



Sent via E-mail & Fed-Ex

**Hanson Aggregates Pennsylvania LLC**  
7660 Imperial Way  
Allentown, PA 18195-1040  
Tel 610-366-4600  
Fax 610-871-5994

November 15, 2019

Gary A. Latsha  
District Mining Manager  
Pottsville District Mining Office  
Pennsylvania Department of Environmental Protection  
5 West Laurel Boulevard  
Pottsville, PA 17901

**Re: Transmittal of Qualitative Geologic Survey Report  
Rock Hill Quarry  
Hanson Aggregates Pennsylvania LLC  
SMP # 7974SM1  
East Rockhill Twp., Bucks Co., PA**

Mr. Latsha:

Hanson Aggregates Pennsylvania LLC (Hanson) is providing the attached Qualitative Geologic Survey Report (QGSR) for review and consideration by the Pennsylvania Department of Environmental Protection (PADEP). The report was prepared by Earthres Group, Inc. (EARTHRES). EARTHRES completed the site investigation and material sampling in accordance with the Department-approved Qualitative Geologic Survey Sampling Plan (QGSSP) submitted on April 3, 2019 and revised on April 25, 2019 to address comments received from the PADEP and East Rockhill Township.

Due to the physical size of the report, Hanson is providing three (3) paper copies to PADEP. An electronic (PDF) version of the report is also being provided on a flash drive to allow its uploading to PADEP's public website for the Rock Hill Quarry. A link to download the electronic version of the report will be e-mailed to everyone included in the CC list at the end of this letter.

Subsequent to this transmittal of the QGSR, Hanson will be submitting the following to the Department for review and consideration:

- A report from Kelly Bailey Consulting, LLC interpreting the QGSR results and providing recommendations for site monitoring during operation of the quarry;
- A Mineral Identification & Management Guide to address inspection and monitoring the Rock Hill Quarry site; and
- An Occupational Health & Safety Monitoring Plan to address potential worker exposure for the Rock Hill Quarry site.

**October 3, 2019 Hanson Letter**

In our correspondence with the Department dated October 3, 2019, Hanson requested several items to aide in its review of the EMSL, Inc. lab reports (as transmitted to Hanson on August 28, 2019). Hanson is requesting an update on the availability of the following items:

- PLM and TEM photos of the samples;
- EDS and SAED of each particle from the EMSL count sheets;
- Powder x-ray diffraction of each sample;
- Explanation of how EMSL differentiates asbestiform / non-asbestiform for TEM & PLM;
- Explanation of how EMSL distinguished between pyroxenes and amphiboles

Please feel free to contact me at (610) 366-4819 should you wish to discuss this submission or have any questions regarding the enclosed information.

Regards,



Andrew J. Gutshall, P.G.  
Area Environmental Manager

encl: Qualitative Geologic Survey Report – EARTHRES – November 15, 2019

cc: John Stefanko, PADEP  
Daniel Sammarco, P.E., PADEP  
Michael P. Kutney, P.G., PADEP  
Amiee Bollinger, PADEP  
James Rebarchak, PADEP  
Sachin Shankar, P.E., PADEP  
Robert Fogel, PADEP  
Neil Shader, PADEP  
Virginia Cain, PADEP  
Craig Lambeth, Esq., PADEP  
Shawn Mountain, PADEP  
Marianne Morano, East Rockhill Township  
David Raphael, Esq., K&L Gates  
Kelly Bailey, CIH, KBC LLC  
Drew Van Orden, P.E., RJ Lee Group  
Louis F. Vittorio, P.G., EarthRes  
Robert Gundlach, Esq., Fox Rothschild  
Curt Mitchell, R.E. Pierson  
Mark E. Kendrick, P.E., Hanson  
Matthew S. Burns, Esq., Hanson  
Michael C. Lewis, CHMM, Hanson  
Environmental File



**Hanson Aggregates Pennsylvania, LLC  
7660 Imperial Way  
Allentown, PA 18195-1040**

**QUALITATIVE GEOLOGIC SURVEY REPORT (QGSR)**

**ROCK HILL QUARRY**

**SMP No. 7974SM1**

East Rockhill Township  
Bucsk County, Pennsylvania

**November 15, 2019**

**Prepared By:**



**EARTHRES**

ENGINEERING FOR SUCCESS™

# Qualitative Geologic Survey Report

Rock Hill Quarry, SMP No. 7974SM1

East Rockhill Township, Bucks County, Pennsylvania

EARTHRES Project # 061003.051

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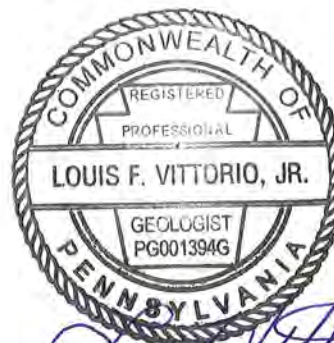
November 15, 2019

## Prepared for:

Hanson Aggregates Pennsylvania, LLC  
7660 Imperial Way  
Allentown, PA 18195-1040

## Prepared by:

Earthres Group, Inc.  
P.O. Box 468  
Pipersville, PA 18947  
Phone: (215) 766-1211



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Louis F. Vittorio, Jr., P.G.

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## **1.0 INTRODUCTION**

On behalf of Hanson Aggregates Pennsylvania, LLC (Hanson), Earthres Group, Inc., (EARTHRES) is providing the following Qualitative Geologic Survey Report (QGSR) for assessment of Naturally Occurring Asbestos (NOA) at the Rock Hill Quarry Operation (Site).

This work was completed in accordance with the approved Qualitative Geologic Survey Sampling Plan (QGSSP) prepared and submitted on April 3, 2019, and revised on April 25, 2019, to address comments received from the Pennsylvania Department of Environmental Protection (PADEP) and East Rockhill Township.

The QGSSP was designed to collect sufficient information as part of the preparation of a detailed QGSR for the Site. The data discussed and presented was collected per the QGSSP in 2019. The QGSR also includes presentation of the data and results from data collection efforts completed at the site in 2018.

## **2.0 PROJECT DESCRIPTION**

This section provides the background, purpose, past, and recent work conducted in response to the Cease Order issued by PADEP on December 5, 2018, concerning the potential presence of NOA at the Site.

### **2.1 Site Setting**

The Site is an active aggregate mine permitted by PADEP to operate under Surface Mining Permit (SMP) No. 7974SM1. Historical information indicates that the Site has been a diabase aggregate quarry since 1903. The Site is located on the western side of Rock Hill in East Rockhill Township, Bucks County, within the Gettysburg-Newark Lowland Section of the Piedmont Physiographic Province of Pennsylvania. The Gettysburg-Newark Lowland is characterized by a gently rolling topography of low to moderate relief with broad, shallow valleys and low ridges. The Site is located on a ridge underlain by diabase. The diabase, an intrusive, crystalline, igneous rock, intruded into native sedimentary rock of the Brunswick and Lockatong formations (Figure 5, Appendix A). The Brunswick Formation is a sequence of sedimentary shales and siltstones with interbedded sandstone. The Lockatong Formation is also a sedimentary sequence with laminated beds of siltstone and shale or argillite. The elevation of the Site rises from approximately 540 feet mean sea level (MSL) to 800 feet MSL from southwest to northeast.

The diabase of the Haycock-Rock Hill Sill is a light-grey, medium- to coarse-grained crystalline igneous rock. At the edges of the Sill, the thinner Byram and Clayton diabase sills are dense, fine-grained, and greenish-black. However, mineralogy is generally the same and consists of plagioclase feldspar and augite as the predominant mineralogical species (Bascom et al., U.S. Geological Survey (USGS) 1931). The Bascom et al. (1931) report provides no indication of the presence of NOA in the mineralogy of the diabase. The Mineralogy of Pennsylvania (Gordon 1922) similarly does not indicate the presence of NOA in East Rockhill Township nor at the Site. However, Bradford et al. (1959) indicated that hydrothermal veins of actinolite, prehnite, and albitite (albite) are reported to be present at the Rock Hill Quarry. A USGS report by Van Gosen (2006) lists and maps NOA occurrences in the eastern United States. The report does not identify NOA occurring at the Site nor in the area. The closest known occurrence of NOA indicated by Van Gosen (2006) is within the serpentine rocks of the Easton, Pennsylvania area.

A comprehensive literature survey was conducted as part of this geologic evaluation to address the nature of diabase found at the Site. The results of the literature search are included in Section 3.0.

## **2.2 Work Plan Development**

This subsection provides a summary of correspondence and site efforts that have led to development of the current QGSSP for the Site.

- EARTHRES *Asbestos Investigation Results* dated January 18, 2018.
- Hanson NOA monitoring plan submitted to PADEP on January 24, 2018.
- PADEP approval of Hanson's NOA monitoring plan on January 25, 2018.
- EARTHRES *2<sup>nd</sup> Quarter 2018 NOA Monitoring Report* to PADEP dated July 27, 2018.
- EARTHRES *3<sup>rd</sup> Quarter 2018 NOA Monitoring Report* to PADEP dated October 24, 2018.
- EARTHRES 4th Quarter 2018 NOA Monitoring Data.
- EARTHRES December 20, 2018 background sampling results for aggregate and surface water.
- EARTHRES *Qualitative Geologic Survey Sampling Plan* to PADEP on behalf of Hanson dated April 3, 2019.
- East Rockhill Township Board of Supervisors issued a comment letter on April 17, 2019, concerning the *Qualitative Geologic Survey Sampling Plan*.
- PADEP issued a comment letter regarding the *Qualitative Geologic Survey Sampling Plan* on April 22, 2019.
- EARTHRES *Response to PADEP and East Rockhill Township Comments – Qualitative Geologic Survey Sampling Plan* letter dated April 25, 2019.

Pertinent correspondence relating to the proposed sampling plan is provided in chronological order in Appendix C. Prior site reports and investigation data are provided in Appendix D.

## **2.3 Previous Site Investigations**

Prior investigation, qualitative geological surveying, and sampling conducted at the Site during 2018 included the collection and analysis of 33 rock samples including: five (5) mineral vein rock samples, 21 composite drill hole cutting samples, five (5) aggregate stockpile samples, and two (2) crusher run (fines) samples. All samples yielded non-detectable (ND) results for NOA, except for one (1) targeted hand sample analysis that indicated NOA to be present.

Five (5) surface water samples were collected from the Site on December 20, 2018, and were analyzed by EMSL Laboratories via U.S. Environmental Protection Agency (EPA) Method 100.2 (EPA 600/R-94/134) for asbestos fibers greater than or equal to ( $\geq$ ) 0.5 microns ( $\mu\text{m}$ ), as well as for fibers  $>10$  microns in length. The results indicated non-detectable results for NOA fibers  $>10$  microns in length. The EPA Drinking Water Limit is 7 million fibers per liter (MFL) for fibers  $>10$  microns in length.



The results for the water samples considering NOA fibers  $\geq 0.5$  microns indicated the presence of one (1) fiber in Sample #1, three (3) fibers in Sample #2, and three (3) fibers in Sample #4. There is no corresponding regulatory limit for NOA detected in the  $\geq 0.5$  micron to less than ( $<$ ) 10 micron size range. Results of the previous investigation are documented in the reports included in Appendix D.

## **2.4 Current Site Investigations**

Recent work performed in accordance with the April 3, 2019 QGSSP, and the April 25, 2019 revision provided to PADEP are summarized in this subsection. Field sampling efforts were completed by professional geologists from EARTHRES and were overseen by representatives of PADEP. Split samples were provided to PADEP for all samples collected.

The work adhered to the QGSSP developed in consultation with Hanson's experts: Kelly Bailey, Certified Industrial Hygienist (CIH), of Kelly Bailey Consulting, LLC, and Drew R. Van Orden, P.E. of RJ Lee Group, Inc., and modifications requested by PADEP. The investigations included the collection and analysis of an additional 57 rock samples and seven (7) water samples, including:

- 1) Seven (7) water samples from seven (7) on-site locations.
- 2) Sixteen (16) samples from four (4) aggregate stockpiles.
- 3) Twenty-five (25) mineral vein samples collected from boulders located primarily on the southern and eastern sides of the quarry pit.
- 4) Nine (9) mineral veins observed in rock cores CB-1 through CB-4.
- 5) Four (4) diabase rock cores samples, one each from rock cores CB-1 through CB-4.
- 6) Three (3) additional hand samples collected at the Site that were selected by PADEP for analysis.

The aggregate sampling (16 samples) was completed to assess the presence of NOA in processed end-use materials. The samples collected from the boulder mineral veins, rock core mineral veins, and hand samples, totaling 37 samples, were targeted at mineralized zones that could possibly contain NOA mineralogy if present at the Site. Although the literature assessment and site observations indicate that NOA is not present in the diabase matrix, four (4) diabase core samples were collected and analyzed to quantitatively assess the potential presence of NOA in the diabase matrix.

Prior to completing the rock coring, mineral veins on the exposed bench faces proposed for quarrying were mapped as requested by PADEP. The core locations and drilling angles were subsequently selected to maximize encountering as many mineral veins as possible in each rock



coring. The mineral veining found and rationale for core bore placement are provided in the *Response to PADEP and East Rockhill Township Comments – Qualitative Geologic Survey Sampling Plan* (EARTHRES April 25, 2019) and is included in Appendix C.

### **3.0 GEOLOGIC EVALUATION**

In January 2018, the area surrounding the quarry and proposed mining area was assessed by EARTHRES personnel to determine the presence of mineral veining and/or sedimentary rock contacts. The diabase described by Bascom, et al. (1931) was similarly observed and was indicated to be massive, fine- to medium-grained, and grey to dark grey in color. Borings drilled during 2018 for bench development on the south-southeastern side of the quarry, as well as observations of the exposed highwalls, support USGS publications indicating a homogenous crystalline diabase geology across the entire Site. Refer to Appendix D for prior evaluations conducted at the Site throughout 2018.

As indicated in EARTHRES' January 18, 2018 report (Appendix D), numerous large boulders were assessed on the southern, northern, and eastern sides of the Site. Boulder surfaces were visually inspected to identify the potential presence of NOA. Each boulder observed consisted of a tightly massed, fine- to medium-grained crystalline diabase.

Sedimentary rocks or features (e.g. bedding, folds, cross-beds, etc.) were not visually observed on the highwalls. Near-vertical jointing was observed along much of the eastern highwall. Contacts with sedimentary host rocks were not indicated in the surrounding outcrops or boulder fields. The quarry and investigation area are indicated to be entirely within the diabase bedrock.

EARTHRES conducted field mapping on April 22, 2019, in the proposed mining area and surrounding area, which is discussed in Section 4.3 herein. The findings of the April 22, 2019 field mapping were incorporated into EARTHRES' April 25, 2019 *Response to PADEP and East Rockhill Township Comments*. Field mapping conducted in April 2019 supports EARTHRES' 2018 conclusion and literature survey for feature orientations (i.e. veins and joints) diabase geology. Refer to Appendix C for the April 25, 2019 *Response to PADEP and East Rockhill Township Comments* report, which summarizes the April 2019 geologic evaluation work.

The diabase is indicated to be a single homogenous unit with no geologic facies changes, ductile shear zones, or brittle shear zones that would constitute separate units. Hydrothermal veins that contain various minerals occur within the otherwise homogenous diabase. The diabase and veins in the active mining area at the Site have been mapped, sampled, and tested using both targeted (e.g., rock core veins, boulder veins, and hand samples) and incremental methods (e.g., aggregate stockpiles, crusher fines and drill cuttings). The following literature assessment summarizes the geological research for the diabase at the Site.

### **3.1 Diabase Geology Literature Assessment**

The diabase at the Site is the result of magma from the mantle intruding into sedimentary rock of the Newark Basin during the late Triassic-early Jurassic Periods, about 200 to 201 million years ago (mya) when the Eastern North American margin began its rift with Europe and Africa (Puffer & Husch 1996; Blackburn et al. 2013). The Newark Basin is bounded on its northwestern and northern margins by southeast to south dipping normal extensional faults that created the basin wherein simultaneous sedimentation and igneous activity associated with the rifting occurred (Schlische & Olsen 1988; Herman 2005). The diabase intrusion at the Site is part of a “mega sheet” that extends approximately 150 kilometers (km) from southeastern New York to eastern Pennsylvania and parallels the Brunswick shale bedding planes that dip approximately 10° to 15° W to 5° to 25° NW (Puffer & Husch 1996; Srogi et al. 2017; Bascom et al. 1931). Radiometric dating of the diabase throughout the Newark Basin points consistently to an age of approximately 201 mya, suggesting emplacement from the same or similar source (Schlische & Olsen 1988).

The magma that formed the diabase is indicated to be extremely homogenous and was emplaced during three (3) distinct events that occurred within a few thousand years and resulted in the occurrence of three (3) distinct diabase types in Pennsylvania (Smith et al. 1975). These three (3) types are, in order of emplacement, the Quarryville, the York Haven, and the Rossville diabase, with the olivine-rich Quarryville the closest to the composition of the magma in the mantle, and the latter two (2) units being olivine-depleted (Smith et al. 1975). This is supported by a later finding that concluded a large volume of magma with little compositional heterogeneity established the magmatic system in the Newark Basin at approximately 201 mya (Srogi et al. 2017).

The diabase at the Site is comprised solely of the York Haven-type diabase, which occurs as sheets and dikes along the entire Triassic basin, and is identical in composition regardless of its occurrence (Smith et al. 1975). Generally, the York Haven consists of a dark-gray, medium- to coarse-grained, high titanium oxide, relatively copper-enriched, quartz-normative tholeiite (olivine-poor, quartz-rich basalt) composed of labradorite (a plagioclase feldspar) and various pyroxenes (Van Gosen 2006). Composition of the diabase is consistent, suggesting once the diabase was intruded, it remained a relatively closed system with little late-stage fractionation (Puffer & Husch 1996).

The Site lies within the Haycock diabase sheet and is comprised almost entirely (90% to 95%) of: non-altered labradorite (a feldspar mineral), augite (a pyroxene mineral) with only small quantities of hornblende (a primary amphibole mineral present independent of pyroxene), magnetite, magnetite-ilmenite, and apatite (Bradford et al. 1959). Within the Haycock sheet, the diabase is fine-grained along the margins where cooling occurred faster and gradually coarsens inward where cooling was slower (Bradford et al. 1959). Between the margins and the interior of the Haycock sheet, the “normal phaneritic diabase type” with 1- to 2-millimeter grain sizes is prevalent

(Bradford et al. 1959). The “normal phaneritic diabase type” is observed at the Site. Amphibole constitutes the only mineral within the diabase veins that can exist in an asbestiform habit. However, the development of the asbestiform habit in amphiboles is not common. Plastic deformation to the diabase has not occurred, and the hornblende amphibole is present primarily as a non-altered, mineral. Hydrothermal alteration along some of the mineral veins in the diabase has been observed (Bradford et al. 1959).

Regionally, only a few of the fractures in the diabase sheets in Bucks County are filled with pale green actinolite. At the Rock Hill Quarry, hydrothermal veins of actinolite, prehnite, and albitite are reported to be present (Bradford et al. 1959). Site observations completed in 2018 and 2019 have identified several veins containing actinolite mineralogy. However, asbestiform actinolite has not been observed in the field during site investigations.

The mineral actinolite is the intermediate phase that forms within the solid solution series between tremolite and ferroactinolite (Klein and Hurlbut, 1985). Within this series, ferroactinolite ( $\text{Ca}_2\text{Fe}_5\text{Si}_8\text{O}_{22}(\text{OH})_2$ ) exists at the low temperature range, and tremolite ( $\text{Ca}_2\text{Mg}_5\text{Si}_8\text{O}_{22}(\text{OH})_2$ ) exists at the high temperature range with actinolite ( $\text{Ca}_2(\text{Mg}, \text{Fe})_5\text{Si}_8\text{O}_{22}(\text{OH})_2$ ) occurring between the two states. The color of actinolite ranges from white to green and is the result of the increase in iron content (from tremolite towards ferroactinolite) within this series. The crystalline structure of this series is prismatic, with tremolite often bladed, frequently in radiating columnar aggregates, and in some cases in silky fibers (Klein and Hurlbut, 1985). In high temperature metamorphic and in igneous occurrences, another complete series exists from this tremolite-actinolite-ferroactinolite series to hornblende due to a wide range of aluminum (Al) substitution for silica (Si). In lower-temperature occurrences, tremolite (or actinolite) may coexist with hornblende (Klein and Hurlbut, 1985).

Secondary mineralization of joints and veins within the diabase that intruded into the Newark Basin include analcime, albite, potassium feldspar, calcite, gypsum, quartz, chlorite, epidote, and pyrite (Herman 2005). Joints and veins mapped in the central part of the Newark Basin strike between about N36°E and N50°E, subparallel to the basin’s northwestern, faulted margin. A second joint set strikes about N16° to N30°E subparallel to intra-basin faults and regional dikes in Pennsylvania. Veins in Triassic-Jurassic strata strike NNE-SSW and mostly dip steeply at 70° to 80°E. A third set varies from about N5°W to N10°E and occurs more commonly in the eastern part of the basin in association with early Jurassic rocks (Herman 2005). The majority of veins mapped in the diabase at the Rock Hill Quarry align with an average strike of N45°E and dip of 78°SE.

