. The void space in the piping is defined by EnergySolutions as oversized debris unless the void space is filled or the piping can be crushed or the pipe cut in half (length wise) to eliminate the void space. Debris sizing is another option for concrete rubble provided that the cost to size the material is cost effective.

A drying agent will be added to waste packages to prevent the formation of free liquids during transport to the disposal facility. The moisture content limits of the DOE disposal contract may require further application of drying agents to lower the moisture content of the waste. Wastes with high moisture contents will include the South Trench debris from wet decontamination and the Argyle Street Sewer if weather conditions are wetter than usual. To the extent practical, wetter waste will be blended with dryer waste of the same waste type to manage moisture.

The amount of mixed waste identified in the South Trench appears to be limited and additional sampling of the South Trench waste during remediation to segregate mixed waste from LLRW will further minimize the volume of mixed waste.

As a cost savings effort, the ACM abatement activities associated with the South Trench decontamination can be limited to abatement of only the ACM needed to complete the Final Status Survey. This limited abatement will result in a cost savings due to the shortened duration of the abatement activities and a reduction of the ACM volume. ACM abatement will be accomplished by removing debris/ACM from the bottom of the South Trench. The FSS will be accomplished as described in the Final Status Survey Plan. Following confirmation of a successful final status survey, the surface of the South Trench will be sprayed with a lock down product to obtain 3$^{rd}$ party air monitoring clearance and allow removal of the air containment controls. This cost savings is contingent upon Oak Ridge Institute for Science and Education (ORISE) being able to enter an ACM abatement enclosure to perform their Quality Assurance (QA) function.

# APPENDIX A
# FIGURES




N

**Legend**

- Columns
- Geoprobe Sample Locations
- Waste Profile Sample Locations 9 feet below concrete
- Waste Profile Sample Locations 5 feet below concrete
- Excavation Depth is 4 feet below concrete
- Excavation Depth is 8 feet below concrete
- Walls
- South Trench

**Note: Sample UNC-WC-XY-002 was moved due to unknown subgrade concrete.**

0 1.5 3 6 9 Feet

## X-Ray Read Room Waste Profile Sampling Locations

**Former UNC Facility**
**New Haven**
**Connecticut**

Date: June 2010
Project #: New Haven
File Name: Figure 1
Prepared By: K. Jackson

**Figure 1**

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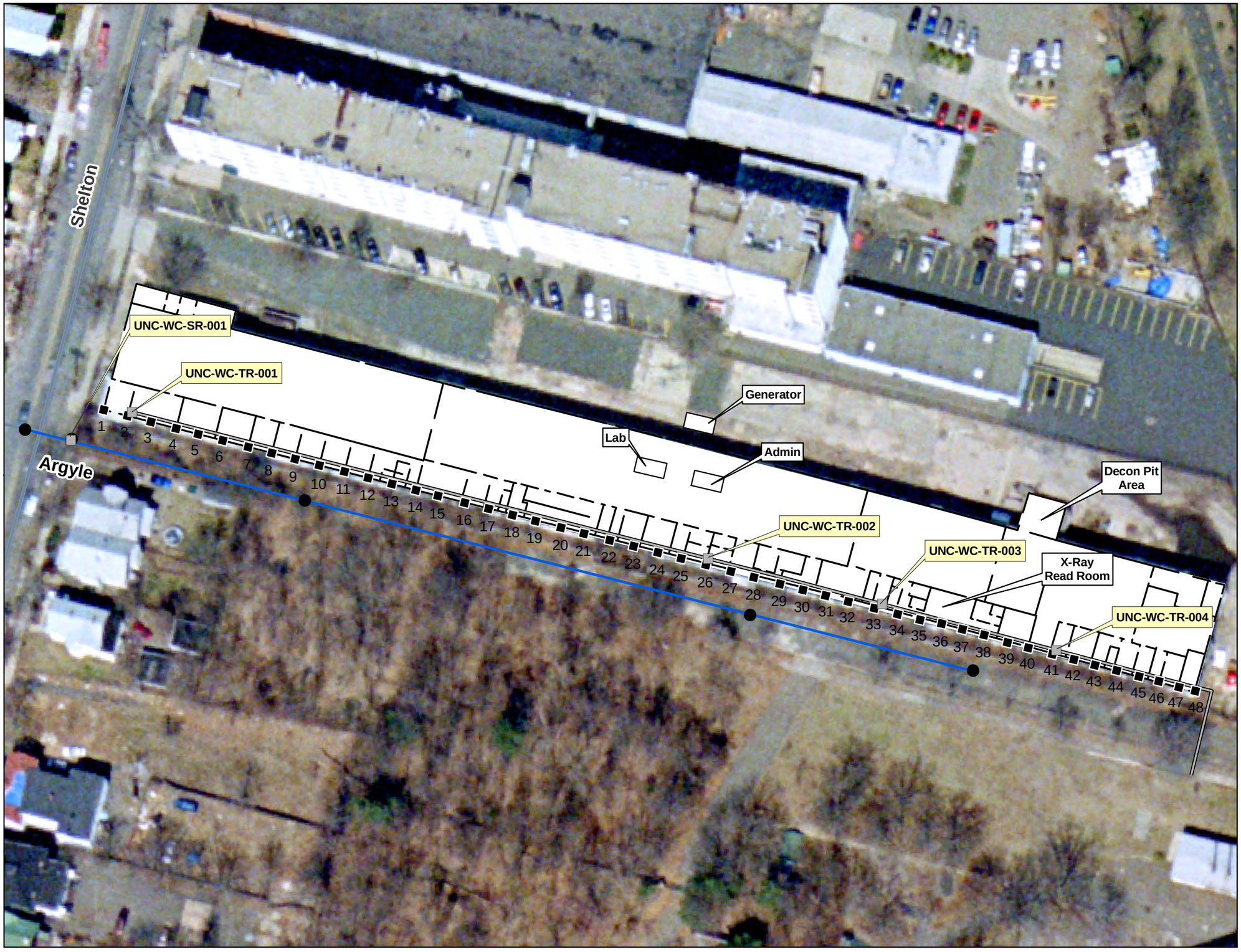


N

**Legend**

- Columns
- South Trench Saw Cut
- Manhole Locations
- Walls
- Sewer Line
- South Trench