The USGS mapped 41 NOA localities in Pennsylvania including two (2) consisting of York Haven-type diabase (Van Gosen 2006). The first site, located 110 miles southwest of the Rock Hill Quarry, contains tremolite asbestos. The second site, located 31 miles southwest of the Site, contains crocidolite asbestos (Van Gosen 2006).

The diabase at the Site has not undergone metamorphism upon which asbestos could materialize from the primary minerals of the igneous rock. Testing at the Site indicates that detectable concentrations of asbestos are not present in the diabase rock and rarely in the infrequent actinolite mineral veins. Presentation and discussion of the results from sampling completed at the Site in 2018 and 2019 are provided in the following report sections.

## **4.0 SAMPLE COLLECTION AND ANALYSIS**

Within the 55-acre (0.09 square-mile) permitted area, the Rock Hill Quarry is indicated to occur in one (1) rock type with little geologic variability. Characterization and sample collection based upon this geology were proposed in the April 3, 2019 QGSSP and the April 25, 2019 Response to PADEP and East Rockhill Township Comment letter.

### **4.1 Surface Water Sampling**

Seven (7) surface water samples were collected by EARTHRES and split with PADEP on April 18, 2019. Sample collection proceeded from downgradient to upgradient to minimize potential for sample cross-contamination. The water sampling locations are shown on Figure 1, Appendix A, and include in order of sampling sequence:

- 1) NPDES Discharge;
- 2) Sediment Trap 2;
- 3) Sediment Basin 2;
- 4) Sediment Basin 1;
- 5) Quarry Pit Lake;
- 6) Sediment Trap 1; and
- 7) Sediment Trap 3.

The water samples were collected as grab samples using a telescopic pole sampler containing an attached sampling cup. The sampler was washed with Alconox® and rinsed with distilled water initially and between each sampling location. The sampler cup was inserted into the water at each location in an inverted position until about half-way to the bottom, then inverted to collect a representative sample. Upon retrieval of the sample cup, the sampled water was decanted into a clean laboratory-provided one-liter plastic bottle. To provide the split samples between EARTHRES and PADEP, a portion of each cup was distributed to separate sample bottles. The samples collected by EARTHRES were placed on ice and transmitted under chain-of-custody to RJ Lee Group, Inc., in Monroeville, Pennsylvania for analysis per EPA Method 100.2 600/R-94-134 for fibers >10µm in length with a minimum aspect ratio of 3:1. The water samples were further analyzed by the RJ Lee Group, Inc., per EPA Method 100.1 600/4-83-043 modified for fibers > 5µm in length with a minimum aspect ratio of 3:1. Sample results are provided on Table 1 in Appendix B. Laboratory sheets are included in Appendix F.

## 4.2 Aggregate Stockpile Sampling

Per the PADEP’s letter of December 19, 2018, aggregate stockpile sampling was to include “...one test per 1,000 tons of material or any fraction thereof...” Hanson mapped the existing aggregate stockpiles and determined the following tonnages and proposed samples as indicated in the below table. The relative locations of the various stockpiles in the aggregate stockpile area are indicated by quadrant in the below table. The aggregate stockpiles sampled are identified on Figure 2, Appendix A.

### 2019 Aggregate Stockpile Sampling

Stone Type	Location	Tonnage	Proposed Samples
2B Stone	Northwest	9,946	10
1B Stone Pile	Northeast	1,695	2
2A Stone Pile	East	1,585	2
Screenings	South	1,983	2

EARTHRES collected aggregate samples on April 18, 2019, as material composites using the American Association of State Highway and Transportation Officials (AASHTO) R90 Test Method (AASHTO 2018). To accomplish the sampling per AASHTO R90, the 2B stockpile was surveyed and marked into 10 radial sections for subsequent collection of 10 samples. Samples from the remaining stockpiles were collected from opposite sides of the piles. The exact sample locations were determined and marked in the field at the time of sampling and were collected from stockpile locations not previously sampled. The samples were mixed and quartered per AASHTO T248 (AASHTO 2014). One-quarter was chosen for sampling and the sample was split with PADEP. Another quarter of each sample was retained for future reference.

Upon reduction of the sample sizes per AASHTO T248, the samples were transmitted to the laboratory in one-gallon sealed plastic bags under chain-of-custody to RJ Lee Group, Inc., in Monroeville, Pennsylvania for microscopic analysis and Polarized Light Microscopy (PLM) via EPA Method 600/R-93/116. Sample results are provided on Table 2 in Appendix B. Laboratory data sheets are included in Appendix F.

## 4.3 Rock Coring and Sampling

Four (4) rock cores were advanced in the planned mining area to an elevation of approximately 585 feet above MSL, which is approximately equivalent to the current water level in the quarry pit. On April 22, 2019, EARTHRES and Hanson professional geologists mapped veins on the bench faces of the proposed coring area. The purpose of the mapping was to select coring locations that would intercept the maximum number of mineral veins. The coring locations are shown on Figure



3, Appendix A. Based on the orientation of the mapped features, the cores were drilled on an approximately 30-degree angle from vertical with an azimuth of approximately N45W. This azimuth is projected perpendicular to the geologic structure (ridgeline trend and geological strike) and was chosen to intercept as many potential features as practical. A summary of the bench mapping is provided in our April 25, 2019 *Response to PADEP and East Rockhill Township Comments* letter in Appendix C.

The exact core locations were marked in the field at the time of drilling. From May 1 to May 15, 2019, an EARTHRES professional geologist oversaw the coring at the four (4) chosen locations, which included two (2) core borings on Bench 1 (CB-1 and CB-2) and two (2) core borings on Bench 2 (CB-3 and CB-4). Continuous wetting of the core was accomplished during drilling to abate dust generation. Retrieved cores were boxed, labeled, and stored on-site for logging and analysis.

A professional geologist visually logged the cores to identify and record the following:

- 1) Geological description;
- 2) Mineralogy and grain size;
- 3) The percentage of core recovered;
- 4) Bedding observations;
- 5) Fracture occurrence;
- 6) Mineral veining; and,
- 7) Other pertinent geological features.

Review and sampling of the core boxes for CB-1, CB-2, CB-3, and CB-4 was completed by EARTHRES and PADEP professional geologists on May 10, 2019, and May 23, 2019. The rock cores were examined visually for the features listed above. Thirteen rock core samples from the four (4) borings were selected, labeled, and split for sampling by EARTHRES and PADEP. Each rock core specimen was first cut in half using a wet core saw. One-half of the core was returned to the core box for retention. The remaining portion of the core was split again to provide samples for laboratory analysis for Hanson and PADEP.

Nine (9) of the rock core samples presented with varying mineralogy including elongated and prismatic crystal habits, indicative of the mineral actinolite. The remaining four (4) samples included diabase rock, one (1) from each core boring.

The samples were sent to RJ Lee Group, Inc., in Monroeville, Pennsylvania under chain-of-custody for microscopic and PLM analysis via EPA Method 600/R-93/116. Sample results are provided on Table 3 in Appendix B. Laboratory data sheets are included in Appendix F.



#### 4.4 Rock Core Vein Volume Determination

EARTHRES Geologists were on-site September 11, 2019, to measure mineral veining in the four (4) core borings. Vein volumes were calculated based on the measurements made of the following dimensions in CB-1 through CB-4:

- Vein Thickness =  $T$  (inches)
- Length across core =  $L$  (inches)
- Width (or Depth of Core) =  $W$  (inches)

Figure 6 in Appendix A illustrates each of the measured core dimensions. The resulting measurements are provided in Appendix E. The veins appear in the core at various angles and the resulting shape of each vein is an oval having an area described by an ellipse. The vein volume was calculated using the area formula for an ellipse multiplied by the measured vein thickness. Measurements (in inches) for each core are provided in Appendix E. The formulas used for vein volume calculation are:

- Ellipse Area =  $A = \pi \frac{1}{2} L \frac{1}{2} W$
- Volume =  $V = \text{Ellipse Area} \times \text{Vein Thickness } (T) \times (\text{cu. in. to cu. ft. conversion})$

The vein volumes were calculated and totaled in the attached spreadsheets (Appendix E) for each vein, in each core. The percentage of actinolite mineral veining per core was calculated by dividing vein volumes by the total core volume. The percentage of asbestos in each core was calculated by multiplying the percent vein volumes by the percent of the asbestos in the vein determined by the NOA testing results. The results are summarized in Table 5 in Appendix B. In accordance with convention, laboratory non-detections of asbestos were considered to be one-half of the detection limit, or 0.05%, for the purpose of producing an average concentration in the rock cores<sup>1</sup>. However, this assumes that there is asbestos where laboratory methods do not detect asbestos, which produces an exaggerated high concentration of asbestos in the rock cores (and other non-detect samples). The diabase matrix in the cores was considered to be absent of NOA in agreement with field, literature, and confirmatory laboratory results.

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<sup>1</sup> Due to numerous non-detections in the collected data, one-half of the detection limit was used for data averaging in accordance with general industry practice. The TEM results additionally provide justification for using one-half of the detection limit and further indicate that using 0.05% provides a conservatively high result.

#### **4.5 Boulder Field Mapping and Sampling**

Boulder fields exist on the southern and eastern sides of the quarry pit. The boulders are indicated to have been historically mined from the quarry. Thirty-three (33) mineral veins were identified after examination of hundreds of boulders in the boulder fields. The identification was completed by EARTHRES and PADEP professional geologists on May 1, 2019. Twenty-five (25) samples were extracted (1 from each boulder) on May 7, May 9, and May 13, 2019 (Boulder locations are provided on Figure 4, Appendix A). Eight (8) mineral veins could not be extracted for analysis due to boulder hardness. The samples were sent to RJ Lee Group, Inc., in Monroeville, Pennsylvania under chain-of-custody for microscopic and PLM analysis via EPA Method 600/R-93/116. Sample results are provided on Table 4 in Appendix B. Laboratory data sheets are included in Appendix F.

#### **4.6 Hand Sample Collection and Analysis**

During reconnaissance of the southeastern boulder field by PADEP and EARTHRES personnel on May 1, 2019, Hand Sample #1 was collected from the ground in the boulder field. Hand Sample #2 was collected below Bench 1. Hand Sample #3 was collected from the face of Bench 1 from Vein #7, which was primarily comprised of green-colored, prismatic actinolite. Sample locations are provided on Figure 3 in Appendix A. The samples were collected as requested by PADEP and as agreed to in the field. The hand samples were split with a wet core saw to provide samples for testing for Hanson and PADEP. The samples were sent to RJ Lee Group, Inc., in Monroeville, Pennsylvania under chain-of-custody for microscopic and PLM analysis via EPA Method 600/R-93/116. Sample results are provided on Table 3 in Appendix B. Laboratory data sheets are included in Appendix F.

## **5.0 INVESTIGATION RESULTS**

Collected samples were sent to RJ Lee Group, Inc., in Monroeville, Pennsylvania for microscopic analysis via PLM and selected confirmation with Transmission Electron Microscopy (TEM) for weight percentage and mineral identification. The sampling results are presented in the following subsections below and are provided on Tables 1 through 7 contained in Appendix B.

### **5.1 Surface Water Sampling**

Results for the April 18, 2019 surface water sampling indicated non-detect concentration for NOA >10  $\mu\text{m}$  in length in compliance with the EPA drinking water standard of 7 MFL. RJ Lee Group, Inc., performed additional analysis on the samples to assess the presence of fibers >5  $\mu\text{m}$  in length. Sample #1 (NPDES Outfall) had one (1) amphibole fiber >5  $\mu\text{m}$  in length. The result equals 0.2 MFL. The remaining samples continued to be non-detect for NOA. The data are summarized in Table 1 in Appendix B. Laboratory reports are provided in Appendix F. Photographs documenting the water sampling are included in Appendix G of this report.

### **5.2 Aggregate Stockpile Sampling**

Results for the aggregate stockpile sampling were non-detect via PLM analysis for NOA in 13 of the 16 samples analyzed. Three (3) sample results (Aggregate #3, Aggregate #5, and Aggregate #8) indicated trace concentrations of asbestos at less than the laboratory detection limit of <0.10%. The data are summarized on Table 2 in Appendix B.

The above samples indicated to have trace concentrations via PLM were subsequently analyzed by TEM via EPA Method 600/R-93/116. The TEM results indicated non-detectable NOA in samples Aggregate #3 (<0.00003 %), Aggregate #5 (<0.00004 %), and Aggregate #8 (<0.00006 %) at significantly lower detection limits than the PLM results.

RJ Lee Group, Inc., performed TEM analysis via EPA Method 600/R-93/116 on three (3) additional stockpile samples, Aggregate #11, Aggregate #13, and Aggregate #15, to verify the non-detect PLM results. The TEM sample results for Aggregate #11, Aggregate #13, and Aggregate #15 indicated 0.0048%, 0.05%, and 0.016% NOA by weight, respectively. Although NOA was detected in these samples, the concentrations were all lower than the PLM detection limit. The highest detection was found in the Aggregate #13 sample at 0.05%.

The trace and confirmed detections of NOA are much lower than 1.0% federal limit<sup>2</sup> enforced by PADEP and the California Air Resources Board (CARB) Air Toxic Control Measures (ATCM) of 0.25% NOA for surface applications (California, 17 CCR Section 93106). The data are summarized

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<sup>2</sup> (a) 40 CFR Part 763.83; (b) 40 CFR Part 61.141; and (c) 15 U.S. Code Chapter 53 Section 2642.

on Table 2 in Appendix B. Laboratory reports are provided in Appendix F. Photographs documenting the sampling are included in Appendix G of this report.

### **5.3 Rock Core Vein Sampling Results**

Laboratory results from the rock core sampling found trace concentrations of NOA in vein samples greater than the 0.10% method quantitation limit in Samples CB-1 #1 (0.20%), CB-2 #6 (0.1%), and CB-1 DB-1 (0.1 %). The results are below the 1.0% federal limit enforced by PADEP and the CARB Surfacing ATCM 0.25% NOA limit.

The initial result for the diabase sample from Core Boring #1 (DB-1) indicated actinolite at the method detection limit of 0.1%. Based upon the literature, diabase mineralogy, and field observations, the NOA detection in DB-1 is anomalous and was further assessed through core log review (Appendix H) and core vein assessment (Section 4.4 and Appendix E). The results show that Sample DB-1 was collected over a vein interval that was mapped and included in the core vein volume assessment. The mineral veining present over the DB-1 interval is shown in pictures provided in Appendix G. The data confirms that the DB-1 sample is not representative of the diabase matrix. However, to confirm the initial result, a duplicate core sample from the remaining portion of DB-1 was collected from the Site on October 17, 2019. The sample was split with a diamond saw at EARTHRES and shipped to RJ Lee Group, Inc., in Monroeville, Pennsylvania under chain-of-custody for PLM and TEM analysis via EPA Method 600/R-93/116. The DB-1 duplicate sample results are shown in Table 3, Appendix B. The results show NOA at 0.6% in the duplicate sample via PLM, and non-detectable concentrations of NOA via TEM (at <000004% and <0.000031% for two sample aliquots tested).

A copy of the data summary table (Table 3) and laboratory report is provided in Appendix B and Appendix F of this report, respectively. Photographs of the core drilling and sampling are included in Appendix G of this report. Core boring logs are provided in Appendix H.

Vein volume measurements and NOA percent determination of the core volumes were completed as described in Section 4.4. To be conservative, the highest NOA result from Sample DB-1 (0.6%) was used in the analysis. Averaging vein measurements from the four (4) cores drilled indicates 0.43% of the drilled rock volume contains actinolite-bearing veins. Multiplying the vein percentage with the PLM results indicates an average of 0.016% of NOA in the cored rock volume (See Table 5 Appendix B). Additionally, the results reported in Table 5 are targeted samples collected from suspect mineral veining, which over exaggerates the actual NOA concentration at the Site. The results indicate that NOA in the cored rock volume is over 62 times below the 1.0% federal limit enforced by PADEP and more than 15 times lower than the 0.25% CARB Surfacing ATCM NOA limit.

#### **5.4 Boulder Field Sampling**

Results of the twenty-five (25) boulder vein samples indicated no detections of NOA at the laboratory detection limit (<0.10). Seven (7) of the samples analyzed indicated trace concentrations of NOA below the laboratory detection limit. These samples represent targeted mineral vein samples where NOA would be most likely to occur. The data shows that NOA in the sampled boulder veins is either non-detectable or in trace concentration below the method detection limit. The results indicate NOA is significantly below the 1.0% federal limit enforced by PADEP lower and is lower than the 0.25% CARB Surfacing ATCM NOA limit. The data are summarized in Table 4 in Appendix B. Laboratory reports are provided in Appendix F. Photographs of the boulders and extracted samples are included in Appendix G of this report.

#### **5.5 Hand Sample Results**

The PLM testing results for Hand Samples #1 and #2 showed non-detectable concentrations of NOA. The PLM result from Hand Sample #3 (i.e., Vein #7) indicated the presence of NOA at the laboratory detection limit of 0.10%. The data are summarized in Table 3 in Appendix B. Laboratory reports are provided in Appendix F. Photographs of the hand samples are included in Appendix G of this report.

Core Boring #1 was selected to intercept mineral veins identified on the lower bench, specifically Veins #1, #3, #4 and #7 (see the April 25, 2019 QGSSP comment response letter in Appendix C). In review of the core logs (Appendix H), and the Vein #7 description provided in the QGSSP comment response letter, it is indicated that the CB-1 #1 sample is from mineral Vein #7.

## **6.0 SUMMARY AND CONCLUSIONS**

Current (2019) and previous (2018) site investigations included the sampling and collection of a combined 102 samples from across the Site (90 samples of rock and 12 surface water samples) that were submitted for laboratory testing for NOA via PLM and TEM analyses. Overall, 111 analyses were completed as part of site efforts. The results of the investigations are further described below.

### **6.1 Prior Investigation Results**

Prior investigation, qualitative geological surveying, and sampling conducted at the Site during 2018 included the collection and analysis of thirty-three (33) rock samples including: five (5) mineral vein rock samples, 21 drill hole cutting samples, five (5) aggregate stockpile samples, and two (2) crusher run (fines) samples. All samples yielded non-detectable results for NOA, except for one (1) biased rock sample that found asbestiform actinolite in a mineral vein (0.25 % NOA via PLM and 0.8% NOA via TEM from a hand sample collected on November 9, 2018, see Appendix D).

Five (5) surface water samples were collected from the Site on December 20, 2018, and were analyzed via EPA Methods 100.1 and 100.2 for asbestos fibers  $\geq 0.5 \mu\text{m}$  and fibers  $>10 \mu\text{m}$ , respectively. The results were non-detectable for NOA fibers  $>10 \mu\text{m}$  (EPA Drinking Water Limit = 7 million fibers/liter). The results for the water samples considering NOA fibers  $\geq 0.5 \mu\text{m}$  and  $< 10 \mu\text{m}$  indicated the presence of NOA in Sample #1 (1 fiber), Sample #2 (3 fibers), and Sample #4 (3 fibers). However, there is no corresponding regulatory limit for NOA detected in the  $\geq 0.5 \mu\text{m}$  and  $< 10 \mu\text{m}$  size range. Results of previous investigation are documented in the reports included chronologically in Appendix D.

### **6.2 Current Investigation Results**

Water Sampling Results: The surface water sampling results via EPA method 100.2 yielded non-detectable concentrations for NOA fibers  $>10 \mu\text{m}$ . Re-analysis of the water samples via a modified EPA Method 100.1 found one (1) fiber  $> 5\mu\text{m}$  in length in Sample #1 (NPDES Outfall). The remaining samples had non-detectable NOA  $> 5\mu\text{m}$  in length. The EPA drinking water standard is 7 MFL  $>10 \mu\text{m}$  in length; all samples fall below the EPA standard of 7 MFL.

Aggregate Sampling Results: The laboratory analyses of the aggregate samples indicated non-detectable concentrations ( $< 0.10\%$ ) of NOA in 13 of the 16 samples analyzed. Trace concentrations of NOA at less than the detection limit ( $< 0.10\%$ ) were found in three (3) samples: #3, #5, and #8 from the 2B aggregate stockpile. TEM confirmation analysis of the three (3) samples revealed non-detectable concentrations of NOA.



Additional TEM analysis via EPA Method 600/R-93/116 was completed on stockpile samples, Aggregate #11, Aggregate #13, and Aggregate #15, to verify the non-detect PLM results. The TEM sample results for Aggregate #11, Aggregate #13, and Aggregate #15 indicated, 0.0048%, 0.05%, and 0.016% NOA by weight, respectively. Although NOA was detected in these samples, the concentrations were all lower than the PLM detection limit. The highest detection was found in the Aggregate #13 sample at 0.05%.

Boulder Sampling Results: Results of the twenty-five (25) boulder vein samples indicated no detections of NOA at the laboratory detection limit (<0.10%). Seven (7) of the samples analyzed indicated trace concentrations of NOA below the laboratory detection limit: RH#2, RH#7, RH#11, RH#12, RH#14, RH#26, and RH#29.