0 15 30 60 90 120 Feet

# South Trench and Argyle Sewer Waste Profile Sampling Locations

**Former UNC Facility**
**New Haven**
**Connecticut**

Date: June 2010

Project #: New Haven

File Name: Figure 2

Prepared By: K. Jackson

**Figure 2**

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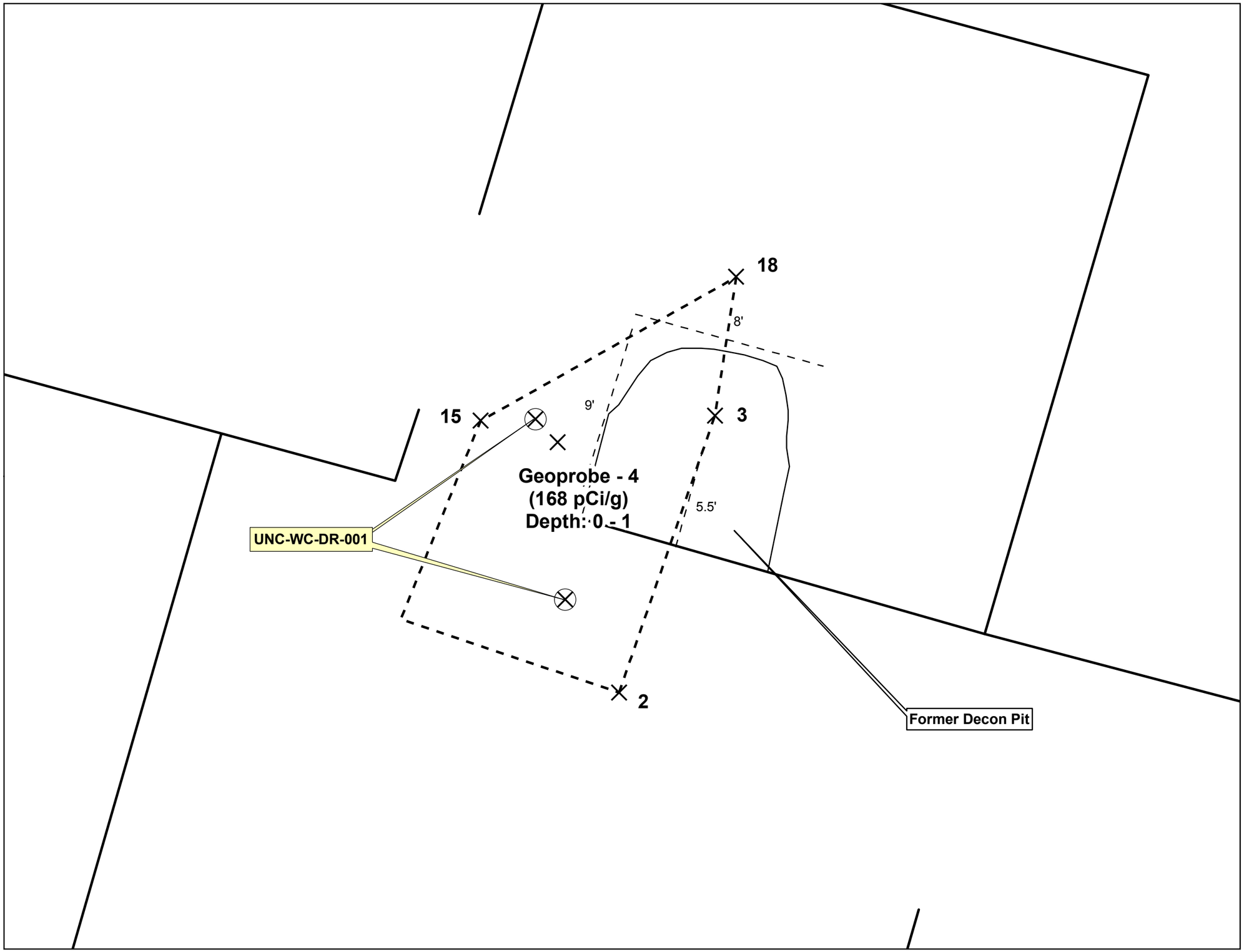


N

**Legend**

- Geoprobe Sample Locations
- Waste Profile Sample Locations 3 feet below concrete
- Excavation Depth is 3 feet below concrete
- Walls

0 1.25 2.5 5 7.5 Feet

## Waste Profile Sampling Locations

**Former UNC Facility**
**New Haven**
**Connecticut**

Date: June 2010
Project #: New Haven
File Name: Figure 3
Prepared By: K. Jackson

**Figure 3**

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# APPENDIX B

# ANALYTICAL DATA PACKAGES

(***Provided Electronically***)

# DATA SUMMARY TABLES

**Laboratory Qualifier Definitions - Appendix B Data Summary**
**UNC New Haven Sampling Report**

The Qualifiers used in this data summary are defined as follows:

< Result is less than value reported

H Analytical holding time was exceeded

J Value is estimated

U Analyte was analyzed for, but not detected above the Method Detection Limit (MDL), Minimum Detected Activity (MDA), or Limits Of Detection (LOD).

B Metals−Either presence of analyte detected in the associated blank, or MDL/Instrument Detection Limit (IDL) < sample value < Practical Quantitation Limit (PQL)