Core Sampling Results: The laboratory PLM analysis of core samples indicate 10 of the 13 samples are non-detect (< 0.10%) for NOA. The three (3) detections include CB-1 #1 at 0.20%, CB-2 #6 at 0.10 %, and DB-1 at 0.10%. Based upon the literature, diabase mineralogy, and field observations, the NOA detection in DB-1 is anomalous and was further assessed through core log review (Appendix H) and core vein assessment (Section 4.4 and Appendix E). The results show that Sample DB-1 was collected over a vein interval that was mapped and included in the core vein volume assessment. The mineral veining present over the DB-1 interval is shown in pictures provided in Appendix G. The data confirms that the DB-1 sample is not representative of the diabase matrix. However, to confirm the initial result, a duplicate core sample from the remaining portion of DB-1 was submitted for PLM and TEM analysis. Results indicate the presence of NOA at 0.6% in the duplicate sample via PLM and non-detectable concentrations of NOA via TEM (at <000004% and <0.000031% for two sample aliquots tested).

Core Vein Volume Assessment: Vein volume measurements and NOA percent determination of the core volumes were completed as described in Section 4.4. To be conservative, the highest NOA result (0.6%) from the DB-1 Duplicate sample was used in the analysis. Averaging vein measurements from the four (4) cores drilled at Rock Hill indicates 0.43% of the drilled rock volume contains NOA veins. Multiplying the vein percentage with the PLM results indicates an average of 0.016% of NOA in the cored rock volume (See Table 5 in Appendix B). It should be noted that this average is an over estimate of NOA in the diabase as the core borings were specifically sited to intersect mineral veins.

Hand Sample Results: The laboratory analysis of the hand samples indicated non-detectable concentrations (< 0.10%) of NOA in two (2) of the three (3) samples analyzed. A concentration of NOA at the detection limit of 0.10% was found in the Vein #7 sample, which was comprised of the mineral actinolite.

### 6.3 Conclusions

The laboratory results from the 65 analyses, completed on 57 rock samples collected in 2019, show that 57 analyses were non-detect for NOA (87.7%) at the method detection limit, ten (10) analyses had trace NOA below the detection limit (15.4%), and eight (8) samples had detections of NOA (12.3%; See Table 6 in Appendix B and the data tables in Appendix E). Of the eight (8) samples that had detections, three (3) were composite samples and five (5) were target samples. Additionally, 43 of the sample analyses for the 2019 investigation are from targeted samples collected specifically where mineral veining occurred and where suspected NOA minerals would occur if present. The results from different media sampled across the Site (including aggregate, rock cores, boulders, and hand samples) during the investigations completed in 2019 indicate the absence of NOA or its very limited presence in trace concentrations in the rock.

The overall 2019 analyses average of NOA is provided in Table 6 in Appendix B and is indicated to be 0.058% (N=65). However, the average percentage calculated is higher than is actually present at the Site, as many samples were non-detect at the PLM detection limit of 0.1%. Accordingly, one-half (½) of the detection limit was used (0.05%) for non-detect samples, which is numerically close to the averaged results. The TEM data shows that NOA, when present, is at a lower level indicated by the TEM average of 0.01% (N=7).

Table 7, Appendix B includes all rock samples collected at the Site in 2018 and 2019. The laboratory results from the 99 analyses completed on 90 rock samples collected, show that 89 analyses were non-detect for NOA (89.9%) at the method detection limit, ten (10) analyses had trace NOA below the detection limit (10.1%), and ten (10) samples had detections of NOA (10.1%). Similar to the 2019 data, the average for NOA in rock samples collected over the course of 2018 and 2019 is indicated to be 0.076% (N=99) as shown in Table 7. The total 2018-2019 site average is essentially the same as the 2019 data due to the detection limits for the samples, as all 2018 samples (N=33) were non-detect (at <0.1% or <0.25%) except for one (1) result. When conservatively considering the 2018 TEM detection of 0.8% NOA from the hand sample collected on November 9, 2018, TEM data average increases to 0.10% (N=8, Table 7). However, the singular 2018 detection is from a biased targeted sample and is not representative of the materials to be mined from the site.

The sampling at the Site provided a bias towards NOA detection as approximately one-half of all rock analyses (N=49) were completed on targeted samples. However, the veins found in the rock cores represent only 0.43% of the cored rock by volume. When further considering the NOA average found over the core volumes, the percent asbestos present in the cored rock mass is



0.016% as shown in Table 5 in Appendix B. It should be noted that this average is an over estimate of NOA in the diabase, as the core borings were specifically sited to intersect mineral veins.

Overall the Site results indicated NOA concentration significantly below the 1.0% federal limit enforced by PADEP. No analyses of any 2018 or 2019 samples were equal to or in excess of the federal limit. Additionally, the average result for all samples is less than the 0.25% CARB Surfacing ATCM NOA limit.

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## Appendix A - Figures




# Rock Hill Quarry

Figure 1  
Surface Water Sampling Locations


## Legend


 Surface water Sample Location


Sediment Trap 2  NPDES Outfall

 Sediment Basin 2

Sediment Basin 1 

Quarry Pit 

Sediment Trap 3 

Sediment Trap 1 

Google Earth

© 2018 Google

1000 ft




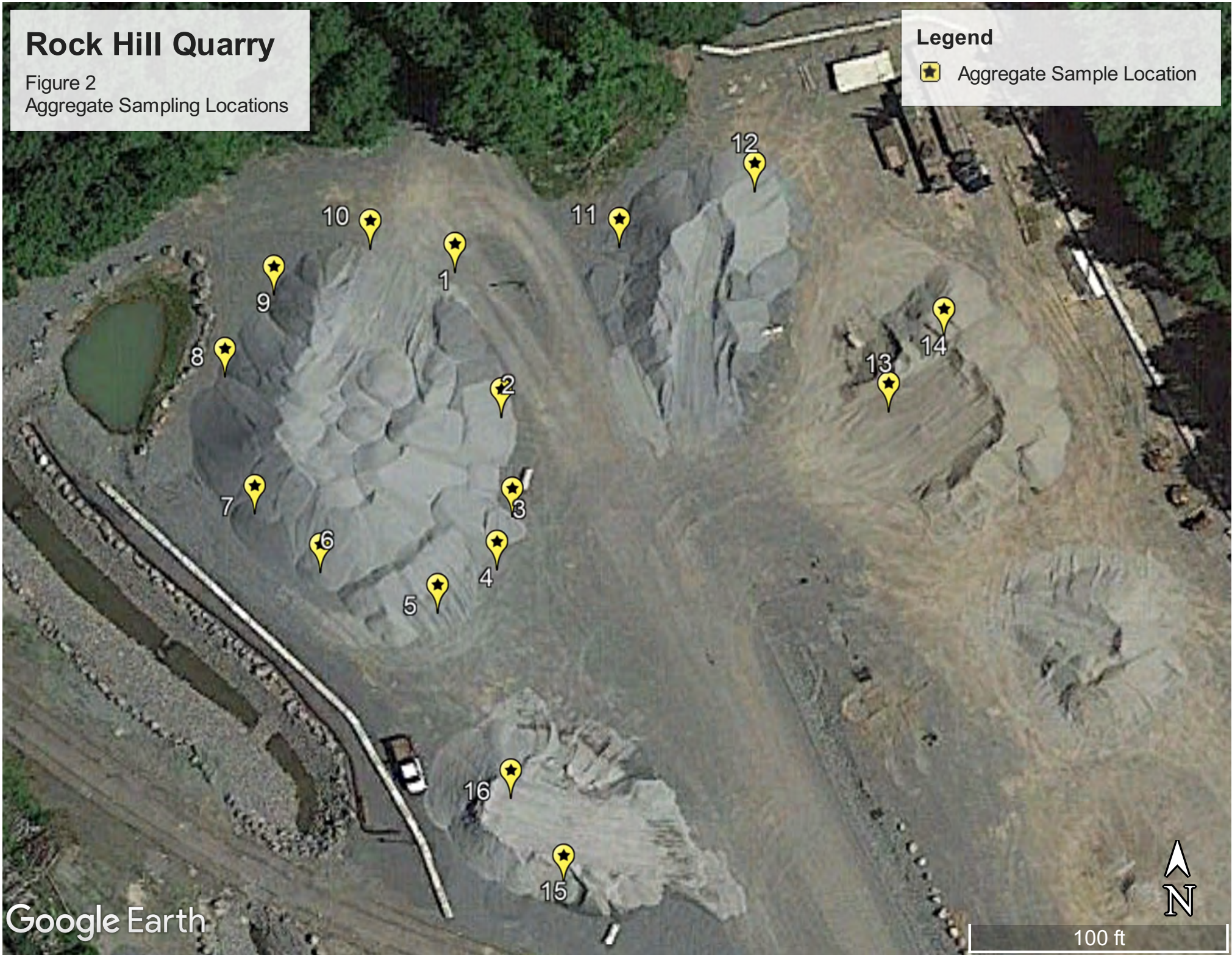


# Rock Hill Quarry

Figure 2  
Aggregate Sampling Locations

## Legend

 Aggregate Sample Location



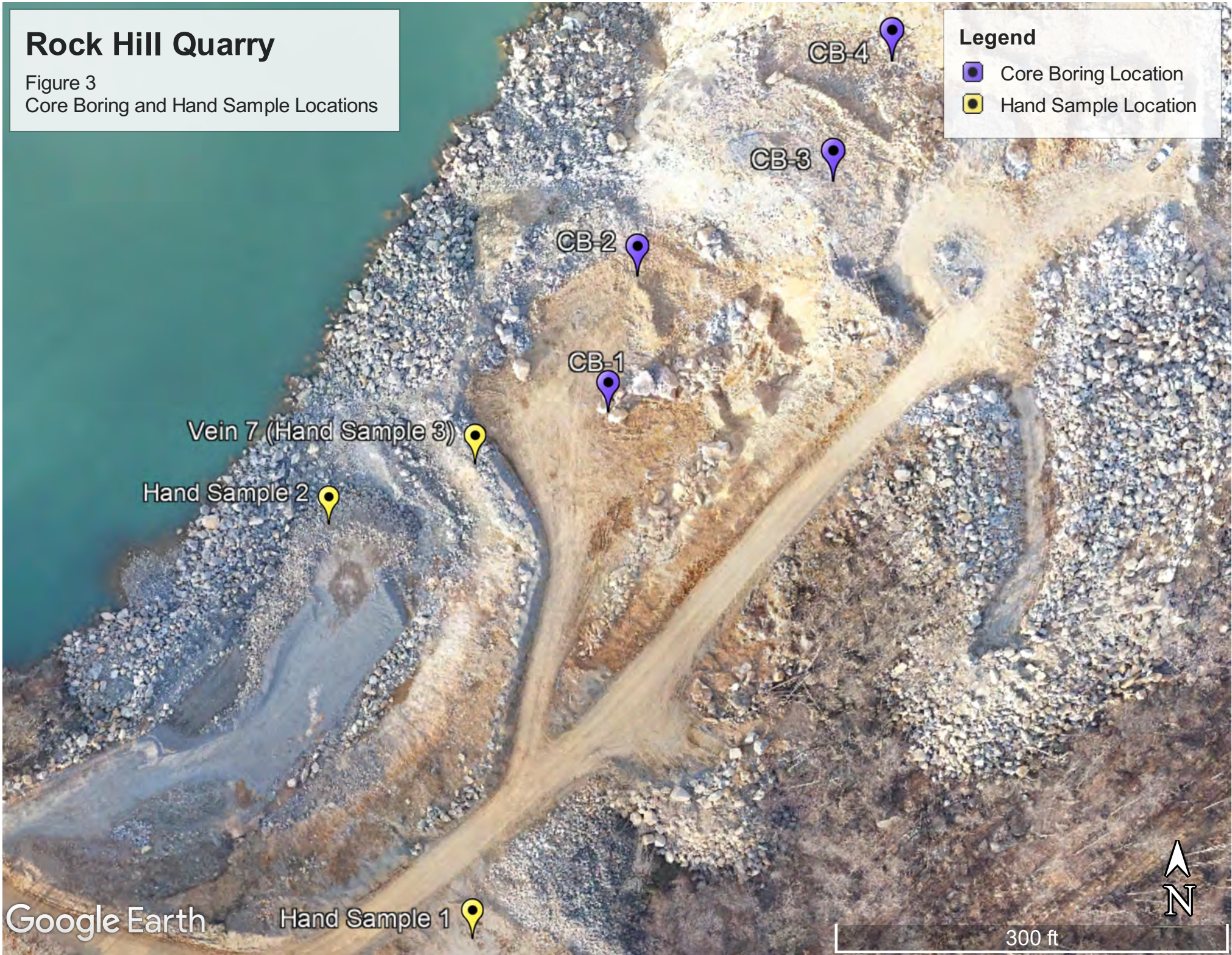


# Rock Hill Quarry

Figure 3  
Core Boring and Hand Sample Locations

**Legend**

- Core Boring Location
- Hand Sample Location





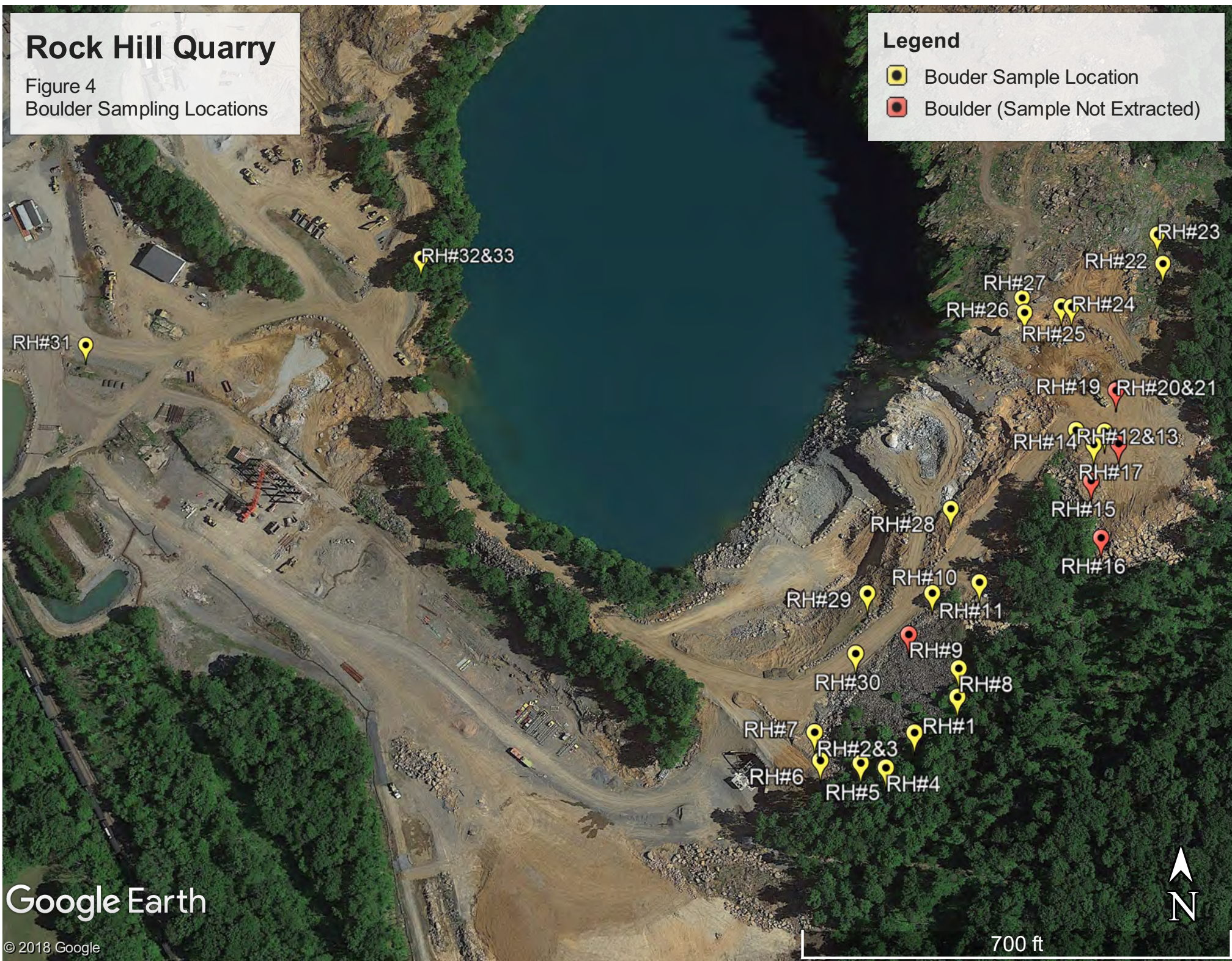


# Rock Hill Quarry

Figure 4  
Boulder Sampling Locations

**Legend**

-  Boulder Sample Location
-  Boulder (Sample Not Extracted)







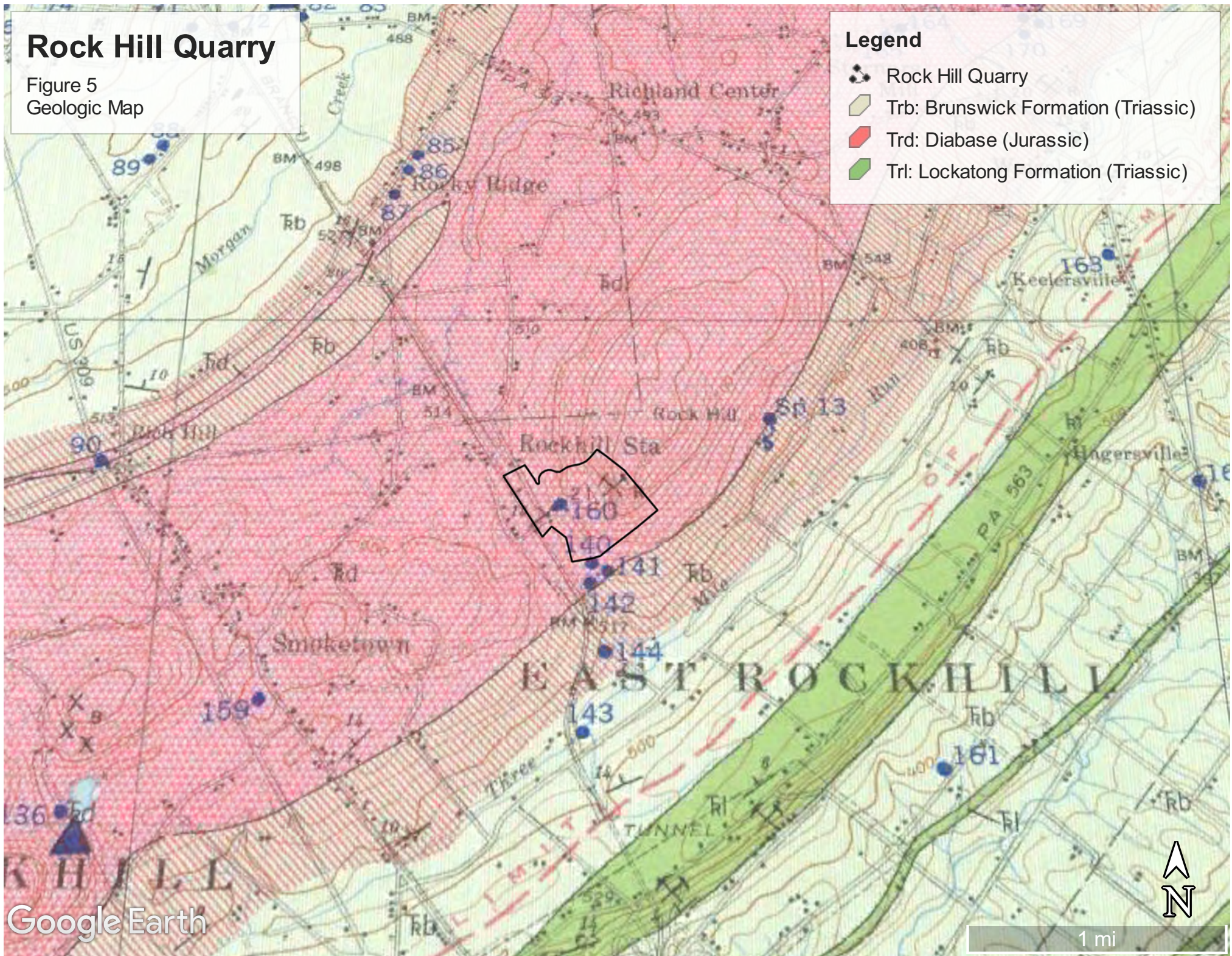


# Rock Hill Quarry

Figure 5  
Geologic Map

## Legend

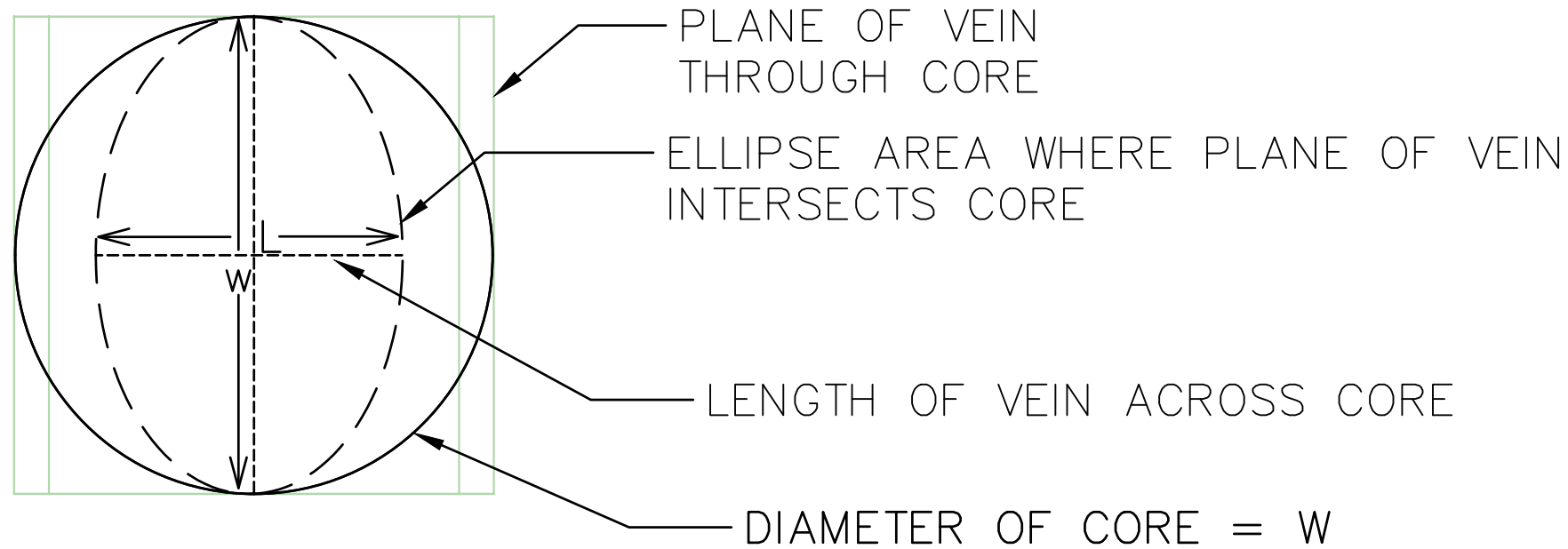
-  Rock Hill Quarry
-  Trb: Brunswick Formation (Triassic)
-  Trd: Diabase (Jurassic)
-  Trl: Lockatong Formation (Triassic)