| X-RAY ROOM | | UNC-WC-XY-001 | | | UNC-WC-XY-002 | | |
|---|---|---|---|---|---|---|---|
| | Units | Result | Qualifier | MDL | Result | Qualifier | MDL |
| **Results of Radionuclides in Waste Samples** | | | | | | | |
| Total Uranium | UG/G | 22.4 | U | 39.5 | 48.3 | | 19.8 |
| Uranium-233/234 | PCI/G | 162 | | 16 | 75.4 | | 19.1 |
| Uranium-235/236 | PCI/G | 15 | | 6.42 | 14.8 | U | 18.8 |
| Uranium-238 | PCI/G | 5.19 | U | 13.2 | 13.9 | | 5.98 |
| **Results of VOCs in Waste Samples** | | | | | | | |
| 1,1-Dichloroethylene | MG/L | ND | U | 0.003 | ND | U | 0.003 |
| 1,2-Dichloroethane | MG/L | ND | U | 0.0025 | ND | U | 0.0025 |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.0025 | ND | U | 0.0025 |
| 2-Butanone | MG/L | ND | U | 0.0125 | ND | U | 0.0125 |
| Benzene | MG/L | ND | U | 0.003 | ND | U | 0.003 |
| Carbon tetrachloride | MG/L | ND | U | 0.003 | ND | U | 0.003 |
| Chlorobenzene | MG/L | ND | U | 0.0025 | ND | U | 0.0025 |
| Chloroform | MG/L | ND | U | 0.0025 | ND | U | 0.0025 |
| Tetrachloroethylene | MG/L | 0.0103 | | 0.003 | 0.00675 | J | 0.003 |
| Trichloroethylene | MG/L | 0.014 | | 0.0025 | 0.00698 | J | 0.0025 |
| Vinyl chloride | MG/L | ND | U | 0.005 | ND | U | 0.005 |
| **Results of SVOCs in Waste Samples** | | | | | | | |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| 2,4,5-Trichlorophenol | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| 2,4,6-Trichlorophenol | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| 2,4-Dinitrotoluene | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| Hexachlorobenzene | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| Hexachlorobutadiene | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| Hexachloroethane | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| m,p-Cresols | MG/L | ND | U | 0.015 | ND | U | 0.015 |
| Nitrobenzene | MG/L | ND | U | 0.015 | ND | U | 0.015 |
| o-Cresol | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| Pentachlorophenol | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| Pyridine | MG/L | ND | U | 0.015 | ND | U | 0.015 |
| **Results of Metals in Waste Samples** | | | | | | | |
| Arsenic | MG/L | ND | U | 0.05 | ND | U | 0.05 |
| Barium | MG/L | 0.521 | | 0.01 | 0.375 | | 0.01 |
| Cadmium | MG/L | 0.0404 | B | 0.01 | ND | U | 0.01 |
| Chromium | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| Lead | MG/L | 0.33 | | 0.033 | 0.214 | | 0.033 |
| Mercury | MG/L | ND | U | 0.00066 | ND | U | 0.00066 |
| Selenium | MG/L | ND | U | 0.05 | ND | U | 0.05 |
| Silver | MG/L | ND | U | 0.01 | ND | U | 0.01 |
| **Results of Pesticides in Waste Samples** | | | | | | | |
| Chlordane (tech.) | MG/L | ND | U | 0.000765 | ND | U | 0.000765 |
| Endrin | MG/L | ND | U | 0.0001 | ND | U | 0.0001 |
| gamma-BHC (Lindane) | MG/L | ND | U | 0.00005 | ND | U | 0.00005 |
| Heptachlor | MG/L | ND | U | 0.00005 | ND | U | 0.00005 |
| Heptachlor epoxide | MG/L | ND | U | 0.00005 | ND | U | 0.00005 |
| Methoxychlor | MG/L | ND | U | 0.0005 | ND | U | 0.0005 |
| Toxaphene | MG/L | ND | U | 0.0015 | ND | U | 0.0015 |
| **Results of Herbicides** | | | | | | | |
| 2,4,5-TP | MG/L | ND | U | 0.0166 | ND | U | 0.0166 |
| 2,4-D | MG/L | ND | U | 0.0166 | ND | U | 0.0166 |
| **Results of Chemical Properties in Waste Samples** | | | | | | | |
| Corrosivity | SU | 9.28 | H | 0.01 | 8.93 | H | 0.01 |
| Paint Filter | | ND | | | ND | | |
| Reactive Releasable Cyanide | UG/KG | 250000 | < | | 250000 | < | |
| Reactive Releasable Sulfide | MG/KG | 500 | < | | 500 | < | |
| Setaflash-200 | FAHRENHEIT | ND | | 75 | ND | | 75 |

| SOUTH TRENCH | | UNC-WC-TR-001 | | | UNC-WC-TR-002 | | | UNC-WC-TR-003 | | | UNC-WC-TR-004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units | Result | Qualifier | MDL | Result | Qualifier | MDL | Result | Qualifier | MDL | Result | Qualifier | MDL |
| **Results of Radionuclides in Waste Samples** | | | | | | | | | | | | | |
| Total Uranium | UG/G | 40.5 | U | 43.3 | 25.4 | U | 47.4 | 24.3 | | 16.2 | 9.57 | U | 48.2 |
| Uranium-233/234 | PCI/G | 6 | | 5.68 | 32.9 | | 12.7 | 73.2 | | 12.5 | 20.2 | | 6.12 |
| Uranium-235/236 | PCI/G | 2.34 | U | 7.03 | 12.3 | | 6.15 | ND | U | 15.4 | 7.57 | U | 27.9 |
| Uranium-238 | PCI/G | 13.3 | U | 14.5 | 6.64 | U | 15.9 | 8.16 | | 4.9 | 2.04 | U | 15.6 |
| **Results of VOCs in Waste Samples** | | | | | | | | | | | | | |
| 1,1-Dichloroethylene | MG/L | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 |
| 1,2-Dichloroethane | MG/L | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 |
| 2-Butanone | MG/L | 0.0177 | J | 0.0125 | 0.031 | J | 0.0125 | 0.0138 | J | 0.0125 | 0.0161 | J | 0.0125 |
| Benzene | MG/L | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 |
| Carbon tetrachloride | MG/L | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 |
| Chlorobenzene | MG/L | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 |
| Chloroform | MG/L | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 |
| Tetrachloroethylene | MG/L | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 | ND | U | 0.003 |
| Trichloroethylene | MG/L | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 | ND | U | 0.0025 |
| Vinyl chloride | MG/L | ND | U | 0.005 | ND | U | 0.005 | ND | U | 0.005 | ND | U | 0.005 |
| **Results of SVOCs in Waste Samples** | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| 2,4,5-Trichlorophenol | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| 2,4,6-Trichlorophenol | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| 2,4-Dinitrotoluene | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| Hexachlorobenzene | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| Hexachlorobutadiene | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| Hexachloroethane | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| m,p-Cresols | MG/L | ND | U | 0.015 | ND | U | 0.015 | ND | U | 0.15 | ND | U | 0.015 |
| Nitrobenzene | MG/L | ND | U | 0.015 | ND | U | 0.015 | ND | U | 0.15 | ND | U | 0.015 |
| o-Cresol | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| Pentachlorophenol | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.1 | ND | U | 0.01 |
| Pyridine | MG/L | ND | U | 0.015 | ND | U | 0.015 | ND | U | 0.15 | ND | U | 0.015 |
| **Results of Metals in Waste Samples** | | | | | | | | | | | | | |
| Arsenic | MG/L | ND | U | 0.05 | ND | U | 0.05 | ND | U | 0.05 | ND | U | 0.05 |
| Barium | MG/L | 1.74 | | 0.01 | 0.938 | | 0.01 | 0.0105 | B | 0.01 | 0.914 | | 0.01 |
| Cadmium | MG/L | 0.218 | | 0.01 | 0.0307 | B | 0.01 | ND | U | 0.01 | 0.0127 | B | 0.01 |
| Chromium | MG/L | 0.0286 | B | 0.01 | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.01 |
| Lead | MG/L | 3.11 | | 0.033 | 35 | | 0.033 | 0.0933 | B | 0.033 | 0.385 | | 0.033 |
| Mercury | MG/L | ND | U | 0.00066 | ND | U | 0.00066 | ND | U | 0.00066 | ND | U | 0.00066 |
| Selenium | MG/L | ND | U | 0.05 | ND | U | 0.05 | ND | U | 0.05 | ND | U | 0.05 |
| Silver | MG/L | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.01 | ND | U | 0.01 |
| **Results of Pesticides in Waste Samples** | | | | | | | | | | | | | |
| Chlordane (tech.) | MG/L | ND | U | 0.000765 | ND | U | 0.000765 | ND | U | 0.000765 | ND | U | 0.000765 |
| Endrin | MG/L | ND | U | 0.0001 | ND | U | 0.0001 | ND | U | 0.0001 | ND | U | 0.0001 |
| gamma-BHC (Lindane) | MG/L | ND | U | 0.00005 | ND | U | 0.00005 | ND | U | 0.00005 | ND | U | 0.00005 |
| Heptachlor | MG/L | ND | U | 0.00005 | ND | U | 0.00005 | ND | U | 0.00005 | ND | U | 0.00005 |
| Heptachlor epoxide | MG/L | ND | U | 0.00005 | ND | U | 0.00005 | ND | U | 0.00005 | ND | U | 0.00005 |
| Methoxychlor | MG/L | ND | U | 0.0005 | ND | U | 0.0005 | ND | U | 0.0005 | ND | U | 0.0005 |
| Toxaphene | MG/L | ND | U | 0.0015 | ND | U | 0.0015 | ND | U | 0.0015 | ND | U | 0.0015 |
| **Results of Herbicides in Waste Samples** | | | | | | | | | | | | | |
| 2,4,5-TP | MG/L | ND | U | 0.0166 | ND | U | 0.0166 | ND | U | 0.0166 | ND | U | 0.0166 |
| 2,4-D | MG/L | ND | U | 0.0166 | ND | U | 0.0166 | ND | U | 0.0166 | ND | U | 0.0166 |
| **Results of Chemical Properties in Waste Samples** | | | | | | | | | | | | | |
| Corrosivity | SU | 8.56 | H | 0.01 | 8.56 | H | 0.01 | 9.68 | H | 0.01 | 6.83 | H | 0.01 |
| Paint Filter | | ND | | | ND | | | ND | | | ND | | |
| Reactive Releasable Cyanide | UG/KG | 250000 | < | | 250000 | < | | 250000 | < | | 250000 | < | |
| Reactive Releasable Sulfide | MG/KG | 500 | < | | 500 | < | | 500 | < | | 500 | < | |
| Setaflash-200 | FAHRENHEIT | ND | | 75 | ND | | 75 | ND | | 75 | ND | | 75 |