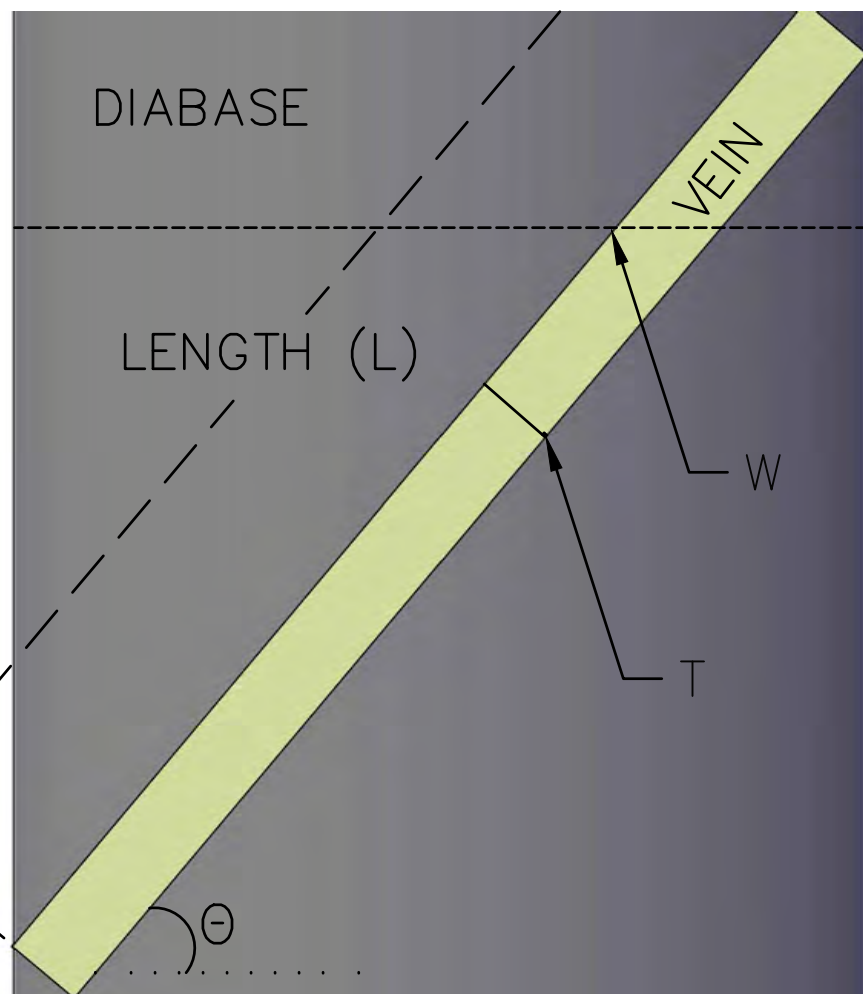


F:\PROJECTS\Hanson\061003.051 Rock Hill Quarry\CAD\Drawings\Rev 0\Core - Veining 3D rev1.dwg Layout: B SIZE LAND User: JHaklar 10/07/2019 12:48

# CORE PLAN VIEW

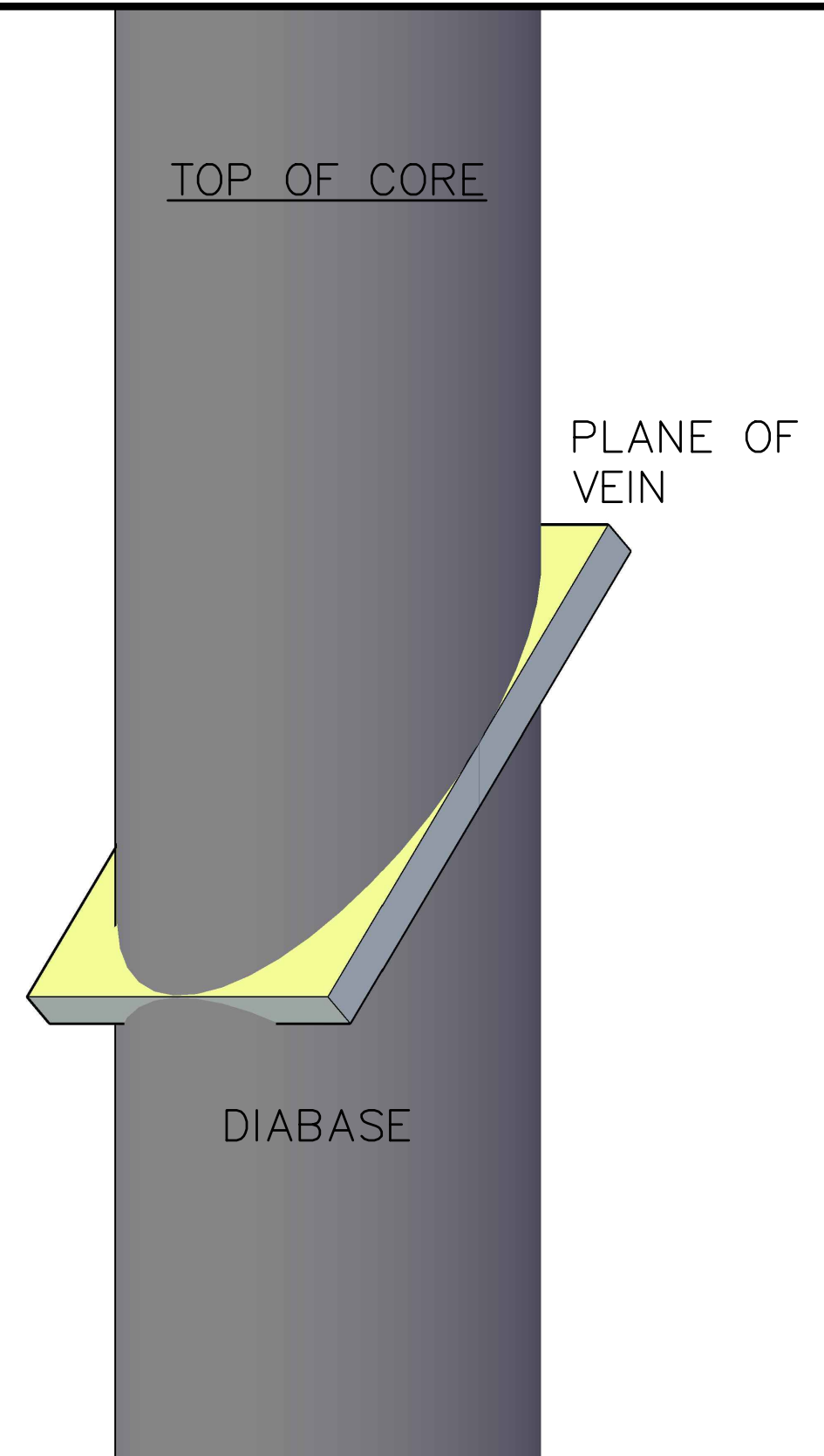


# PROFILE VIEW




$$V = \frac{1}{2}W \times \frac{1}{2}L \times \text{PI} \times T$$

V = VOLUME OF ELLIPSE  
 W = DIAMETER OF CORE  
 L = MEASURE LENGTH OF VEIN ACROSS CORE  
 Pi = 3.1415926.....  
 T = VEIN THICKNESS



**FIGURE 6**  
 VEIN MEASUREMENT DIAGRAM

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 Morgantown, WV 26505

DRAWN BY: JPH	CHECKED BY: LFV
DATE: 10/07/19	PROJECT NO: 061003.051
DRAWING SCALE: NOT TO SCALE	

HANSON AGGREGATES PENNSYLVANIA, LLC  
 ROCK HILL QUARRY  
 2055 NORTH ROCKHILL ROAD  
 EAST ROCKHILL TOWNSHIP, BUCKS COUNTY, PA

**Appendix B - Tables**

**Table 1**  
**Summarized Surface Water Analytical Results - April 2019**  
**Hanson Aggregates Pennsylvania, LLC Rock Hill Quarry**

Field Identification		NPDES Outfall	Sed. Trap 2	Sed. Basin 2	Sed. Basin 1	Quarry Pit	Sed. Trap 1	Sed. Trap 3
Matrix:		Water	Water	Water	Water	Water	Water	Water
Sample Date:		4/18/2019	4/18/2019	4/18/2019	4/18/2019	4/18/2019	4/18/2019	4/18/2019
Parameter (MFL - Million Fibers per Liter)	US EPA Safe Drinking Water Standard							
<b>EPA Method 100.2 600/R-94-134, Fibers greater than 10 µm in length</b>								
Amphibole Asbestos Structures	NS	0	0	0	0	0	0	0
Concentration (MFL)	7 MFL	<0.2	<1.0	<1.0	<1.0	<0.2	<1.0	<1.0
<b>EPA Method 100.1 600/4-83-043, Fibers greater than 5 µm in length</b>								
Amphibole Asbestos Structures	NS	1	0	0	0	0	0	0
Concentration (MFL)	NS	0.2	<0.9	<0.3	<0.2	<0.2	<1.0	<0.6

Notes:

- EPA maximum contaminant level (MCL) for asbestos in drinking water is 7 MFL (million fibers per liter > 10 µm in length)
- Less than (<) indicates that asbestos was not detected at the analytical detection limit (e.g. <1.0 = a detection limit of 1 MFL)
- EPA Method 100.2 600/R-94-134 for fibers > 10 microns in length with a minimum aspect ratio of 3:1
- EPA Method 100.1 600/4-83-043 modified for fibers > 5 microns in length with a minimum aspect ratio of 3:1
- NS: No Standard

**Table 2**  
**Summarized Aggregate Analytical Results - April 18, 2019**  
**Hanson Aggregates Pennsylvania, LLC Rock Hill Quarry**

Field Identification	1	2	3		4	5		6	7	8	
Analysis	PLM	PLM	PLM	TEM	PLM	PLM	TEM	PLM	PLM	PLM	TEM
<b>Parameter</b>											
Asbestos Detected (%)	ND	ND	<0.1 TR	<0.00003	ND	<0.1 AC	<0.00004	ND	ND	<0.1AC <0.1TR	<0.00006
Field Identification	9	10	11		12	13		14	15		16
Analysis	PLM	PLM	PLM	TEM	PLM	PLM	TEM	PLM	PLM	TEM	PLM
<b>Parameter</b>											
Asbestos Detected (%)	ND	ND	ND	0.0048	ND	ND	0.05	ND	ND	0.016	ND

Notes:

PLM Analytical Method EPA 600/R-93-116

TEM Weight Percent  $\geq 5\mu\text{m}$  per ASTM D-5756 Standard Test Method

ND: not detected above method detection limit. The PLM detection limit is  $1/1000 = 0.1\%$ ; ND =  $<0.1\%$ .

ND for TEM results are indicated by "<" at the detection limit listed.

For PLM analysis <0.1 TR and/or <0.1 AC indicates asbestos was identified in the sample, but the concentration was less than the method detection limit of 0.1%

TR: Tremolite

AC: Actinolite

**Table 3**  
**Summarized Core Boring & Hand Sample Analytical Results - May 23, 2019**  
**Hanson Aggregates Pennsylvania, LLC Rock Hill Quarry**

Field Identification	<b>CB-1 #1</b>	<b>CB-1 #3</b>	<b>CB-2 #4</b>	<b>CB-2 #5</b>	<b>CB-2 #6</b>	<b>CB-3 #7</b>
Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
<b>Parameter</b>						
Asbestos Detected (%)	0.20 AC	ND	ND	ND	0.10 TR	ND
Field Identification	<b>CB-3 #8</b>	<b>CB-3 #9</b>	<b>CB-4 #10</b>	<b>DB-1</b>	<b>DB-1 (Dup.)</b>	<b>DB-1 (Dup.)</b>
Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
<b>Parameter</b>						
Asbestos Detected (%)	ND	ND	ND	0.1 AC*	0.6 TR*	ND**
Field Identification	<b>DB-2</b>	<b>DB-3</b>	<b>DB-4</b>	<b>Hand Sample #1</b>	<b>Hand Sample #2</b>	<b>Vein 7</b>
Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
<b>Parameter</b>						
Asbestos Detected (%)	ND	ND	ND	ND	ND	0.10 AC

Notes:

PLM/TEM Analytical Method EPA 600/R-93-116

ND: not detected above method detection limit. The PLM detection limit is  $1/1000 = 0.1\%$ ; ND =  $<0.1\%$ . For TEM results, the detection limits are listed below

\*: Initial PLM analysis for DB-1 indicated 0.1 % NOA. PLM Analysis on DB-1 Duplicate indicated 0.6% NOA

\*\* : Analysis of DB-1 Duplicate via TEM Method EPA 600/R-93-116 was ND for asbestos as follows: (Aliquot 1) at  $< 0.00004\%$ ; and (Aliquot 2) at  $< 0.000031\%$ .

TR: Tremolite

AC: Actinolite

**Table 4**  
**Summarized Boulder Field Analytical Results - April 2019**  
**Hanson Aggregates Pennsylvania, LLC Rock Hill Quarry**

Field Identification	<b>RH#1</b>	<b>RH#2</b>	<b>RH#3</b>	<b>RH#4</b>	<b>RH#5</b>	<b>RH#6</b>	<b>RH#7</b>	<b>RH#8</b>	<b>RH#10</b>
Matrix:	Solid	Solid	Solid	Solid	Solid	Solid	Solid	Solid	Solid
Sample Date:	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019
<b>Parameter</b>									
Asbestos Detected (%)	ND	<0.10 AC	ND	ND	ND	ND	<0.10 TR	ND	ND
Field Identification	<b>RH#11</b>	<b>RH#12</b>	<b>RH#14</b>	<b>RH#18</b>	<b>RH#22</b>	<b>RH#23</b>	<b>RH#24</b>	<b>RH#25</b>	<b>RH#26</b>
Matrix:	Solid	Solid	Solid	Solid	Solid	Solid	Solid	Solid	Solid
Sample Date:	5/8/2019	5/8/2019	5/8/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019
<b>Parameter</b>									
Asbestos Detected (%)	<0.10 AC	<0.10 AC	<0.10 AC	ND	ND	ND	ND	ND	<0.10 AC
Field Identification	<b>RH#27</b>	<b>RH#28</b>	<b>RH#29</b>	<b>RH#30</b>	<b>RH#31</b>	<b>RH#32</b>	<b>RH#33</b>		
Matrix:	Solid	Solid	Solid	Solid	Solid	Solid	Solid		
Sample Date:	5/7/2019	5/8/2019	5/8/2019	5/8/2019	5/7/2019	5/7/2019	5/13/2019		
<b>Parameter</b>									
Asbestos Detected (%)	ND	ND	<0.10 AC	ND	ND	ND	ND		

Notes:

PLM Analytical Method EPA 600/R-93-116

ND: not detected above method detection limit. The PLM detection limit is 1/1000 = 0.1%; ND = <0.1%.

For PLM analysis <0.1 TR and/or <0.1 AC indicates asbestos was identified in the sample, but the concentration was less than the method detection limit of 0.1%

TR: Tremolite

AC: Actinolite



**Table 5**  
**Summary of Asbestos Testing in Rock Core Borings**  
**Hanson Aggregates Pennsylvania, LLC Rock Hill Quarry**

Core	Total Drilled Length of Core feet	<u>Actinolite Vein Volume</u> Total Core Volume	Asbestos Concentration PLM
CB-1	91	1.09%	0.0212%
CB-2	90	0.32%	0.0278%
CB-3	160.5	0.18%	0.0091%
CB-4	160	0.13%	0.0063%
<b>Arithmetic Mean</b>		0.43%	0.016%
<b>Geometric Mean</b>		0.30%	0.014%

**Table 6**  
**QGSR Sampling RJ Lee Laboratory Data Summary Table (2019)**  
**Asbestos Concentrations (%)**  
**Hanson Aggregates of Pennsylvania, LLC Rock Hill Quarry**

	<b>All Samples<sup>1</sup></b>	<b>Composite Samples<sup>2</sup></b>	<b>Target Samples<sup>3</sup></b>
	ND = 1/2 DL	ND = 1/2 DL	ND = 1/2 DL
<b>Geometric Mean (All):</b>	0.0321	0.0148	0.0479
<b>Average (All):</b>	0.0588	0.0396	0.0686
<b>Number of Samples:</b>	65	22	43
<b>Geometric Mean (PLM Only):</b>	0.0554	0.0500	0.0576
<b>Average (PLM Only):</b>	0.0647	0.0500	0.0702
<b>Number of Samples:</b>	58	16	42
<b>Geometric Mean (TEM Only):</b>	0.0004	0.0006	0.00002
<b>Average (TEM Only):</b>	0.0101	0.0118	0.00002
<b>Number of Samples:</b>	7	6	1

1 - Including all RJ Lee Group Laboratory sample analyses via PLM and TEM (with duplicate analyses averaged)

2 - Stockpile Samples (2019)

3 - Hand Samples, Core Samples and Boulder Vein Samples (2019)

The 2019 data includes the collection of 57 samples and completion of 65 analyses (7 TEM & 1 PLM duplicate sample)

**Table 7**  
**2018-2019 Data Summary Table**  
**Asbestos Concentrations (%)**  
**Hanson Aggregates of Pennsylvania, LLC Rock Hill Quarry**

	<b>All Samples<sup>1</sup></b>	<b>Composite Samples<sup>2</sup></b>	<b>Target Samples<sup>3</sup></b>
	ND = 1/2 DL	ND = 1/2 DL	ND = 1/2 DL
<b>Geometric Mean (All):</b>	0.0445	0.0378	0.0526
<b>Average (All):</b>	0.0760	0.0664	0.0857
<b>Number of Samples:</b>	99	50	49
<b>Geometric Mean (PLM Only):</b>	0.0626	0.0669	0.0587
<b>Average (PLM Only):</b>	0.0731	0.0739	0.0723
<b>Number of Samples:</b>	91	44	47
<b>Geometric Mean (TEM Only):</b>	0.0009	0.0006	0.00400
<b>Average (TEM Only):</b>	0.1089	0.0118	0.40001
<b>Number of Samples:</b>	8	6	2

1 - Including all 2018-2019 sample analyses via PLM and TEM (with duplicate analyses averaged)

2 - Stockpile Samples (2018-19), Crusher Fines (2018) and Drill Cuttings (2018)

3 - Hand Samples (2018-2019), Core Samples (2019) and Boulder Vein Samples (2019)

The 2018 data set includes the collection of 33 samples and completion of 34 analyses (1 TEM Verification Sample)

The 2019 data set includes the collection of 57 samples and completion of 65 analyses (7 TEM and 1 PLM Duplicate Sample)

## **Appendix C – Work Plans and DEP Correspondence**



**EARTHRES**  
ENGINEERING FOR SUCCESS™

April 3, 2019

Michael J. Menghini, District Mining Manager  
Department of Environmental Protection  
Pottsville District Mining Office  
5 West Laurel Boulevard  
Pottsville, PA 17901-2454

**SUBJECT: Qualitative Geologic Survey Sampling Plan  
Rock Hill Quarry  
SMP No. 7974SM1  
East Rockhill Township, Bucks County  
EARTHRES Project No. 061003.051**

Dear Mr. Menghini:

On behalf of Hanson Aggregates Pennsylvania, LLC (Hanson), Earthres Group, Inc. is providing the following Qualitative Geologic Survey Sampling Plan for continued assessment of Naturally Occurring Asbestos (NOA) at the Rock Hill Quarry Operation.