| SEWER MANHOLE | | UNC-WC-SR-001 | | |
|---|---|---|---|---|
| | Units | Result | Qualifier | MDL |
| **Results of Radionuclides in Waste Samples** | | | | |
| Total Uranium | UG/G | 17.1 | U | 17.8 |
| Uranium-233/234 | PCI/G | 30.4 | | 17.2 |
| Uranium-235/236 | PCI/G | 2.22 | U | 17 |
| Uranium-238 | PCI/G | 5.39 | | 5.39 |
| **Results of VOCs in Waste Samples** | | | | |
| 1,1-Dichloroethylene | MG/L | ND | U | 0.003 |
| 1,2-Dichloroethane | MG/L | ND | U | 0.0025 |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.0025 |
| 2-Butanone | MG/L | ND | U | 0.0125 |
| Benzene | MG/L | ND | U | 0.003 |
| Carbon tetrachloride | MG/L | ND | U | 0.003 |
| Chlorobenzene | MG/L | ND | U | 0.0025 |
| Chloroform | MG/L | ND | U | 0.0025 |
| Tetrachloroethylene | MG/L | ND | U | 0.003 |
| Trichloroethylene | MG/L | ND | U | 0.0025 |
| Vinyl chloride | MG/L | ND | U | 0.005 |
| **Results of SVOCs in Waste Samples** | | | | |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.01 |
| 2,4,5-Trichlorophenol | MG/L | ND | U | 0.01 |
| 2,4,6-Trichlorophenol | MG/L | ND | U | 0.01 |
| 2,4-Dinitrotoluene | MG/L | ND | U | 0.01 |
| Hexachlorobenzene | MG/L | ND | U | 0.01 |
| Hexachlorobutadiene | MG/L | ND | U | 0.01 |
| Hexachloroethane | MG/L | ND | U | 0.01 |
| m,p-Cresols | MG/L | ND | U | 0.015 |
| Nitrobenzene | MG/L | ND | U | 0.015 |
| o-Cresol | MG/L | ND | U | 0.01 |
| Pentachlorophenol | MG/L | ND | U | 0.01 |
| Pyridine | MG/L | ND | U | 0.015 |
| **Results of Metals in Waste Samples** | | | | |
| Arsenic | MG/L | ND | U | 0.05 |
| Barium | MG/L | 1.21 | | 0.01 |
| Cadmium | MG/L | 0.0109 | B | 0.01 |
| Chromium | MG/L | 0.0132 | B | 0.01 |
| Lead | MG/L | 1.66 | | 0.033 |
| Mercury | MG/L | 0.00076 | B | 0.00066 |
| Selenium | MG/L | ND | U | 0.05 |
| Silver | MG/L | ND | U | 0.01 |
| **Results of Pesticides in Waste Samples** | | | | |
| Chlordane (tech.) | MG/L | ND | U | 0.000765 |
| Endrin | MG/L | ND | U | 0.0001 |
| gamma-BHC (Lindane) | MG/L | ND | U | 0.00005 |
| Heptachlor | MG/L | ND | U | 0.00005 |
| Heptachlor epoxide | MG/L | ND | U | 0.00005 |
| Methoxychlor | MG/L | ND | U | 0.0005 |
| Toxaphene | MG/L | ND | U | 0.0015 |
| **Results of Herbicides in Waste Samples** | | | | |
| 2,4,5-TP | MG/L | ND | U | 0.0166 |
| 2,4-D | MG/L | ND | U | 0.0166 |
| **Results of Chemical Properties in Waste Samples** | | | | |
| Corrosivity | SU | 7.4 | H | 0.01 |
| Paint Filter | | ND | | |
| Reactive Releasable Cyanide | UG/KG | 250000 | < | |
| Reactive Releasable Sulfide | MG/KG | 500 | < | |
| Setaflash-200 | FAHRENHEIT | ND | | 75 |