The sampling plan was prepared in follow-up to your letter of December 19, 2018, and our joint meeting on February 21, 2019 with the Pennsylvania Department of Environmental Protection (PA DEP), Hanson, Kelly Bailey, CIH, Drew R. Van Orden, P.E., and R.E. Pierson personnel.

This sampling plan has been designed to collect sufficient information for the preparation of a detailed Qualitative Geologic Survey of the site so that, based upon the results, the PA DEP will be able to lift the stop work order and allow Hanson and R.E. Pierson Materials to resume active operation of the Quarry.

#### **CURRENT AND PROPOSED SAMPLING**

Prior investigation, qualitative geological surveying and sampling conducted at the site during 2018 included the collection and analysis of thirty-three (33) samples including: 5 mineral vein rock samples, 21 drill hole cutting samples, 5 aggregate storage pile samples and 2 crusher run (fines) samples. All samples yielded non-detectable results for NOA, except for one biased rock sample that found a trace amount of asbestiform actinolite in a mineral vein.

The following work plan elements were developed in consultation with Hanson’s asbestos experts: Kelly Bailey, CIH, of Kelly Bailey Consulting, LLC and Drew R. Van Orden, P.E. of RJ Lee Group, Inc. The proposed work efforts include:

- 1) Aggregate storage pile sampling;
- 2) Rock coring and sampling;
- 3) Surficial geological analysis of the existing boulder field on the southern and eastern sides of the Quarry pit; and,
- 4) Sampling of water from the NPDES discharge, Sediment Basin 1, Sediment Basin 2, and the Quarry pit.

A minimum of two (2) days’ notice will be given to the PA DEP to allow for coordination of each field sampling event.

**AGGREGATE STORAGE PILE SAMPLING**

Per the Department’s letter of December 19, 2018, aggregate storage pile sampling is to include “...one test per 1,000 tons of material or any fraction thereof...” Hanson mapped the existing aggregate storage piles and determined the following tonnages and proposed samples as indicated in the below table. The relative locations of the various storage piles are also indicated by compass direction. The aggregate storage piles proposed for sampling are identified on Figure 1A.

**Proposed Aggregate Storage Pile Sampling**

<b>Stone Type</b>	<b>Location</b>	<b>Tonnage</b>	<b>Proposed Samples</b>
2B Stone	Northwest	9,946	10
1B Stone Pile	Northeast	1,695	2
2A Stone Pile	East	1,585	2
Screenings	South	1,983	2

Aggregate samples will be collected as material composites using AASHTO R90. The samples will be mixed and reduced in size prior to transmittal to the laboratory per AASHTO T248. Samples will be transmitted to the laboratory in one gallon sealed plastic bags. To accomplish the AASHTO R90 sampling, the 2B storage pile will be surveyed and marked into ten radial sections for subsequent collection of ten samples. Samples from the remaining storage piles will be collected from opposite sides of the piles. The exact sample locations will be determined and marked in the field at the time of sampling. Samples will be collected from storage pile locations that were not previously sampled.

Upon reduction of the sample sizes per AASHTO T248, the samples will be transmitted under chain-of-custody to RJ Lee Group, Inc. in Monroeville, PA for microscopic analysis and Polarized Light Microscopy (PLM). If asbestiform minerals are found via PLM analysis, the sample will be further analyzed by Transmission Electron Microscopy (TEM) to confirm mineral identification and morphology. Analytical methods to be employed for the proposed testing are included in Attachment 1. The Pennsylvania and national laboratory accreditation certificates for RJ Lee Group, Inc. are included in Attachment 2.

## **ROCK CORING**

Four rock cores will be advanced in the planned mining area to an elevation of approximately 585 feet above mean sea level (MSL), which is approximately equivalent to the current water level in the Quarry pit. The approximate coring locations are shown on Figure 1B. The cores will be drilled on an approximately 30-degree angle from vertical with an azimuth of approximately N45W. This azimuth is projected perpendicular to the geologic structure (ridgeline trend and geological strike) and was chosen to intercept as many potential features as practical. Where safely accessible, the highwalls below the coring locations will be examined prior to drilling to assess the presence and trend (dip and azimuth) of mineral veining. Based upon what is observed, the azimuth and location of the core drilling locations may be modified to better intercept found mineral vein trends. The exact core locations will be determined and marked in the field at the time of drilling. Continuous wetting of the core will be accomplished during drilling to minimize dust formation. Retrieved cores will be boxed, labeled and stored onsite for logging and analysis.

A professional geologist will visually log the cores to identify and record the following:

- 1) Geological description;
- 2) Mineralogy and grain size;
- 3) The percentage of core recovered;
- 4) Bedding observations;
- 5) Fracture occurrence;
- 6) Mineral veining; and,
- 7) Other pertinent geological features.

Found mineral veins will be examined using a hand lens and fine steel pick to assess the presence of fibrous mineral morphology. If potentially suspect mineral morphology is identified, the mineral veining will be photographed and sampled in the following manner:

- 1) The section of the core containing the suspect mineral vein will be isolated using a wet saw or core splitter;
- 2) The portion of the core to be sampled will be split by wet sawing. Half of the sample will be saved, while the remainder of the sample will be transmitted for laboratory analysis.



The PA DEP will have the opportunity to collect a split sample from the sampled portion of the core;

- 3) The sample will be sent to RJ Lee Group, Inc. in Monroeville, PA under chain-of-custody for microscopic and PLM analysis; and,
- 4) If asbestiform minerals are found via PLM analysis, the sample will be further analyzed by TEM to confirm mineral identification and morphology.

Additionally, one (1) diabase sample from each rock core (4 samples total) will be collected from a representative core portion where veining is absent. Sample preparation and analysis will be in accordance with the above procedures.

### **BOULDER FIELD ANALYSIS**

A boulder field exists on the southern and eastern sides of the quarry pit. Examinations of at least 30 mineral veins on randomly selected boulders located in the boulder field will be completed. A professional geologist will examine the found mineral veining with a hand lens and fine steel pick to assess the presence of fibrous mineral morphology. If potentially suspect mineral morphology is identified, the mineral veining will be photographed and sampled. The exact boulder and vein locations will be determined and marked in the field at the time of sampling. The samples will be sent to RJ Lee Group, Inc. in Monroeville, PA under chain-of-custody for microscopic and PLM analysis. If asbestiform minerals are found via PLM analysis, the sample will be further analyzed by TEM to confirm mineral identification and morphology.

### **WATER SAMPLING**

Water samples will be collected from the NPDES discharge, Sediment Basin 1 (southern basin), Sediment Basin 2, and the Quarry pit (4 samples total). The water samples will be collected as grab samples using a telescopic pole sampler containing an attached sampling cup. The sampling apparatus will be washed with Alconox® and rinsed with distilled water initially and between each sampling location. Sample collection will proceed from downgradient to upgradient to minimize potential for sample cross-contamination. Proposed water sampling locations are shown on Figure 1A. The water samples will be collected in clean laboratory-provided one liter plastic bottles. The samples will be placed on ice and transmitted under chain-of-custody to RJ Lee Group, Inc. in Monroeville, PA for analysis per EPA Method 100.2.

### **SAMPLING AND REPORTING**

Upon approval of the work plan, Hanson is prepared to commence sampling at the site. Results of the investigation should be available approximately three (3) weeks after submittal of all samples to the laboratory. Status reports will be provided to the PA DEP weekly once sampling has

commenced. The results of the investigation will be provided in a Qualitative Geologic Survey Report.

If you have any questions or concerns regarding the proposed investigation and sampling, please feel free to contact me at (215) 766-1211.

Sincerely,  
**Earthres Group, Inc.**



Louis F. Vittorio, Jr., P.G.  
Vice President

Figure 1A – Water & Aggregate Sampling Locations  
Figure 1B – Proposed Coring Locations  
Attachment 1 – Sample Analysis Procedures and Methods  
Attachment 2 – Laboratory Certifications

cc: Mark E. Kendrick, Hanson\*  
Andrew J. Gutshall, P.G., Hanson\*  
Matthew S. Burns, Esq, Hanson\*  
Curt Mitchell, R.E. Pierson  
Mike Logan, CPS\*  
Kelly F. Bailey, CIH, KBC, LLC\*  
Drew R. Van Orden, P.E., RJ Lee Group, Inc\*  
Michael P. Kutney, P.G., PA DEP\*  
Gary Latsha, PA DEP\*  
Amiee Bollinger, PA DEP\*  
James D. Rebarchak, PA DEP\*  
Marianne Morano, East Rockhill Township\*  
David J. Raphael, Esq., K&L Gates\*  
Robert W. Gundlach, Esq., Fox Rothschild\*  
(\*via electronic mail)



## **FIGURES**



# Figure 1A

Water and Aggregate Sampling Locations

**Legend**

-  Aggregate Storage Pile
-  Water Sampling Location






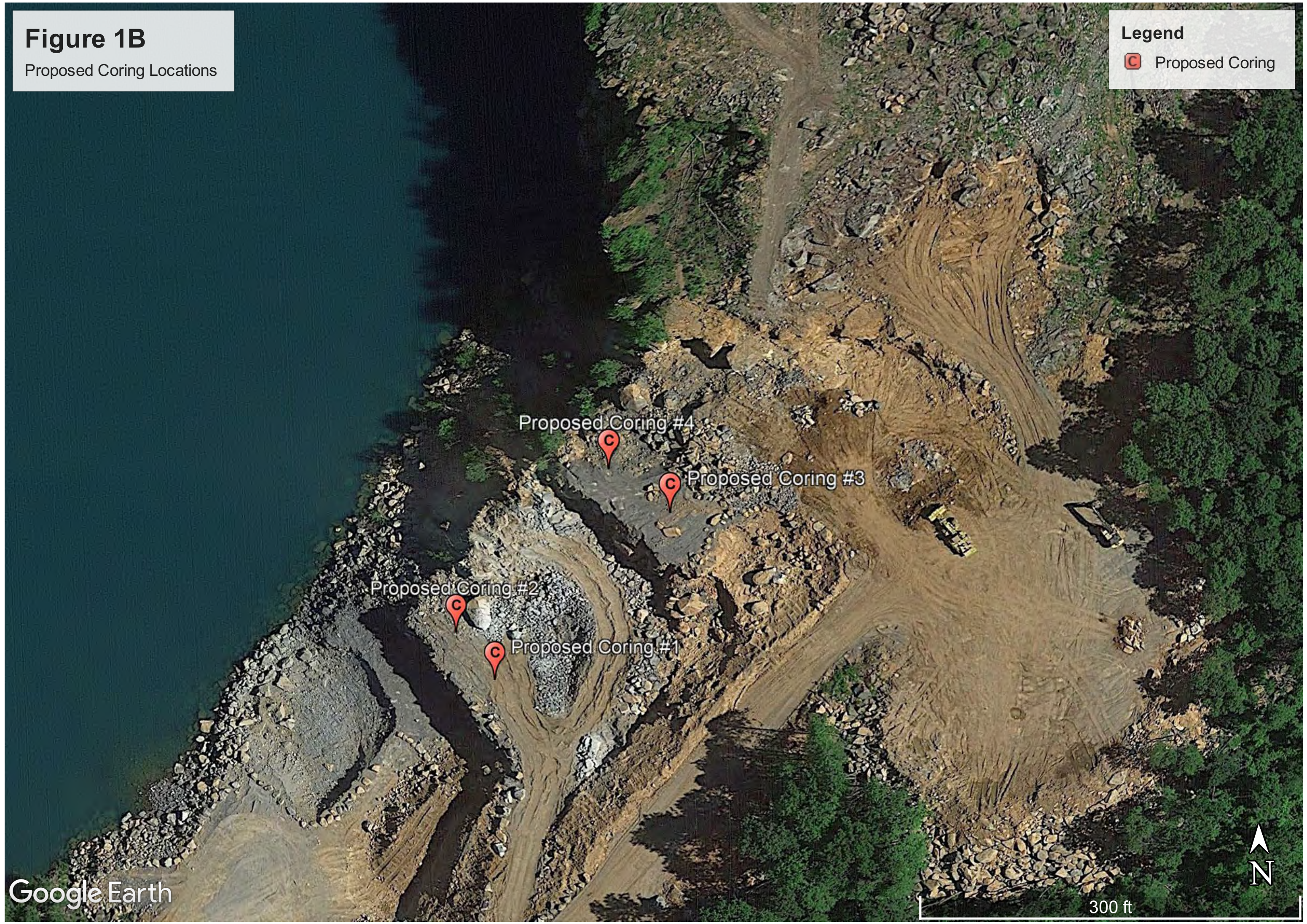
# Figure 1B

Proposed Coring Locations

## Legend

 Proposed Coring

Google Earth





**ATTACHMENT 1**  
**Sample Analysis Methods**

## Attachment 1

### Sample Analysis Procedures and Methods

For obtaining a representative sample from a large bulk sample, the AASHTO procedures for reducing the sample should be used. The subsequent analyses of the submitted samples will follow a three step procedure: 1) Basic microscopic analysis to assess the presence of asbestiform mineral habitat; 2) Polarized Light Microscopy (PLM) to determine the presence and asbestos mineral type, if present; and, 3) Should positive results be indicated by PLM, follow-up Transmission Electron Microscopy (TEM) analysis will be completed to confirm the minerals present and their morphology. The techniques and methods to be employed in sample analysis are provided below:

- A geologist will inspect hand and core samples initially using a stereo binocular microscope, with magnification ranging from 10x to 60x. Using a fine steel pick (dental pick) the geologist will scrape the surface of the suspect mineralization to determine if any of the minerals display typical asbestiform habit and characteristics such as fiber bundles, splayed ends, or matted or fibrous masses.
- Further examination of the sample will then be conducted using the Polarized Light Microscope (PLM) using EPA 600/R-93/116.
- If asbestiform minerals are found, representative samples will be further analyzed by Transmission Electron Microscopy per EPA 600/R-93/116 to confirm mineral identification and morphology.
- Where appropriate, the microscopic PLM and/or TEM analyses will include a count of the asbestiform fibers, representative digital images, and measurements of the width and length dimensions of found fibers counted.

Water samples will be collected as grab samples and will be analyzed by TEM per EPA 100.2.

The samples will be analyzed using the above procedures by RJ Lee Group, which is accredited by the American Industrial Hygiene Association and is in the NIST National Voluntary Laboratory Accreditation Program for asbestos analysis. RJ Lee Group has mineralogical expertise and has vast experience to detect asbestos fibers in the natural environment (e.g. rocks, soils, water, etc.).



## **ATTACHMENT 2**

### **Laboratory Accreditation Certificates**

**COMMONWEALTH OF PENNSYLVANIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

*BUREAU OF LABORATORIES*  
*LABORATORY ACCREDITATION PROGRAM*



Certifies That

02-00396

**RJ Lee Group, Inc.**

**350 Hochberg Road, Monroeville, PA 15146**



Having duly met the requirement of  
The act of June 29, 2002 (P.L. 596, No. 90)  
dealing with Environmental Laboratories Accreditation  
(27 Pa. C.S. §§4104-4113) and the  
National Environmental Laboratory Accreditation Program Standard

is hereby approved as an

**Accredited Laboratory**

to conduct analysis within the fields of accreditations more fully described in the attached Scope of Accreditation

Expiration Date: **04/30/2019**

Certificate Number: **014**

A handwritten signature in black ink that reads "Aaren Alger".

Aaren S. Alger, Chief  
Laboratory Accreditation Program  
Bureau of Laboratories



## AIHA Laboratory Accreditation Programs, LLC

*acknowledges that*

### **RJ Lee Group, Inc.**

350 Hochberg Road, Monroeville, PA 15146

Laboratory ID: 100364

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2005 international standard, *General Requirements for the Competence of Testing and Calibration Laboratories* in the following:

### **LABORATORY ACCREDITATION PROGRAMS**

- |   |                                       |
|---|---------------------------------------|
| <input checked="" type="checkbox"/> <b>INDUSTRIAL HYGIENE</b> | Accreditation Expires: April 01, 2020 |
| <input checked="" type="checkbox"/> <b>ENVIRONMENTAL LEAD</b> | Accreditation Expires: April 01, 2020 |
| <input type="checkbox"/> <b>ENVIRONMENTAL MICROBIOLOGY</b>    | Accreditation Expires:                |
| <input type="checkbox"/> <b>FOOD</b>                          | Accreditation Expires:                |
| <input type="checkbox"/> <b>UNIQUE SCOPES</b>                 | Accreditation Expires:                |

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached **Scope of Accreditation**. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2005 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached **Scope of Accreditation**. Please review the AIHA-LAP, LLC website ([www.aihaaccreditedlabs.org](http://www.aihaaccreditedlabs.org)) for the most current Scope.

*Elizabeth Bair*

Elizabeth Bair  
Chairperson, Analytical Accreditation Board

*Cheryl O. Morton*

Cheryl O. Morton  
Managing Director, AIHA Laboratory Accreditation Programs, LLC



## AIHA Laboratory Accreditation Programs, LLC SCOPE OF ACCREDITATION

**RJ Lee Group, Inc.**  
350 Hochberg Road, Monroeville, PA 15146

Laboratory ID: **100364**  
Issue Date: 03/30/2018

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

### Industrial Hygiene Laboratory Accreditation Program (IHLAP)

**Initial Accreditation Date: 09/01/1991**

IHLAP Scope Category	Field of Testing (FoT) (FoTs cover all relevant IH matrices)	Technology sub-type/ Detector	Published Reference Method/ Title of In-house Method	Method Description or Analyte <i>(for internal methods only)</i>
<b>Chromatography Core</b>	Gas Chromatography	GC/FID	NIOSH 1003	
			NIOSH 1005	
			NIOSH 1007	
			NIOSH 1022	
			NIOSH 1300	
			NIOSH 1301	
			NIOSH 1400	
			NIOSH 1401	
			NIOSH 1402	
			NIOSH 1403	
			NIOSH 1450	
			NIOSH 1453	
			NIOSH 1457	
			NIOSH 1458	
			NIOSH 1459	
			NIOSH 1500	
			NIOSH 1501	
			NIOSH 1550	
			NIOSH 1615	
			NIOSH 2000	
NIOSH 2500				
NIOSH 2537				
NIOSH 2546				
NIOSH 2553				
NIOSH 2554				





IHLAP Scope Category	Field of Testing (FoT) (FoTs cover all relevant IH matrices)	Technology sub-type/ Detector	Published Reference Method/Title of In-house Method	Method Description or Analyte <i>(for internal methods only)</i>
<b>Chromatography Core</b>	Gas Chromatography	GC/FID	NIOSH 2555	
			NIOSH 4000	
			NIOSH 5020	
			NIOSH 5515	
			NIOSH 5523	
	Gas Chromatography (Diffusive Samplers)		NIOSH 1003	
			NIOSH 1005	
			NIOSH 1007	
			NIOSH 1022	
			NIOSH 1300	
			NIOSH 1301	
			NIOSH 1400	
			NIOSH 1401	
			NIOSH 1402	
			NIOSH 1403	
			NIOSH 1450	
			NIOSH 1453	
			NIOSH 1457	
			NIOSH 1458	
			NIOSH 1459	
			NIOSH 1500	
			NIOSH 1501	
			NIOSH 1550	
			NIOSH 1615	
			NIOSH 2000	
			NIOSH 2500	
			NIOSH 2537	
			NIOSH 2546	
			NIOSH 2553	
			NIOSH 2554	
			NIOSH 2555	
			NIOSH 4000	
			NIOSH 5020	
NIOSH 5515				
NIOSH 5523				
Ion Chromatography (IC)		NIOSH 7903		
Liquid Chromatography	HPLC/UV	OSHA ID - 215		
		NIOSH 2016		
		NIOSH 5506		



<b>IHLAP Scope Category</b>	<b>Field of Testing (FoT)</b> (FoTs cover all relevant IH matrices)	<b>Technology sub-type/ Detector</b>	<b>Published Reference Method/Title of In-house Method</b>	<b>Method Description or Analyte</b> <i>(for internal methods only)</i>
<b>Chromatography Core</b>	Liquid Chromatography	HPLC/UV	OSHA 42	
			OSHA 47	
			OSHA 58	
<b>Spectrometry Core</b>	Atomic Absorption	CVAA	NIOSH 6009	
	Inductively-Coupled Plasma	ICP/MS	NIOSH 7300 Modified	
		ICP/AES	NIOSH 7300	
			NIOSH 7300 Modified	
	X-ray Diffraction (XRD)		NIOSH 7500	
	Infrared		NIOSH 5026	
<b>Asbestos/Fiber Microscopy Core</b>	Polarized Light Microscopy (PLM)		40 CFR Part 763, Sub. E., Appendix E	Interim Method of the Determination of Asbestos in Bulk Insulation Samples
			EPA 600/R-93/116	
	Phase Contrast Microscopy (PCM)		NIOSH 7400A	
	Transmission Electron Microscopy (TEM)		40 CFR Part 763, Sub. E., Appendix A	
NIOSH 7402				
<b>Miscellaneous Core</b>	Gravimetric		NIOSH 0500	
			NIOSH 0600	
			NIOSH 5042	
			OSHA 58	
	Thermo-optical Analysis (TOA)		NIOSH 5040	
<b>Beryllium Testing</b>	Inductively-Coupled Plasma	ICP/MS	NIOSH 7303 Modified	
		ICP/AES	NIOSH 7300	
			NIOSH 7300 Modified	

A complete listing of currently accredited Industrial Hygiene laboratories is available on the AIHA-LAP, LLC website at: <http://www.aihaaccreditedlabs.org>



## AIHA Laboratory Accreditation Programs, LLC

### SCOPE OF ACCREDITATION

**RJ Lee Group, Inc.**

350 Hochberg Road, Monroeville, PA 15146

Laboratory ID: **100364**

Issue Date: 04/10/2018

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

The EPA recognizes the AIHA-LAP, LLC ELLAP program as meeting the requirements of the National Lead Laboratory Accreditation Program (NLLAP) established under Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992 and includes paint, soil and dust wipe analysis. Air and composited wipes analyses are not included as part of the NLLAP.