| DECON PIT | | UNC-WC-DR-001 | | |
|---|---|---|---|---|
| | Units | Result | Qualifier | MDL |
| **Results of Radionuclides in Waste Samples** | | | | |
| Total Uranium | UG/G | 26.8 | U | 51.7 |
| Uranium-233/234 | PCI/G | 199 | | 15.1 |
| Uranium-235/236 | PCI/G | 11.2 | | 7.33 |
| Uranium-238 | PCI/G | 3.95 | U | 5.93 |
| **Results of VOCs in Waste Samples** | | | | |
| 1,1-Dichloroethylene | MG/L | ND | U | 0.003 |
| 1,2-Dichloroethane | MG/L | ND | U | 0.0025 |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.0025 |
| 2-Butanone | MG/L | 0.018 | J | 0.0125 |
| Benzene | MG/L | ND | U | 0.003 |
| Carbon tetrachloride | MG/L | ND | U | 0.003 |
| Chlorobenzene | MG/L | ND | U | 0.0025 |
| Chloroform | MG/L | ND | U | 0.0025 |
| Tetrachloroethylene | MG/L | 0.0229 | | 0.003 |
| Trichloroethylene | MG/L | 0.0438 | | 0.0025 |
| Vinyl chloride | MG/L | ND | U | 0.005 |
| **Results of SVOCs in Waste Samples** | | | | |
| 1,4-Dichlorobenzene | MG/L | ND | U | 0.01 |
| 2,4,5-Trichlorophenol | MG/L | ND | U | 0.01 |
| 2,4,6-Trichlorophenol | MG/L | ND | U | 0.01 |
| 2,4-Dinitrotoluene | MG/L | ND | U | 0.01 |
| Hexachlorobenzene | MG/L | ND | U | 0.01 |
| Hexachlorobutadiene | MG/L | ND | U | 0.01 |
| Hexachloroethane | MG/L | ND | U | 0.01 |
| m,p-Cresols | MG/L | ND | U | 0.015 |
| Nitrobenzene | MG/L | ND | U | 0.015 |
| o-Cresol | MG/L | ND | U | 0.01 |
| Pentachlorophenol | MG/L | ND | U | 0.01 |
| Pyridine | MG/L | ND | U | 0.015 |
| **Results of Metals in Waste Samples** | | | | |
| Arsenic | MG/L | ND | U | 0.05 |
| Barium | MG/L | 0.0203 | B | 0.01 |
| Cadmium | MG/L | ND | U | 0.01 |
| Chromium | MG/L | ND | U | 0.01 |
| Lead | MG/L | 0.0427 | U | 0.033 |
| Mercury | MG/L | ND | U | 0.00066 |
| Selenium | MG/L | 0.0828 | U | 0.05 |
| Silver | MG/L | ND | U | 0.01 |
| **Results of Pesticides in Waste Samples** | | | | |
| Chlordane (tech.) | MG/L | ND | U | 0.000765 |
| Endrin | MG/L | ND | U | 0.0001 |
| gamma-BHC (Lindane) | MG/L | ND | U | 0.00005 |
| Heptachlor | MG/L | ND | U | 0.00005 |
| Heptachlor epoxide | MG/L | ND | U | 0.00005 |
| Methoxychlor | MG/L | ND | U | 0.0005 |
| Toxaphene | MG/L | ND | U | 0.0015 |
| **Results of Herbicides in Waste Samples** | | | | |
| 2,4,5-TP | MG/L | ND | U | 0.0166 |
| 2,4-D | MG/L | ND | U | 0.0166 |
| **Results of Chemical Properties in Waste Samples** | | | | |
| Corrosivity | SU | 8.41 | H | 0.01 |
| Paint Filter | | ND | | |
| Reactive Releasable Cyanide | UG/KG | 250000 | < | |
| Reactive Releasable Sulfide | MG/KG | 500 | < | |
| Setaflash-200 | FAHRENHEIT | ND | | 75 |

# APPENDIX C

# ChemScope ASBESTOS INSPECTION AND DATA REPORT

ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610

Cabrera Services Inc.
473 Silver Lane
East Hartford, CT 06118
mjarrell@cabreraservices.com

4/7/2010

**ASBESTOS PRE-RENOVATION INSPECTION**
**71 SHELTON AVENUE , NEW HAVEN , CT**
**PIPE INSULATION IN A UTILITY TRENCH**
**CS# 174-72, 4/2/2010, Page 1 of 4**

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| 3 | Limitations of Inspection |
| 4 | Recommendations |
| Attached | CS#174-72 Analysis Report (2 pages) with one (1) Bulk Sample Location Drawing and one (1) Chain of Custody Document |


*This investigation and information provided in this report depends partly on background information provided by the client.*

*This report is intended for the use of the client. The scope of services performed may not be appropriate for other users and any use of this report by third parties is at their sole risk. This report is intended to be used in its entirety. No excerpts may be taken to be representative of this report.*

INTRODUCTION

### *Purpose:*

This is an Asbestos Pre-Renovation Inspection for compliance with the EPA NESHAP Regulations for Building Renovations and Demolition, 40 CFR PART 61, amended 11/20/90 intended to identify the type and location of any asbestos containing building materials which are part of the renovation. Our sampling was limited to the selected pipes in the utility trench along the southeast side of the building, as directed by our client.

### *Executive Summary:*

Damaged friable asbestos containing materials (ACM) were detected within the scope of this inspection and will need to be properly removed and disposed of prior to the disturbance of these materials.

### *Building Description:*

The subject building is a large (> 100,000 sq ft) former manufacturing plant built more than fifty years ago.

### *Method of Testing:*

For sampling, EPA Wet Methods are used to prevent fiber release. Building materials sampled are analyzed at our laboratory by EPA method 600/R-93/116. This is currently the approved EPA Test method, which uses Polarized Light Microscopy with Dispersion Staining. The laboratory is accredited by NIST/NVLAP and AIHA, and is a Connecticut Approved Environmental Laboratory for Asbestos Analysis.

### *Qualifications:*

The survey team consisted of inspector, Dan Sullivan.

Mr. Sullivan is certified as follows:

- EPA and State of Connecticut Accredited Asbestos Inspector.
- State of Connecticut Licensed Asbestos Project Monitor (#000036)
- State of Connecticut Licensed Asbestos Inspector/Management Planner (#000019)
- State of Connecticut Licensed Asbestos Project Designer (#000096)

For information about Chem Scope, Inc., log onto http://www.chem-scope.com.

## INSPECTION REPORT SYNOPSIS

***Location Name and Address:*** 71 Shelton Avenue, New Haven, CT – Selected Areas of Pipe Insulation In Utility Trench below concrete floor slab

***Inspection Date(s):*** 4/2/2010.

***Scope of Inspection:*** Asbestos inspection, as directed by our client. Our scope of work is based upon our conversations with Michelle Jarrell and Dan Williams. We understand that the scope of the our sampling was limited to two (2) 8" OD lines and one (1) 4" OD insulated pipe located in a utility trench 1-3' below the concrete slab along the southeast side of Room 4. See "Limitations of Inspection" for further information.

***Findings:*** The following asbestos containing materials (ACM) were detected in the Scope of the Inspection:

| *MATERIAL* | *LOCATION* | *APPROXIMATE FOOTAGE* |
|---|---|---|
| **Gray/White fibrous ACM pipe insulation** (damaged, 8" OD, with debris, 1-3' below concrete slab) | **Utility Trench** | **Unknown*** |
| **Gray/White fibrous ACM pipe insulation** (damaged, 4" OD, with debris, 1-3' below concrete slab) | **Utility Trench** | **Unknown*** |

*The amount of pipe insulation in trenches could not be determined as we did not have access to enter the subject, sampling was done of reachable insulation from above the opening.

**NOTE:** Other suspect ACM materials exist in the building that are not mentioned in this report because they are either not in the scope of this inspection or were inaccessible at the time of the inspection.

## LIMITATIONS OF THE INSPECTION

The following materials/areas were not in the scope of this inspection:

1. We did not have full access to the subject trench, we only had access to the pipes we could reach from the top of the opening to the trench along the southeast side of Room 4.
2. We did not sample any other materials other than the three pipes in the trench below the floor in Room4.

It is important to note that every effort is made to detect asbestos (ACM) in the path of the renovation by our inspectors. It is not practical or prudent to demolish the entire pipe system, during an inspection. The owner should be aware of this in case suspect materials, which are concealed (possible pipe gaskets, etc.), are uncovered during the actual renovation.

## RECOMMENDATIONS

Based on the visual inspection which confirmed existing asbestos contamination in the pipe trench and the findings in samples CS# 174-72-(1-3), an Alternate Work Practice (AWP) application should be written to be consistent with CT Department of Public Health (DPH) regulations for the proper abatement and decontamination of the entire pipe trench. The AWP must be written by a CT DPH Licensed Asbestos Project Designer and would contain more detailed instructions for the work (let us know if you would like pricing to do such a design).

All Asbestos Containing Materials (ACM) detected in the path of the renovation must be removed prior to disturbance of these materials during the renovation of this site.

DPH regulations 19a-332a-1 through 16 require notification to the DPH before demolition of any structure. Notification to the DPH is required for asbestos abatement involving greater than 10 linear feet or 25 square feet of ACM when renovation or demolition activities are performed.

Asbestos removal is regulated by federal and state agencies. The abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices, including containment, decontamination facilities and negative air units. Final reoccupancy testing is also required (if the building is going to be reoccupied after the asbestos removal) for removal of greater than three (3) sq ft or linear ft of ACM. Disposal of all ACM is regulated by EPA and the Connecticut DEP; an EPA approved landfill must be used.

If the scope of work changes or if suspect materials, which were previously not accessible or not sampled during this inspection are discovered during the renovation or if the scope of the renovation changes to include disturbance of new materials not inspected, then renovation must stop and the materials must be sampled by a CT DPH licensed asbestos inspector prior to disturbance of these materials.

Sincerely,

Dan Sullivan
Field Operations Manager

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ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610

# Certificate Of Analysis

*Michelle Jarrell - Cabrera Services, Inc.*
*12747 Olive Boulevard*
*Suite 350*
*St. Loius MO 63141*

*4/7/2010*
*CS# 174-72*


*Bulk sample(s) from , 71 Shelton Avenue, New Haven, CT collected by Dan Sullivan on 4/2/2010*

*Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116*

| Sample Identification | Findings (Analyzed 4/7/10) |
|---|---|
| *174-72-1 Gray/White fibrous pipe insulation (8" diameter line, damaged, 1-3 ft below concrete floor slab) / Room 4 Southeast Side* | *75% Chrysotile Asbestos*<br>*<1% Amosite Asbestos*<br>*25% Non- Fibrous Particles* |
| *174-72-2 Gray/White fibrous pipe insulation (4" diameter line, damaged, 1-3 ft below concrete floor slab) / Room 4 Southeast Side* | *65% Chrysotile Asbestos*<br>*10% Amosite Asbestos*<br>*25% Non- Fibrous Particles* |
| *174-72-3 Gray/White fibrous pipe insulation (8" diameter lower line, damaged, 1-3 ft below concrete floor slab) / Room 4 Southeast Side* | *75% Chrysotile Asbestos*<br>*25% Non- Fibrous Particles* |

# PARAMETERS
# ASBESTOS PLM ANALYSIS
**(Revised 12/17/09)**

1. *Materials which contain >1% asbestos (greater than 1%) by PLM (polarizing light microscopy) analysis are considered to be asbestos containing materials under EPA, OSHA and the State of Connecticut Regulations. {Note: A more sensitive method is available called TEM (transmission electron microscopy). TEM may detect asbestos fibers that PLM cannot see, but the above agencies' enforcement is based on PLM analysis. Rules may differ for states other than Connecticut. It is best to check with the individual state. For example, New York State requires TEM confirmation of negative PLM results on floor tile}.*

2. *If no asbestos is detected in a sample, or if the asbestos content is less than 1% by PLM, additional samples of the same material should be submitted for confirmation. Please check with the laboratory for guidance on the number of samples needed. Sample collection in Connecticut must be by a DPH Licensed Asbestos Inspector. Many other states also require licensing.*

3. *Floor Tile Mastic: Mastic under floor tile should be separately sampled by scraping some of the mastic from the floor to avoid contamination from the floor tile.*

4. *Although Chem Scope, Inc. takes great effort to insure accuracy in the estimation of asbestos in the materials analyzed, no quantitation method is without some uncertainty. Based on independent calibration studies and comparison of Chem Scope's quantitative results with NVLAP and AIHA round robin programs we estimate our uncertainty in quantitation to be relatively small. The average relative uncertainty of the estimate is calculated to be 31% for samples that contain less than 10% asbestos. This means a estimate of 10% asbestos in a sample has a probable range of 6.9% to 13.1% while an estimate of 1% has a range of 0.69% to 1.31%.*

5. *The presence of non-asbestos components, which are recognized by the PLM analyst, is reported with the estimated amounts. This is not an exhaustive analysis for the non-asbestos materials since the primary purpose is to determine if asbestos is present and, if so, how much is present of each type of asbestos.*

6. *Results reported apply only to the sample(s) analyzed.*

7. *Special treatment of samples: Chem Scope, Inc. routinely uses gravimetric sample reduction techniques such as low temperature ashing or acid dissolution on samples like floor tile, roofing materials, glue dots, or high cellulose content samples prior to PLM analysis. These methods are used to aid in the PLM analysis and to provide better quantitative data. Layered samples, if possible, are analyzed separately as individual layers. However, in accordance with the method, if any layer contains >1% asbestos (greater than 1%) it is to be considered an asbestos containing material. All results are reported to the original sample basis.*