#### Environmental Lead Laboratory Accreditation Program (ELLAP)

**Initial Accreditation Date: 12/05/1995**

Field of Testing (FoT)	Technology sub-type/ Detector	Method	Method Description <i>(for internal methods only)</i>
Settled Dust by Wipe		EPA SW-846 3050B	
		EPA SW-846 7000B	

A complete listing of currently accredited Environmental Lead laboratories is available on the AIHA-LAP, LLC website at: <http://www.aihaaccreditedlabs.org>

United States Department of Commerce  
National Institute of Standards and Technology



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**Certificate of Accreditation to ISO/IEC 17025:2005**

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NVLAP LAB CODE: 101208-0

**RJ Lee Group, Inc.**  
Monroeville, PA

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

**Asbestos Fiber Analysis**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

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2018-07-01 through 2019-06-30

*Effective Dates*



---

*Dana S. Glaman*  
For the National Voluntary Laboratory Accreditation Program





**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005**

**RJ Lee Group, Inc.**  
350 Hochberg Road  
Monroeville, PA 15146-1516  
Ms. Tammie Mussitsch  
Phone: 724-325-1776 Fax: 724-733-1799  
Email: [accreditations@rjlg.com](mailto:accreditations@rjlg.com)  
<http://www.RJLG.COM>

**ASBESTOS FIBER ANALYSIS**

**NVLAP LAB CODE 101208-0**

**Bulk Asbestos Analysis**

<u>Code</u>	<u>Description</u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

**Airborne Asbestos Analysis**

<u>Code</u>	<u>Description</u>
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

Handwritten signature of Tammie Mussitsch in black ink.

For the National Voluntary Laboratory Accreditation Program

## James Haklar

---

**From:** Louis Vittorio  
**Sent:** Wednesday, April 17, 2019 6:46 AM  
**To:** 'Kutney, Michael'; Menghini, Michael; Latsha, Gary; Bollinger, Amiee; Rebarchak, James; Tallman, Richard; Cain, Virginia; Fogel, Robert; Sammarco, Daniel; Stefanko, John; Shankar, Sachin; Lambeth, Craig; Furlong, Erika  
**Cc:** Andrew Gutshall; Curt Mitchell (cmitchell@repierson.com); Kendrick, Mark E (Allentown) USA; Mike Logan (mlogan@CPS-2Comply.com); Kelly Bailey; drew@rjlg.com; Marianne Morano; David Raphael; RGundlach@foxrothschild.com; Matthew Burns  
**Subject:** Response to Comments - Rock Hill Quarry Sampling Plan

Mike:

Thank you for your comments dated April 12, 2019 pertaining to the submitted *Qualitative Survey Sampling Plan* for the Rock Hill Quarry site. On behalf of Hanson Aggregates Pennsylvania, LLC (Hanson), I am providing the following comment responses (*in italic font*):

### Regarding the existing stockpiles:

- 1. The chosen sampling approach uses AASHTO R90. According to the AASHTO R90 method, sampling of stockpiles should be avoided due to problems involved in obtaining a representative gradation of material. Please explain why this is the best choice available for sampling the stockpiles.**

*AASHTO R90 provides sampling methods for aggregates from: (a) source production (e.g. from conveyors at the crusher), (b) in-place end product (roadways), or (c) stockpiles. Note 3 in the AASHTO R90 method essentially states that when methods/locations (a) and (b) are available for sampling, they are preferred in lieu of stockpile sampling to assure a representative gradation of material is obtained. As sampling of the existing stockpiles is required, a provided AASHTO R90 stockpile sampling method is proposed to be used. Specifically, the sampling is proposed to be conducted with Stockpile Method A. The method requires using a Front End Loader to dig into the pile to obtain a representative sample of the aggregate gradation in place. In regards to the gradation concern, the sampling will entail the collection of samples from piles having differing gradations, including 2B, 1B, and 2A stone and screenings.*

### Regarding the rock core drilling:

- 1. A drilling program typically has a goal or target. What are the targets or goals in this case? How will success be determined?**

*The goal of the drilling program is to further evaluate the presence or absence of trace amounts of naturally occurring asbestos (NOA) in the rock to be mined. Success will be determined through laboratory analysis for NOA in the mineral vein samples identified in the cores as specified in the work plan.*

- 2. Please provide additional explanation for the planned azimuth and dip angle of the drilling. Please explain why the proposed azimuth and dip angle are thought to be the most likely to intercept asbestos-bearing features?**

*The dip angle of the proposed borings was chosen to maximize the potential to intercept veining, which is indicated to be near vertical from current observations. The azimuth of the drilling program was chosen to be perpendicular to regional geological strike, which is also coincident with the orientation of the diabase ridge. In the extensional*

*geological rift environment that existed during diabase emplacement, the diabase was intruded along geological strike. The strike direction is also perpendicular to the extensional forces that enabled diabase emplacement. Through drilling in the direction perpendicular to the regional geological strike (and parallel to extensional forces), the coring is more likely to cross mineral veins and/or bedding features (i.e. heterogeneities) that may exist in the rock.*

**3. Please explain the basis for the number of core holes and their spacing.**

*Core drilling was proposed based upon guidance contained the Aggregates Handbook (NSSGA, 2013, Alexandria, VA, 2<sup>nd</sup> edition). Typical spacing recommended therein is much larger than proposed (e.g. 1 per four acres). For the current program, we are proposing targeted, oriented core holes (see our response to Comment #2) spaced approximately 50-ft to 70-ft apart on two separate benches. The actual locations of the core holes will be adjusted based upon field conditions (see our response to Comment #4 below). Based upon the results of the coring, including consideration of rock homogeneity and the NOA sampling results, more or less coring will be proposed for future operations.*

**4. It would seem prudent to perform a field investigation of the mineral vein orientations and spacing before launching a drilling program to investigate them. The number and orientation of the drill holes could change based on the findings. If it is determined that the drilling was directed in a sub-optimal orientation, the Department may require additional drilling.**

*Per the Department's request, mineral veins visible in the highwalls in the proposed drilling area will be mapped where safely possible to guide the selection of core hole locations, and drilling dip and azimuth.*

**5. Please include any lithologic contacts as part of the field logging and identifying procedures.**

*Per the Department's request, any lithologic contacts encountered will be included on the core logs to be prepared as specified in the work plan.*

**Regarding the water bodies:**

**1. Please sample all of the sediment traps on the permit in addition to the other water bodies already proposed.**

*Per the Department's request, the sediment traps in the permit area in addition to the other water bodies proposed will be sampled as specified in the work plan.*

**The Department would like to be on site for all sampling events. Please provide the schedule for sampling as soon as possible.**

*It is our intention to commence water and aggregate sampling on Thursday April 18<sup>th</sup>. Core drilling is to commence April 22<sup>nd</sup>.*

If you have any questions, please contact me or Andrew Gutshall of Hanson at your convenience.

Regards,  
-Lou

**Louis F. Vittorio, Jr., P.G.** | Vice President  
Earthres Group, Inc. | *Engineering for Success<sup>SM</sup>*

Headquarters | Philadelphia Region | P. O. Box 468, Pipersville, PA 18947  
215-766-1211 office | 215-768-7064 mobile | 800-264-4553 toll free  
[lvittorio@earthres.com](mailto:lvittorio@earthres.com) | [www.earthres.com](http://www.earthres.com) | [L](#) | [t](#) | [f](#)



**From:** Kutney, Michael [mailto:mkutney@pa.gov]

**Sent:** Friday, April 12, 2019 3:51 PM

**To:** Louis Vittorio <lvittorio@earthres.com>; Menghini, Michael <mmenghini@pa.gov>; Latsha, Gary <galatsha@pa.gov>; Bollinger, Amiee <ambollinge@pa.gov>; Rebarchak, James <jrebarchak@pa.gov>; Tallman, Richard <rtallman@pa.gov>; Cain, Virginia <vicain@pa.gov>; Fogel, Robert <rofogel@pa.gov>; Sammarco, Daniel <dsammarco@pa.gov>; Stefanko, John <jstefanko@pa.gov>; Shankar, Sachin <sshankar@pa.gov>; Lambeth, Craig <clambeth@pa.gov>; Furlong, Erika <erfurlong@pa.gov>

**Cc:** Andrew Gutshall <Andrew.Gutshall@LehighHanson.com>; Curt Mitchell (cmitchell@repierson.com) <cmitchell@repierson.com>; Kendrick, Mark E (Allentown) USA <Mark.Kendrick@lehighhanson.com>; Mike Logan (mlogan@CPS-2Comply.com) <mlogan@CPS-2Comply.com>; Kelly Bailey <kfbcih@gmail.com>; drew@rjlg.com; Marianne Morano <MMorano@EastRockHillTownship.org>; David Raphael <dave.raaphael@klgates.com>; RGundlach@foxrothschild.com; Matthew Burns <matthew.burns@lehighhanson.com>

**Subject:** RE: [External] Rock Hill Quarry Sampling Plan

Lou-

The Department has reviewed the Qualitative Survey Sampling Plan, dated April 3, 2019, and has the following comments:

Regarding the existing stockpiles:

1. The chosen sampling approach uses AASHTO R90. According to the AASHTO R90 method, sampling of stockpiles should be avoided due to problems involved in obtaining a representative gradation of material. Please explain why this is the best choice available for sampling the stockpiles.

Regarding the rock core drilling:

1. A drilling program typically has a goal or target. What are the targets or goals in this case? How will success be determined?
2. Please provide additional explanation for the planned azimuth and dip angle of the drilling. Please explain why the proposed azimuth and dip angle are thought to be the most likely to intercept asbestos-bearing features?
3. Please explain the basis for the number of core holes and their spacing.
4. It would seem prudent to perform a field investigation of the mineral vein orientations and spacing before launching a drilling program to investigate them. The number and orientation of the drill holes could change based on the findings. If it is determined that the drilling was directed in a sub-optimal orientation, the Department may require additional drilling.
5. Please include any lithologic contacts as part of the field logging and identifying procedures.

Regarding the water bodies:

1. Please sample all of the sediment traps on the permit in addition to the other water bodies already proposed.

Regarding the boulder field sampling:

No comments

The Department would like to be on site for all sampling events. Please provide the schedule for sampling as soon as possible.

If you have any questions, please contact me at 570.621.3470.

Sincerely,



**Michael Kutney, P.G.** | Chief, Permits & Technical Section  
Department of Environmental Protection  
Pottsville District Mining Office  
5 West Laurel Boulevard | Pottsville, PA 17901  
Phone: 570.621.3118 | Fax: 570.621.3110  
[www.dep.pa.gov](http://www.dep.pa.gov)

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---

**From:** Louis Vittorio <[lvittorio@earthres.com](mailto:lvittorio@earthres.com)>  
**Sent:** Wednesday, April 3, 2019 6:24 PM  
**To:** Menghini, Michael <[mmenghini@pa.gov](mailto:mmenghini@pa.gov)>; Kutney, Michael <[mkutney@pa.gov](mailto:mkutney@pa.gov)>; Latsha, Gary <[galatsha@pa.gov](mailto:galatsha@pa.gov)>; Bollinger, Amiee <[ambollinge@pa.gov](mailto:ambollinge@pa.gov)>; Rebarchak, James <[jrebarchak@pa.gov](mailto:jrebarchak@pa.gov)>  
**Cc:** Andrew Gutshall <[Andrew.Gutshall@LehighHanson.com](mailto:Andrew.Gutshall@LehighHanson.com)>; Curt Mitchell ([cmitchell@repierson.com](mailto:cmitchell@repierson.com)) <[cmitchell@repierson.com](mailto:cmitchell@repierson.com)>; Kendrick, Mark E (Allentown) USA <[Mark.Kendrick@lehighhanson.com](mailto:Mark.Kendrick@lehighhanson.com)>; Mike Logan ([mlogan@CPS-2Comply.com](mailto:mlogan@CPS-2Comply.com)) <[mlogan@CPS-2Comply.com](mailto:mlogan@CPS-2Comply.com)>; Kelly Bailey <[kfbcih@gmail.com](mailto:kfbcih@gmail.com)>; [drew@rjlg.com](mailto:drew@rjlg.com); Marianne Morano <[MMorano@EastRockHillTownship.org](mailto:MMorano@EastRockHillTownship.org)>; David Raphael <[dave.raaphael@klgates.com](mailto:dave.raaphael@klgates.com)>; [RGundlach@foxrothschild.com](mailto:RGundlach@foxrothschild.com); Matthew Burns <[matthew.burns@lehighhanson.com](mailto:matthew.burns@lehighhanson.com)>  
**Subject:** [External] Rock Hill Quarry Sampling Plan

**ATTENTION:** *This email message is from an external sender. Do not open links or attachments from unknown sources. To report suspicious email, forward the message as an attachment to [CWOPA\\_SPAM@pa.gov](mailto:CWOPA_SPAM@pa.gov).*

Mike:

On behalf of Hanson Aggregates Pennsylvania, LLC (Hanson), Earthres Group, Inc. is providing the following Qualitative Geologic Survey Sampling Plan for continued assessment of Naturally Occurring Asbestos (NOA) at the Rock Hill Quarry Operation.

Upon approval, Hanson is prepared to commence sampling at the site. In the meantime, should you have any questions, please contact me or Andrew Gutshall of Hanson at your convenience.

Regards,  
-Lou

**Louis F. Vittorio, Jr., P.G.** | Vice President  
Earthres Group, Inc. | *Engineering for Success<sup>SM</sup>*

Headquarters | Philadelphia Region | P. O. Box 468, Pipersville, PA 18947  
215-766-1211 office | 215-768-7064 mobile | 800-264-4553 toll free  
[lvittorio@earthres.com](mailto:lvittorio@earthres.com) | [www.earthres.com](http://www.earthres.com) | [L](#) | [t](#) | [f](#)





**EARTHRES**  
ENGINEERING FOR SUCCESS™

April 25, 2019

Michael J. Kutney, P.G.  
Chief Permits & Technical Session  
Department of Environmental Protection  
Pottsville District Mining Office  
5 West Laurel Boulevard  
Pottsville, PA 17901-2454

**SUBJECT: Response to PA DEP and East Rockhill Township Comments  
Qualitative Geologic Survey Sampling Plan  
Rock Hill Quarry, SMP No. 7974SM1  
East Rockhill Township, Bucks County, PA  
EARTHRES Project No. 061003.051**

Dear Mike:

I am in receipt of the Department's comments via email dated April 22, 2019, which pertain to the proposed core drilling investigation submitted in the *Qualitative Geologic Survey Sampling Plan* (QGSSP) dated April 3, 2019 for the Rock Hill Quarry site. On behalf of Hanson Aggregates Pennsylvania, LLC (Hanson), I am providing the following responses to the Department's comments and East Rockhill Township's comments (dated April 17, 2019), which you forwarded to my attention. The comments are presented below, followed by our responses in *italics*:

- 1) Per our discussion on Friday, April 19, I voiced concerns regarding the Department's (core drilling) comments nos. 1, 3, and 4. It was my position that those had not been adequately addressed and therefore, the Department would not authorize core drilling until those comments are adequately addressed. Below is a summary of those concerns, as well as additional comments resulting from a review of the attached documents.**

*EARTHRES and Hanson professional geologists were onsite Monday April 22, 2019 to map mineral vein features exposed on the benches proposed for drilling and ultimately mining activities. The results of that effort are attached to these responses. Overall, the features found were trending as expected provided the geological environment, the geological evaluation contained in our report of January 2018, our QGSSP dated April 3, 2019 and our prior comment responses of April 17 and 19, 2019. Additional detailed responses to your questions are provided in the following comment responses and in the attached documents.*

- 2) **The Aggregates Handbook appears to be geared toward characterization of the aggregate deposit, not investigating unfavorable components within it (in this case veins which may contain asbestos). Using its guidance for the purpose of investigating mineral veins seems inappropriate. Please explain why following the guidance in the Aggregates Handbook is appropriate in this case (PADEP comment #3).**

*The Aggregates Handbook, the NSSGA Guide, the condition of the highwalls, and our prior experience at the site, that included significant sampling, were all used as a guide for selecting drilling locations to clear the selected benches for mining. We indicated in prior responses that the work would be iterative and dependent on the results of the drilling and sampling. However, based upon the field work completed this week we have analyzed the data and modified the initially proposed drilling locations as requested.*

- 3) **Both the NSSGA Guide and the Aggregates Handbook encourage a proper mapping effort as part of the investigations described in these documents. The Department has notified Hanson during the December and February meetings and during other discussions that it expects the veins at the Rock Hill quarry to be mapped and described. To date, the Department has not received any information from Hanson regarding the mapping effort or its results. Results from a comprehensive mapping effort could effectively answer the Department's comments #1, #3 and #4 regarding the core drilling as well as East Rockhill Township's comment #4.**

*Please find the attached table that includes the geological data (i.e. strike, dip, and description) of the bench-face features found during the on-site mapping completed on April 22, 2019. The data was statistically analyzed using Rockworks software to determine the average strike and dip of the features. A stereonet plot of the data is attached and indicates an average strike of the vein features to be N45E, dipping steeply at 78 degrees SE. The average feature strike is in agreement with the regional strike direction indicated the QGSSP submitted on April 3, 2019. Also provided herein are photographs of the mapped features that are keyed to their locations on each bench (Drawing D-1: Bench Face Mapping). The data was further plotted in 3D using AutoCAD to evaluate feature trends with respect to the proposed drilling locations.*

*The proposed coring locations and mapped features are shown in map view on the attached Figure 1. The cores will be drilled on an approximately 30-degree angle from vertical with an azimuth of approximately N45W. The drilling direction is oriented perpendicular to geological strike and is dipping opposite of the found features in order to intercept as many potential features as practical. The core borings will be advanced to an elevation of approximately 585 feet above mean sea level (MSL), which is approximately equivalent to the current water level in the Quarry pit.*



*Core Borings 1 (B-1) and B-2 are proposed to be located on Bench 1. The B-1 location was chosen to intercept the Veins 1, 3, 4, and 7. Coring B-2 is proposed in an area where face-mapped features are not projected to be present, thus providing additional geological coverage.*

*Core Borings B-3 and B-4 are proposed to be located on Bench 2. The B-3 location was chosen to intercept the Veins 1, 6, 10 and 11. B-4 is proposed to intercept Veins 12 and 13 and provide additional geological coverage in an area where face-mapped features are not projected to be present.*

*Logging and sampling of the retrieved cores will be completed as indicated in the April 3, 2019 QGSSP.*

- 4) **The NSSGA Guide also describes a program for testing for Settled Dust. Please explain why testing for Settled Dust has not been proposed for this site.**

*The Site has not operated since November 2018. Based upon the results of the current investigations, settled dust sampling will be proposed if appropriate. Such a recommendation would be outlined in the Qualitative Geologic Survey Report.*

#### **Responses to East Rock Hill Township Comments Dated April 17, 2019:**

1. **Aggregate Storage Pile Sampling:** The Plan only lists four aggregate storage piles, but more than four stockpiles are clearly visible on Figure 1A, which appears to be a Google Earth image from June 2018. Please ensure that all material stockpiled at the site is included in the scope of the Plan.

*The four (4) aggregate storage piles proposed for sampling, and since sampled with the Department's approval and oversight, were the only processed aggregate stockpiles present at the site in November 2018 when site operations were halted.*

2. **Aggregate Sampling Frequency:** The origin and intent of PADEP's requirement of "one test per 1,000 tons of material or any fraction thereof..." is unknown. This requirement may be based on construction standards which are designed to characterize the mechanical properties of the material and not its hazardous composition. Other PADEP programs, such as for the management of fill, would require an increased sampling frequency. Furthermore, if the storage piles will be divided into "fractions," such as truck or crusher loads, then PADEP should require additional sampling than what is proposed in the Plan.

*The sampling frequency of the piles was mandated by the Department and was based upon the California Air Resources Board Method 435 (CARB 435). The sample*

frequency provided therein is for determining the presence of asbestos fibers in Serpentine Aggregate stockpiles. The method is not specifically designed for the geology being mined at the Rock Hill Quarry, as the operators are not proposing to mine Serpentine Aggregate. Rather the site is proposing to mine an asbestos-free host rock (diabase) that contains mineral veins that potentially contain trace actinolite asbestos. However, as California has the most developed programs and guidance for asbestos determinations, we surmise that the Department mandated a conservative (greater) initial sampling frequency for the processed aggregate stockpiles based upon that available guidance.

Future aggregate sampling frequency (if deemed to be appropriate) will be further based upon the results accumulated by the QGSSP data. Currently, thirty-three (33) aggregate and drill cutting samples have been analyzed as previously reported, and an additional sixteen (16) aggregate samples were collected and submitted for analysis on April 18, 2019 as part of the approved QGSSP.

- 3. Rock Coring and Sampling Location:** The rock coring locations are limited to the southeastern corner of the site in an area referred to as the "planned mining area." However, the "planned mining area" is not delineated on the figure and the area/amount of material to be mined is not otherwise described in the Plan. The rock coring locations should not be limited to this area but should cover the entire area covered by the mining permit, but a bare minimum should include coring of the boulder field along the southern and eastern sides of the site, at a minimum frequency no greater than that provided for the "planned mining area." If the mining permit allows the operator to mine and blast in other areas of the quarry, then these areas should also be surveyed for asbestos-containing mineral veins to understand which areas should be avoided.

The drilling program included in the April 3, 2019 QGSSP was designed for the two (2) targeted benches only. As indicated previously, any future sampling will be based upon the results obtained from this initial drilling program.

- 4. Rock Coring and Sampling Frequency:** While the amount of material in the "planned mining area" is not described in the Plan, the number and spacing of the rock cores shown on Figure 1B is insufficient. The cores are spaced approximately 75 to 250 feet apart, and many asbestos-containing mineral veins could exist between the cores and would therefore not be accounted for in the survey.

Please see our detailed response to the Department's Comment #3. The drilling locations were adjusted as described based upon the found geological features. If the results indicate the presence of naturally occurring asbestos-containing mineral veins, additional sampling may be proposed.

5. **Boulder Field Size and Location:** The Plan describes the boulder field as existing to the southern and eastern sides of the quarry pit, but does not offer any description of the size, depth, or amount of material contained in the boulder field. The Plan also does not describe the geology or the origin of the boulder field. Additionally, sampling 30 boulders on the surface is insufficient to characterize the horizontal and vertical extent of the material.

*The boulders are erosional remnants and/or were placed by historical mining. However, the origin and geology of the boulder field will be described in the Qualitative Geologic Survey Report after the investigation of the boulders is complete. The intention of the boulder investigation is to evaluate easily accessible rock for the potential presence of mineral veins, and if found, collect samples as appropriate. The intention is not to map the horizontal and vertical extent of the materials. Similar to other parts of the proposed investigation, if asbestos containing mineral veins are found in the investigation, additional sampling and or handling of the boulders will be proposed.*

6. **Boulder Field Sampling Bias:** The boulder field is proposed to be sampled, and sample locations are to be selected, by the geologist in the field. The geologist employed by the operator should not be left with the discretion to pick and choose boulders to sample, particularly when there may be an interest in avoiding boulders with potential asbestos veins. For this reason, other PADEP programs regulating site remediation and waste characterization require sampling locations to be biased towards observed contamination or to be based on a truly randomized sampling grid to remove the potential for bias when selecting samples for analysis.

*By looking for and specifically sampling suspected asbestiform mineral veins, the proposed sampling is actually biased towards finding asbestos, if present, not avoiding it. Additionally, a licensed professional geologist will complete the work and will be accompanied by a Department staff member.*

7. **Wind Erosion of Aggregate Storage Piles:** Wind erosion of the storage piles and open areas of the site can create significant air emissions depending on local wind conditions. If such wind erosion is expected or observed, the Plan should seek to determine the asbestos content of those surfaces that may erode and become airborne.

*Air quality sampling is addressed under the air quality permit. Significant background sampling has already been conducted. No detections of airborne Naturally Occurring Asbestos (NOA) were found.*



8. **Roadway Dust Emissions:** Heavy truck traffic on the unpaved roads at the site is a significant source of air emissions. The Plan should include an analysis of the silt and asbestos content of the road surface so that the potential emissions from this source can be understood.

*See our response to Comment #7. Additionally, potential fugitive dust emissions from unpaved roads at the site are controlled by engineering controls (i.e. regular use of the site water truck).*

9. **Water Sampling Locations:** The Plan states that water samples will be collected from four locations. However, there are clearly more than four water features present at the quarry. These locations should be included in the Plan and water and sediment samples should be collected from these locations.

*Additional water sampling was requested by the Department and completed at the site on April 18, 2019. Water samples were collected from the following locations: NPDES 001 outfall, Sediment Pond No. 1, Sediment Pond No. 2, Quarry Pit, Sediment Trap No. 1, Sediment Trap No. 2, and Sediment Trap No. 3.*

10. **Sediment Sampling:** The Plan states that water samples will be collected from various locations including sedimentation basins. Since any asbestos present in the water would be expected to settle, the Plan should also include sediment sampling at these locations.

*The basins and sediment traps were sampled near their discharge structures and towards where captured water containing suspended solids migrates (prior to becoming sediment). The water samples collected were indicated to contain some suspended solids, which will be the focus of the analysis.*

11. **Sampling Oversight:** Due to the potential bias that may be introduced during sampling, we request that a licensed geologist employed by the department be present during all sampling collection activities.

*Sampling proposed in the plan was, and will be conducted, in the presence of a PADEP staff member experienced in sampling methodology. In addition, sampling was conducted by or directed by a Pennsylvania licensed Professional Geologist.*

12. **Potential for Asbestos Releases:** The CERCLA Reportable Quantity for friable asbestos is 1 pound. Emission calculations for the crushing/screening plant estimate potential particulate matter emissions to be 83 pounds *per hour*. Mining, blasting, wind erosion, and truck traffic will contribute additional particulate matter emissions. Therefore, even minimal amounts of asbestos contained in the quarry

**materials could easily create a "CERCLA release" once they have been rendered airborne by the operator. This suggests that a significantly more rigorous and quantitative analysis of the quarry material is necessary.**

*The Rock Hill Quarry is not a CERCLA site, for which the above referenced emission regulation is intended to address. However, air emissions via air quality sampling is addressed under the air quality permit. The air monitoring requirements may be reevaluated based upon the results of the QGSSP and the potential for asbestos release.*

I trust that the information provided herein in response to the presented comments is more than sufficient to allow the core drilling portion of the QGSSP to move forward. In the meantime, if you have any questions regarding the comment responses, please feel free to contact me at (215) 766-1211.

Sincerely,  
**Earthres Group, Inc.**



Louis F. Vittorio, Jr., P.G.  
Vice President



Enclosures: Bench Face Mapping Data Tables  
Stereonet Plot and Statistics  
Drawing D-1: Bench Face Mapping  
Figure 1 – Geologic Features and Coring Location Plan

## **Bench Face Mapping Data Tables**



**Bench Face Mapping Data  
Rock Hill Quarry  
April 22, 2019**

**Face Below Lower Bench**

Vein ID	Strike	Dip	Photo Time	Description
1	N40E	75SE	8:31	4" to 6" wide weathered zone; no mineral veining visible.
2	N20W	90	8:44	Whitish, thin coating on diabase sub-parallel to wall face.
3	N52E	85SE	8:44	8" to 1.5' wide weathered fault/shear zone; whitish undulating mineral veining noted, green color noted at top of zone.
4	N64E	71SE	8:51	Approx. 8" wide brown highly weathered; whitish undulating mineral veining noted.
5	S80E	80SW	8:59	Whitish, very thin coating on diabase trending oblique to wall face.
6	N50E	84SE	9:02	Approx. 0.5" white haloed, dark colored vein.
7	N70E	82SE	9:08	Approx. 8" wide weathered vein; apparent Actinolite vein; green elongated flattened crystals; appears to pinch out further up the wall.
8	N30E	78SE	9:17	Approx. 0.5" white haloed, dark colored vein.
9	N15E	70SE	9:28	Approx. 4" wide banded white/greenish mineral vein.

**Face Below 2<sup>nd</sup> Bench**

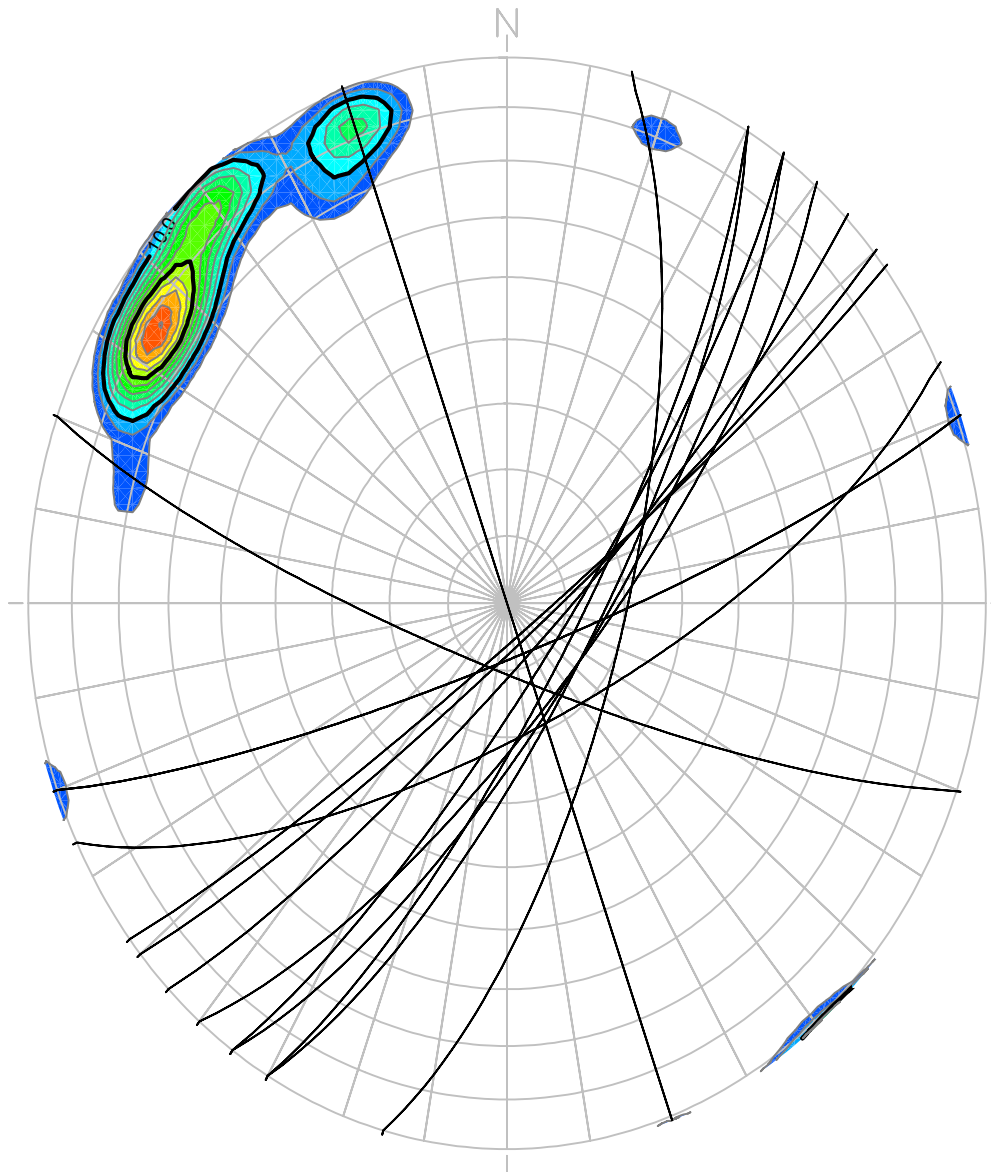
Vein ID	Strike	Dip	Photo Time	Description
10	N35E	80SE	10:04	South side of wall, white vein visible near top of wall; estimated narrow 1" vein.
11	N70E	82SE	10:10	Approx. 0.5" white vein, continuous trending up wall.
12	N30E	75SE	10:14	Approx. 8" to 12" mud vein, discontinuous in upper and lower wall due to weathering and talus; no white veins visibly noticeable.
13	N45E	82SE		Approx. 4" to 8" mud vein, located several feet north on wall from above Vein #3; discontinuous in upper and lower wall due to weathering and talus; central discolored white vein noticeable.

**Face Above 2<sup>nd</sup> Bench**

Vein ID	Strike	Dip	Photo Time	Description
NA	N35E	75SE	10:49	Weathered wall, general strike and dip of wall structure near center of wall recorded.

## **Stereonet Plot and Statistics**

# Rock Hill Quarry - Bench Mapping



Statistical Summary	
Projection:	Schmidt (Equal Area)
Number of Sample Points:	14
Mean Lineation Azimuth:	314.7 <b>N44.7E</b>
Mean Lineation Plunge:	12.1 <b>77.9 SE</b>
Great Circle Azimuth:	227.9
Great Circle Plunge:	12.1
1st Eigenvalue:	0.814
2nd Eigenvalue:	0.178
3rd Eigenvalue:	0.007
LN ( E1 / E2 ):	1.518
LN ( E2 / E3 ):	3.17
(LN(E1/E2)) / (LN(E2/E3)):	0.479
Spherical Variance:	0.1178
Rbar:	0.8822



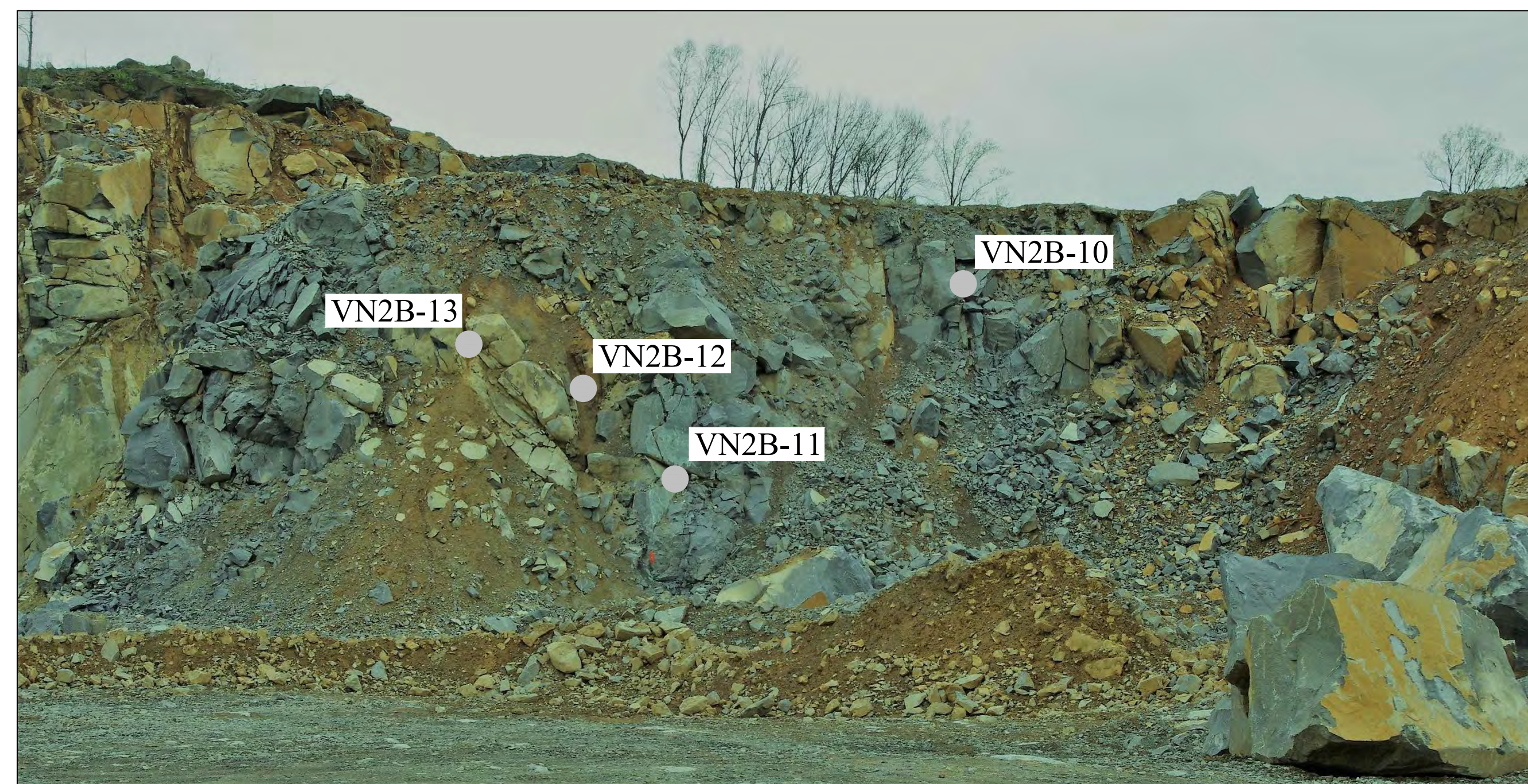
**Drawing D-1: Bench Face Mapping**



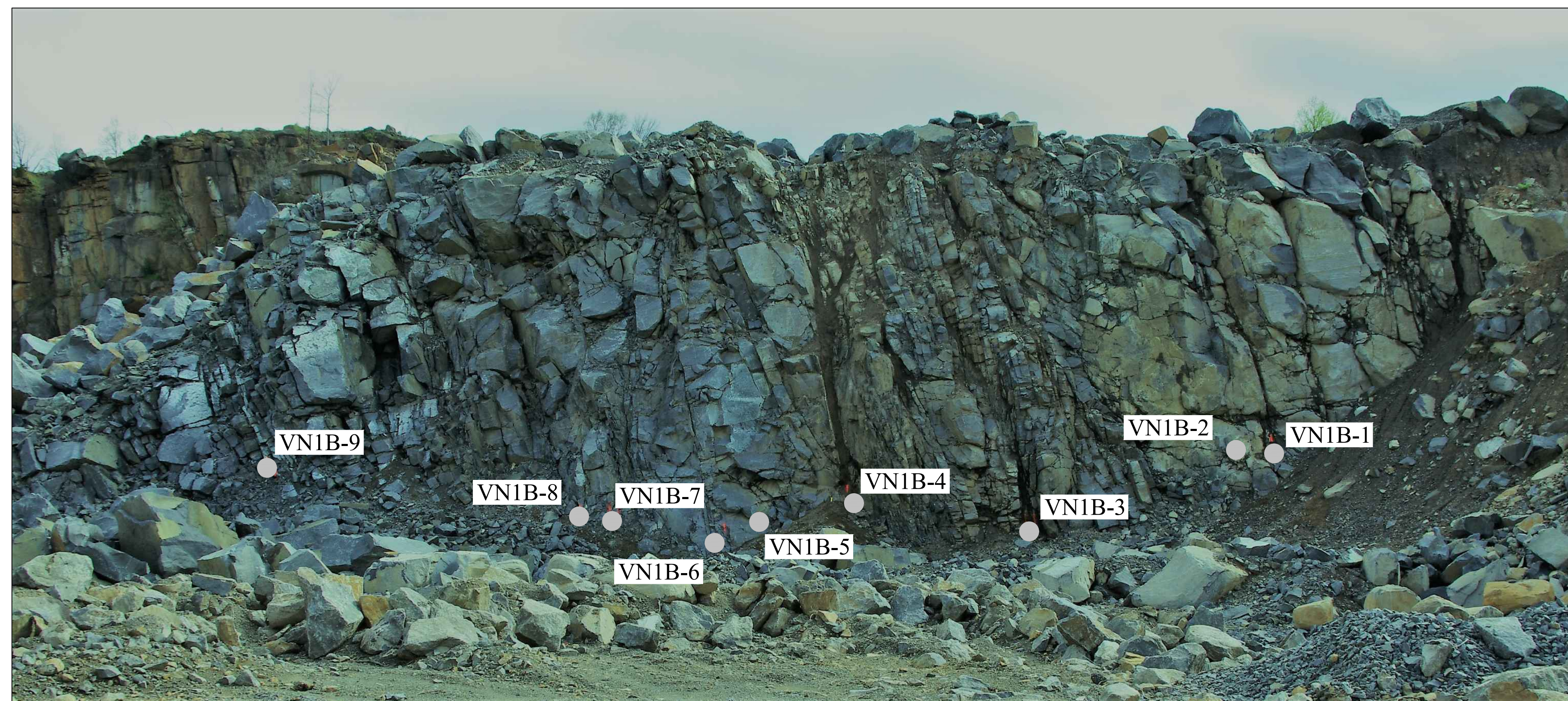
BENCH 3 FACE



BENCH 2 FACE (VN2B)



BENCH 1 FACE (VN1B)