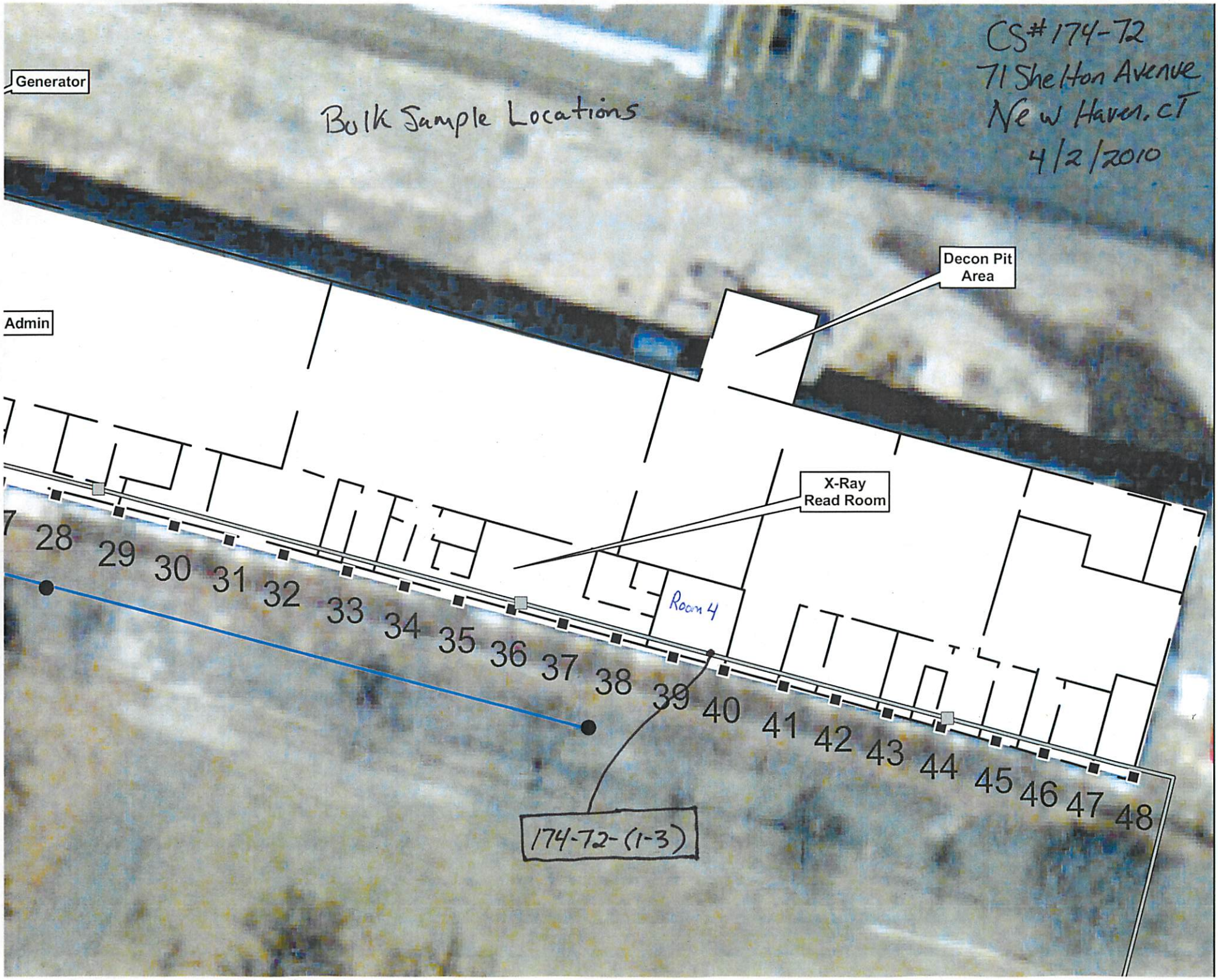
8. *Sample results are not corrected for blanks. Analytical blanks are run daily and if contamination is suspected the samples are rerun.*

9. *Chem Scope, Inc. performs "400 point" point counting when the asbestos content is visually estimated to be less than 10%. There is no additional charge for this analysis.*

*The Scope of Accreditation referenced in this report applies to bulk asbestos fiber analysis by PLM (Polarized Light Microscopy).*
*Accreditation does not imply endorsement by NVLAP, NIST or any Federal or State Agency.*
*This report pertains only to the samples tested and may not be reproduced in part.*
*Condition of the samples at the time of receipt was acceptable unless otherwise noted on the Certificate of Analysis.*
*See test parameters above and attached chain of custody form.*
*We would love to hear from you. Comments? Questions? Please call or email us* at chem.scope@snet.net.

***ChemScope, Inc. is accredited by AIHA LAP, LLC LAB #100134***
***NVLAP Lab Code 101061-0.***
***Connecticut Department of Public Health (DPH) Approved Environmental Lab PH 0581***

| *Signature* | *Signature (if applicable)* | *Authorized Signature or* | *Authorized Signature* |
|---|---|---|---|
| *Analyst* | *Inspector* | *Ronald D. Arena*<br>*Director* | *Suzanne Cristante*<br>*Quality Manager* |


CS# 174-72
71 Shelton Avenue
New Haven, CT
4/2/2010
Bulk Sample Locations
Generator
Admin
Decon Pit Area
X-Ray Read Room
Room 4
7 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
174-72-(1-3)

# ChemScope *INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY*

15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610

## Chain of Custody

Sample Source: 71 Shelton Avenue, New Haven, CT CS Job CS# 174-72

Sampled by: [illegible] Date Sampled: 4/2/10 Customer Name: Michelle Jarrell - Cabrera Services, Inc.

Analyst _____ Date Received 4/2/10 Date Analyzed _____

| CS Sample# | Client Sample# | Sample Description | Comments |
|---|---|---|---|
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Sample Turnaround: 4/7/10

Analysis Requested(if variable, use comment column) PLM

Check if you want sample returned ____ (sampled will be disposed of after 30 days).

Relinquished by [illegible] Date 4/2/10 Time 10:00 am Received by [illegible]
Relinquished by _____ Date _____ Time _____ Received by _____

Other Special Instructions: _____

_____

Result Transmittal Instructions (for Chem Scope to transmit): Tell DS (203-996-3621) for report

**FOR CHEM SCOPE, INC. TO FILL OUT IF SAMPLES ARE GOING TO OUTSIDE LAB:**

Name of Laboratory: _____ Method of Transportation to Laboratory: _____

Result Transmittal Instructions (for outside Lab to Chem Scope, Inc): ***PLEASE FAX RESULTS***

The person submitting samples is responsible for obtaining true and representative samples, for complying with applicable regulations and for the use of the data obtained from the analysis. For example, many states have licensing and laboratory approval requirements. Please contact the individual states if you have any questions regarding specific sampling or approval requirements. For Connecticut sites, we have licensed inspectors available to collect client samples and to perform building inspections.

**Dear Laboratory Customer or Potential Customer,**

New laboratory accreditation standards require us to provide our clients information about our services to make sure that your requirements for testing are adequately defined, documented and understood. The following is for your information. Please call us if you have any questions or comments.

**Type of Samples:**
/_/ PCM cassettes are routinely run by NIOSH Method 7400.
/ / Bulk materials are run by EPA Method: #600/R-93/116.

**Air Samples:** NIOSH 7400 Method counts all fibers. This method may be used for personal air samples and for finals. Two field blanks must be submitted for each set of samples. In the unlikely event that there is to be any deviation from the standard test, you will be consulted by phone before the work begins. Those clients who have not had NIOSH 582 or AHERA asbestos training courses (either supervisor or project monitor) should consult with the lab director for more information. The test parameters are further explained in the analytical report.

**Bulk materials**: sampled are analyzed by the latest EPA Method: (#600/R-93/116) which uses polarized light microscopy (PLM). When asbestos is detected and the amount is estimated to be <10%, we automatically point count the samples. When there are interfering substances present, we may use ashing, acid washing or other procedures described in the method to handle the interference. Those clients who have not had AHERA asbestos training courses (either inspector, supervisor or project designer) should consult with the lab director for more information. The test parameters are further explained in the analytical report.

**All Samples** must be clearly labeled with source name and identification number or sufficient information from the client to make this sample uniquely identified. (We will then add our notebook #, page # (batch) and unique number within the batch.) Samples must be in a clean, air tight package such as a zip loc bag. Appropriate completed paperwork must accompany the sample. Bulk and air samples may not be submitted in the same package.

As soon as available bench top results will be faxed to you and reports will then be mailed. We will retain air samples for at least one month and bulk samples for 6 months unless you advise us otherwise.

You are welcome to visit the laboratory at any time to discuss the work, monitor the work or verify our testing services. We appreciate your business and encourage any feedback regarding improving our services or our quality system. Please take a minute to complete the following survey and mail/fax it to ChemScope, Inc.

**Customer Service Survey**

To help us improve our services give your opinions to the following:

1- The printed laboratory report was complete and easy to understand. ☐ YES ☐ NO
If no, please explain _____.

2- The turn around time for results met your expectations/needs. ☐ YES ☐ NO
If no, please explain _____.

3- How likely are you to recommend ChemScope Inc. to someone?
☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

4- How likely are you to return to ChemScope in the future if the need arises?
☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

5. On a scale of 1 to 5 where 1 represents "Satisfied" and 5 represents "Dissatisfied", how would you rate your level of overall satisfaction.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

6- Please add any additional comments or suggestions that would be helpful when you use our services:
_____

Name _____ Company _____

Address _____ Telephone/e-mail _____

Can we contact you regarding this survey? ☐ YES ☐ NO

# APPENDIX D
# DATA VERIFICATION REPORT

CABRERA SERVICES
RADIOLOGICAL · ENGINEERING · REMEDIATION

June 3, 2010

Mr. John Eberlin
UNC New Haven Project Manager
12747 Olive Blvd Suite 350
St. Louis, MO 63141

Subject: Verification and Evaluation of Data Quality
UNC New Haven
April 2, 2010 Sample Event

Dear Mr. Eberlin,

This is a letter provides a summary of the verification and evaluation of the data quality for results provided by GEL Laboratories, LLC for the UNC New Haven characterization samples. This review is not intended to serve as a level 4 data validation assessment, rather it is intended as Data Verification as stated in EPA GA/G-8, evaluating the completeness, general quality assurance, usability and potential data integrity concerns. Third level validation was provided by GEL and found throughout. The review of process elements found throughout the full data package, laboratory raw data and electronic data deliverable (250495) were evaluated.

Project: UNC New Haven
Sample Event: April 2, 2010
Analytical Parameters: TCLP (preparation leading to metals and VOAs)
Ignitability (General Chemistry)
Corrosivity (General Chemistry)
Paint Filter (General Chemistry, free liquids qualitative)
Cyanide, Reactive (General Chemistry)
Sulfide (General Chemistry)
Total Uranium (Radiochemistry)
U-235 (Radiochemistry)

| | PROJECT | LABORATORY |
|---|---|---|
| Sample Identifiers: | UNC-WC-DR-001 | 250594001 |
| | UNC-WC-TR-001 | 250594002 |
| | UNC-WC-TR-002 | 250594003 |
| | UNC-WC-TR-004 | 250594004 |
| | UNC-WC-XY-001 | 250594005 |
| | UNC-WC-SR-001 | 250594006 |
| | UNC-WC-TR-003 | 250594007 |
| | UNC-WC-XY-002 | 250594008 |

*General Findings:*

- Several aliquots were significantly reduced in size and QC analysis not conducted because of anticipated highly radioactive matrix. This impact the overall sensitivity and general usability of the data. However, this assumption is not verified base on uranium analyses.
- Seven of the eight samples were not received in time to meet holding time analyses for Corrosivity. However, based on the manner in which GEL calculates TAT and receipt times, and the nature of the results, I see no issues with these resultant values being utilized/valid.
- Recommend requesting sample aliquot be incorporated into the EDD in future packages.
- Total Uranium, as an analytical parameter, is routinely presented in mass/mass units. This has little to no value without isotopic ratios and the site decision criterion is stated in activity/mass. In the future, I recommend requesting JUST isotopic uranium by alpha spectroscopy. This will provide the necessary values and units to base project decisions. See further details in SUMMARY.

*Logistics:*
No issues/concerns were noted of Sample receipt processing. Proper receipt, relinquishing, holding times (note Corrosivity analyses above) and samples integrity were achieved and documented with chain of custody records. Standards logs and documentation are sufficient to correlate to QC measurements.

*GC/MS Based Parameters:*
No issues or concerns noted with GC Semivolatile Herbicide, GC Semivolatile Pesticide, GC/MS Semivolatile and GC/MS Volatile analyses. MDL and PQL values were sufficient and met expectations. No method deviations were noted. Analysis results of method blanks and laboratory control samples provided acceptable batch quality acceptance, viz. spike recovery and cross contamination. Toxicity characterization leaching procedure sample preparation and other extraction logs/processes were verified as appropriate. Instrument performance checks were reviewed and appear valid. No finding resulting from review of aliquot, subsampling and/or dilution factors noted.

Positive TCE and PCE values noted and appear accurate.

*General Chemistry and Metals Parameters:*
No issues or concerns noted with General Chemistry and Metals analyses. MDL and PQL values were sufficient and met expectations. No method deviations were noted. Method blanks, laboratory control samples, duplicate deltas, matrix spikes (MS) and MS duplicates all met acceptance criteria. No concerns with Toxicity characterization leaching procedure sample preparation, acid digestion, and other extraction logs/processes were verified as appropriate.

*Radiological Analyses:*
As noted above, several aliquots were significantly reduced in size and QC analysis not conducted because of anticipated highly radioactive matrix. Additionally, U-235/236 and Total U analyses did not meet the standard detection limits due to "limited sample volume." These two factors dramatically limited the value of the uranium parameters, even the QC analyses did not meet that detection limits as the aliquots were made parallel to sample volumes.

SUMMARY:

The only data quality issue resides in the uranium analyses. Based on the results for total uranium I see no reason why a "High Rad Testing" approach should have been taken; thus reducing sensitivity. With Total Uranium being used as a site decision criterion the results provided in ug/g have marginal value, without information on isotopic ratios and increased aliquot size. Reviewing the raw data I can obtain the necessary isotopic data and convert the results to total uranium in pCi/g – in most each case the total uranium value would exceed 30 pCi/g. However, the sensitivities and value uncertainties will still have an impact on overall confidence.

It is important to communicate the isotopic mix/ratio between the uranium isotopes varied throughout the eight samples. It should also be noted that with <1 mg aliquot size, with previous subsampling, and the nature of uranium in discrete particles, it may we wise to request larger aliquots and increase homogenization in the field prior to lab submittal.

Sincerely,

Steven Howard
Quality Director

cc: Project file