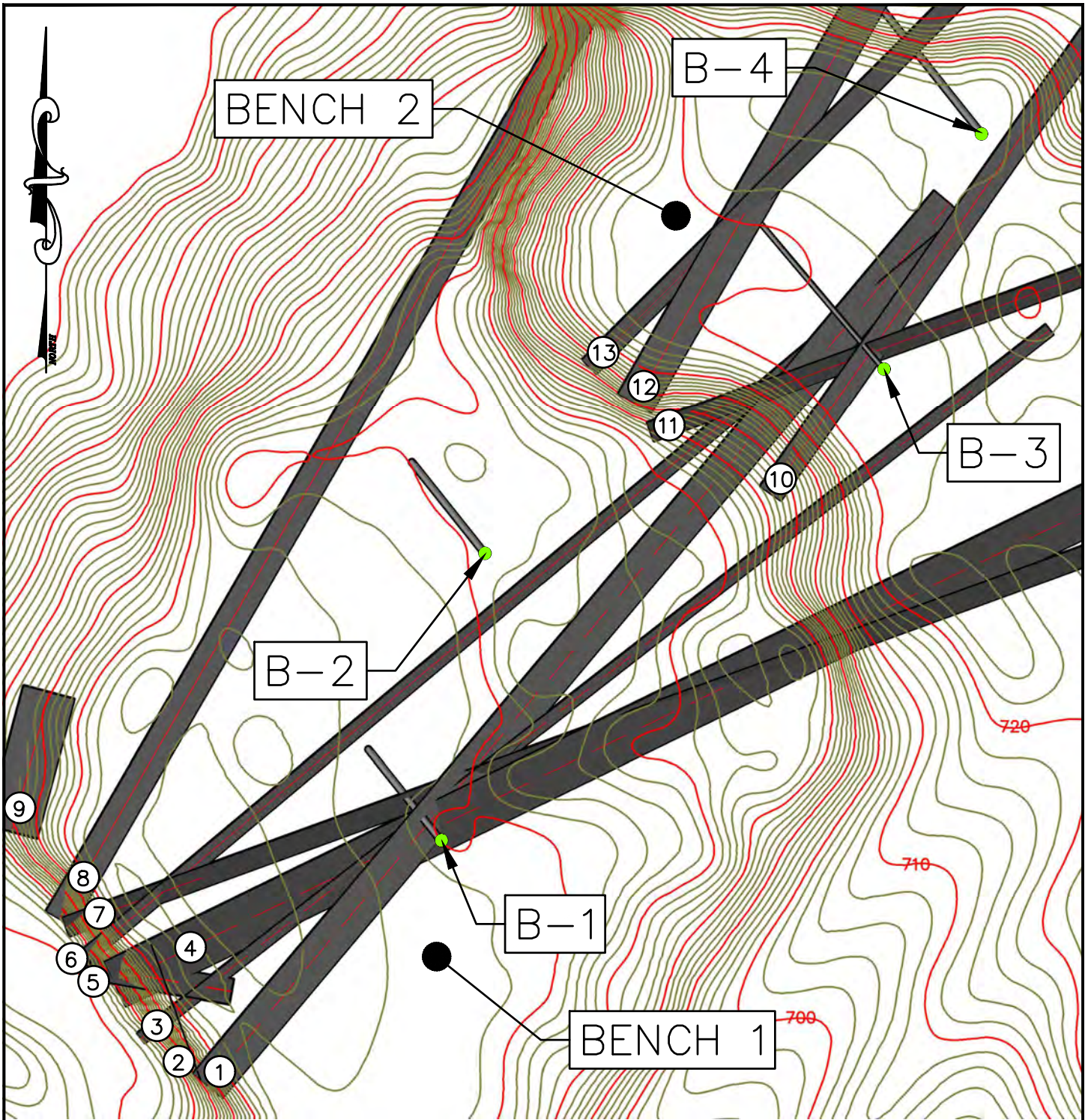
DRAWN BY: JPT CHECKED BY: LTY DATE: 4-24-19 PROJECT NO: 081022.051 DRAWING NUMBER: D-1	BENCH FACE MAPPING ROCK HILL QUARRY ROCK HILL QUARRY HANSON AGGREGATES PENNSYLVANIA, LLC	PREPARED BY: EARTHRES ENGINEERING FOR SUCCESS® www.earthres.com	PREPARED FOR: Hanson HANSON AGGREGATES COMPANY	PROJECT SITE: ROCK HILL QUARRY 2055 NORTH ROCKHILL ROAD EAST ROCKHILL TOWNSHIP, BUCKS COUNTY, PA	REVISIONS NO. DATE BY
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F:\PROJECTS\Hanson\061003.052 Rock Hill Permit Update\CAD\Drawings\BENCH PHOTOS.dwg Layout: E SIZE User: jtklar 04/25/2019 15:52



## **Figure 1 – Geologic Features and Coring Location Plan**





BORINGS ARE MADE AT STRIKE N45W, DRILLED AT 30° FROM VERTICAL.



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HEADQUARTERS  
PHILADELPHIA REGION  
P.O. Box 468  
6912 Old Embsen Road  
Pipersville, PA 18947

APPALACHIAN  
REGIONAL OFFICE  
P.O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

DRAWN BY:  
JJB

DATE:  
4/25/19

DRAWING SCALE:  
1" = 50'

CHECKED BY:  
LFV

PROJECT NO:  
061003.051



**FIGURE 1**  
GEOLOGIC FEATURES AND BORING LOCATION PLAN

HANSON AGGREGATES PENNSYLVANIA, LLC  
ROCK HILL QUARRY  
2055 NORTH ROCKHILL ROAD  
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY, PA

## **Appendix D - Prior Reports and Analytical Reports**



Prior investigation, qualitative geological surveying, and sampling conducted at the Site during 2018 included the collection and analysis of five (5) surface water samples and thirty-three (33) rock and aggregate samples including: 5 mineral vein rock samples, 21 drill hole cutting samples, 5 aggregate storage pile samples and 2 crusher run (fines) samples.

Appendix D includes the following table, figures and prior geologic evaluations:

*2018 Laboratory Data Summary Table*

*2018 Quarterly Sampling Locations Figure*

*December 20, 2018 One-Time Background Sample Location Figure*

*ERG's Asbestos Investigation Results report dated January 18, 2018*

*ERG's 2<sup>nd</sup> Quarter 2018 NOA Monitoring Report dated July 27, 2018*

*ERG's 3<sup>rd</sup> Quarter 2018 NOA Monitoring Report dated October 24, 2018*

*ERG's 4<sup>th</sup> Quarter 2018 NOA Monitoring Data*

*EMSL Analytical, Inc. December 20, 2018 Aggregate and Surface Water Laboratory Results*

All samples yielded non-detectable results for NOA, except for one biased rock sample collected on November 9, 2018 that found a trace amount of asbestiform actinolite in a mineral vein (Hand Sample 1). After the fibrous asbestos exceedance on November 9, 2018, PA DEP requested one round of background sampling, which occurred on December 20, 2018. Refer to the documents provided in this appendix for a summary of prior geologic evaluations completed from January 2018 to December 2018.

**2018 Laboratory Data Summary Table**



**2018 Laboratory Data Summary Table**

Quarter	ID	Date	ID On COC	% Fibrous	% Non-Fibrous	% Asbestos
1st	S-1	1/9/2018	S-1	0	100	ND
	S-2	1/9/2018	S-2	0	100	ND
	S-3	1/9/2018	S-3	0	100	ND
	S-4	1/9/2018	S-4	0	100	ND
	S-5	1/9/2018	S-5	0	100	ND
	S-6	1/9/2018	S-6	0	100	ND
	S-7	1/9/2018	S-7	0	100	ND
	S-8	1/9/2018	S-8	0	100	ND
	S-9	1/9/2018	S-9	0	100	ND
	Hand Sample S-1	1/12/2018	S-1	0	100	ND
	Hand Sample S-2	1/12/2018	S-2	0	100	ND
	Hand Sample S-3	1/12/2018	S-3	0	100	ND
	Hand Sample N-1	1/12/2018	N-1	0	100	ND
2nd	DH-1	6/4/2018	Composite*	0	100	ND
	DH-2	6/4/2018				
3rd	S-1	7/17/2018	Composite #1	0	100	ND
	S-2	7/17/2018				
	S-3	7/18/2018	Composite #2	0	100	ND
	S-4	7/18/2018				
	S-5	7/31/2018	Composite #1	0	100	ND
	S-6	7/31/2018				
	S-7	8/22/2018	Composite #1*	0	100	ND
	S-8	8/22/2018				
	S-9	9/6/2018	Composite*	0	100	ND
	S-10	9/6/2018				
	S-11	9/24/2018	Composite #1	0	100	ND
	S-12	9/24/2018				

Samples analyzed via EPA method 600/R-93/116 with PLM via 400 pt. (<0.25%) or 1000 pt. count (<0.1%)

PLM detection limit = <0.1% (1000 point count)

\* Indicates PLM detection limit of <0.25% (400 point count)

ND - Not detected within analytical limits

US EPA Drinking Water Maximum Contaminant Level (MCL) = 7 MFL (million fibers per liter > 10 µm in length)

AC = Actinolite

**2018 Laboratory Data Summary Table (Continued)**

Quarter	ID	Date	ID On COC	% Fibrous	% Non-Fibrous	% Asbestos	
4th	S-1	10/10/2018	Composite #1	0	100	ND	
	S-2	10/10/2018					
	S-3	10/19/2018	Composite #1*	0	100	ND	
	S-4	10/19/2018					
	S-5	10/30/2018	Composite #1*	0	100	ND	
	S-6	10/30/2018					
	S-7	11/1/2018	Composite #1*	0	100	ND	
	S-8	11/1/2018					
	S-9	11/9/2018	Composite #1*	0	100	ND	
	S-10	11/9/2018					
Hand Sample 1	11/9/2018	Hand Sample 1* (PLM)	0.25	99.75	<b>0.25 AC</b>		
		Hand Sample 1 (TEM)	-	-	<b>0.80 AC</b>		
12/20/2018 Background	2B Aggregate	12/20/2018	1*	0	100	ND	
	2B Aggregate	12/20/2018	2*	0	100	ND	
	1B Aggregate	12/20/2018	3*	0	100	ND	
	2A Aggregate	12/20/2018	4*	0	100	ND	
	Screenings	12/20/2018	5*	0	100	ND	
	Crusher Fines (West)	12/20/2018	6*	0	100	ND	
	Crusher Fines (East)	12/20/2018	7*	0	100	ND	
	<b>Surface Water Samples (&gt;10 µm Only)</b>				<b>Analytical Sensitivity</b>	<b>Concentration</b>	<b>Fibers Detected</b>
	Outfall	12/20/2018	1	2.60	<2.60	ND	
	Outfall (Dup)	12/20/2018	2	2.60	<2.60	ND	
	North Pond	12/20/2018	3	1.80	<1.80	ND	
	South Pond	12/20/2018	4	6.80	<6.80	ND	
	Quarry Pit	12/20/2018	5	2.60	<2.60	ND	
	<b>Surface Water Samples (≥0.5 µm)</b>				<b>Analytical Sensitivity</b>	<b>Concentration</b>	<b>Fibers Detected</b>
	Outfall	12/20/2018	1	2.60	2.60 AC	1	
	Outfall (Dup)	12/20/2018	2	2.60	7.90 AC	3	
	North Pond	12/20/2018	3	1.80	<1.80	ND	
	South Pond	12/20/2018	4	6.80	20.00 AC	3	
	Quarry Pit	12/20/2018	5	2.60	<2.60	ND	

Samples analyzed via EPA method 600/R-93/116 with PLM via 400 pt. (<0.25%) or 1000 pt. count (<0.1%)

PLM detection limit = <0.1% (1000 point count)

\* Indicates PLM detection limit of <0.25% (400 point count)

ND - Not detected within analytical limits

US EPA Drinking Water Maximum Contaminant Level (MCL) = 7 MFL (million fibers per liter > 10 µm in length)

AC = Actinolite



## 2018 Quarterly Sampling Locations Figure

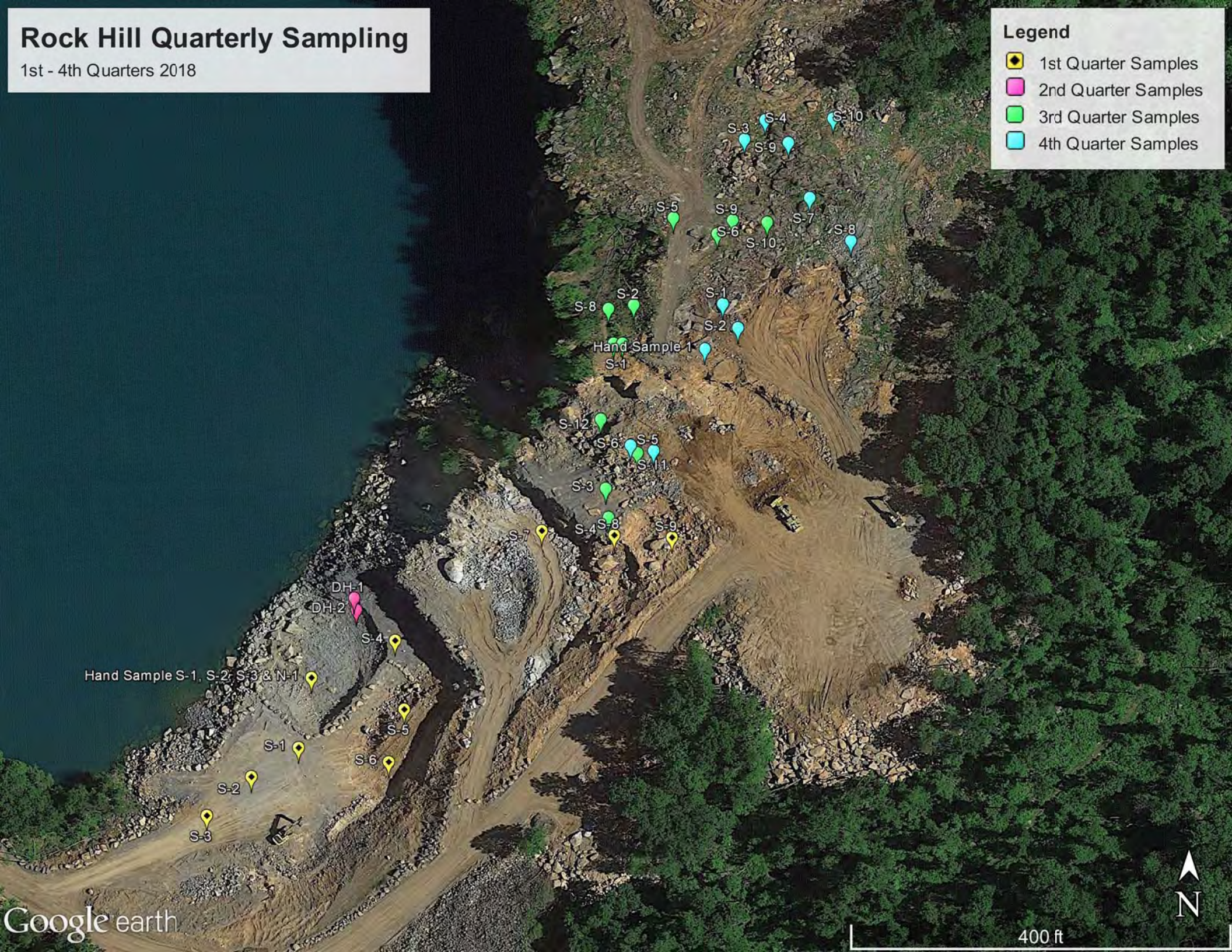


# Rock Hill Quarterly Sampling

1st - 4th Quarters 2018

**Legend**

- 1st Quarter Samples
- 2nd Quarter Samples
- 3rd Quarter Samples
- 4th Quarter Samples






**December 20, 2018 One-Time Background Sample Location  
Figure**



# Rock Hill Quarry

12-20-2018 Sampling

## Legend

 Aggregate & Surface Water Sample

1&2 Outfall  
1- 2B Stone  
2- 2B Stone  
3- 1B Stone  
4- 2A Stone

5- Screening

7- Crusher (East)  
6- Crusher (West)

3 North Pond

4 South Pond

5 Quarry Pit





# **ERG's Asbestos Investigation Results**

**January 18, 2018**

January 18, 2018

Michael J. Menghini, District Mining Manager  
Department of Environmental Protection  
Pottsville District Mining Office  
5 West Laurel Boulevard  
Pottsville, PA 17901-2454

**SUBJECT: Asbestos Investigation Results  
Rock Hill Quarry Operation  
SMP No. 7974SM1  
East Rockhill Township, Bucks County  
EarthRes Project No. 061003.051**

Dear Mr. Menghini:

On behalf of Hanson Aggregates Pennsylvania, LLC (Hanson) and pursuant to the Pennsylvania Department of Environmental Protection's (herein referred to as PA DEP or the "Department") letter dated January 4, 2018, please find the following investigation and testing results completed by EarthRes Group, Inc. (EarthRes) at the Hanson Rock Hill Quarry (the "site").

## **INTRODUCTION**

The work completed in the following investigation included geological evaluation through publication review, onsite mapping, and sampling and analysis of the rock in the planned active mining area. The work was completed to determine the potential presence of naturally occurring asbestos (NOA) minerals. The work was performed onsite by EarthRes personnel between January 8 and 11, 2018, under the supervision of a Pennsylvania licensed Professional Geologist (P.G.). A site figure showing the quarry and investigation areas is included in Appendix A.

## **SITE DESCRIPTION AND CONDITIONS**

The site is an existing permitted mine located on the western side of Rock Hill. Currently, the southern portion of the mine is being prepared for additional mining of the diabase bedrock. Site preparations include overburden removal and drilling of test holes for sampling and production blasting. However, per the Department's January 4, 2018 letter and directive, production drilling, blasting, and crushing has ceased.



## GEOLOGICAL SETTING AND LITERATURE REVIEW

The diabase of the Haycock-Rock Hill Sill is a light-grey, medium to coarse grained crystalline igneous rock. At the edges of the Sill, the thinner Byram and Clayton diabase sills are dense, fine-grained, and greenish-black. Constituents, however, are the same and consist of plagioclase feldspar and augite being the predominant mineralogical species ([Bascom et al., USGS 1931](#)). The referenced USGS report provides no indication of the presence of NOA in the mineralogy of the diabase. The [Mineralogy of Pennsylvania \(Gordon, 1922\)](#) similarly does not indicate the presence of NOA in East Rockhill Township nor at the current quarry site. Additionally, a [USGS report by Van Gosen \(2006\)](#) lists and maps NOA occurrences in the eastern United States. The report does not identify NOA occurring at the site or in the area. The closest occurrence is within the serpentine rocks of the Easton, PA area.

The internet site [www.mindat.org](http://www.mindat.org), which is an “open-source” mineral specimen web based database, lists a potential single occurrence of NOA at the site from a sample collected in the 1970s. The [mindat.org posting](#) was completed by a third party (not the collector) and it notes that the sample was previously listed to a locale in Quakertown. The posting does not contain analyses for asbestos, but lists “possibly tremolite” as a description.

## SITE SPECIFIC INVESTIGATION

**Investigation and Sampling Rationale:** Investigation at the quarry was targeted in the following manner: 1) assessing the presence of NOA minerals in the proposed mining area through mapping, and sampling of rock and borehole data; 2) evaluating for the presence of contacts with surrounding sedimentary rocks where metamorphism of the host rock could potentially form NOA minerals, and 3) evaluating and sampling found mineralized veins in the diabase bedrock that could potentially contain NOA minerals.

**Site Assessment:** EarthRes completed site reconnaissance, mapping and sampling activities between January 8 and 11, 2018. Sampling of subsurface rock was accomplished via drill cuttings from borings installed by Maine Drilling and Blasting on January 8, 2018 in three (3) areas currently being prepared for mining. Sampling for potential NOA minerals was biased to these areas. Field geologists from EarthRes mapped the geology and collected samples from the borings on January 9<sup>th</sup>. Additionally, hand samples from mineral veining observed on the existing southern highwall were collected on January 11<sup>th</sup>. A map showing the investigation, drilling and sampling locations is attached in Appendix A. Boring logs are included in Appendix B, and Site and hand sample photographs are included in Appendix C.

**Sample Collection and Analysis:** Nine (9) composite samples were collected from drill cuttings at each boring location. The boreholes were identified on the laboratory chain-of-custody (COC) as Samples 1 through 9. The corresponding sampling locations are shown on the attached Figure

in Appendix A. The boring samples were collected using a decontaminated steel shovel that was used to mix and collect a composite sample from the drill cuttings. One (1)-gallon Ziplock® bags were filled with approximately 0.5 gallons of drill cuttings from each borehole. The samples were sealed and placed in 5-gallon buckets for transfer to the laboratory for preparation and testing.

Outcrop hand samples of observed mineral veining from the southern highwall were collected and numbered (from north to south): N-1, S-1, S-2 and S-3, as the highwall in the area of the sampling trends approximately north-south. The general sampling location is shown on the attached Figure in Appendix A. Pictures of the highwall, specific sampling locations and the collected sampled are provided in the photographs in Appendix C.

The samples were transported directly to EMSL Laboratory in Cinnaminson, NJ using standard chain-of-custody procedures. Each sample was analyzed using Polarized Light Microscopy (PLM) via EPA 600/R-93/116 Method with preparation using the CARB 435 Method.

**Geological Mapping and Assessment:** As shown on the attached Figure, the area surrounding the quarry and proposed mining area was assessed to determine the presence of vein infillings and/or sedimentary rock contacts. The diabase described by Bascom, et al. (1931) was similarly observed and was indicated to be massive, fine to medium grained and grey to dark grey in color.

Numerous large boulders were assessed on the southern, northern, and eastern sides of the site. Freshly-broken surfaces were visually inspected to identify the potential presence of naturally occurring asbestos NOA. Each boulder observed consisted of a tightly-massed, fine to medium grained crystalline diabase. Joints were observed to be weathered and typically covered by an oxide, typically manganese or ferric oxide. Mineral veining containing potential NOA was not observed in the examined boulders. Four (4) mineral veins were observed on the southern highwall adjacent to the proposed mining area and were sampled as described in the preceding paragraph.

Sedimentary rocks or features (e.g. bedding, folds, cross-beds, etc.) were not visually observed on the highwalls. Near-vertical jointing was observed along much of the eastern highwall. Contacts with sedimentary host rocks were not indicated in the surrounding outcrops or boulder fields. Several photographs taken onsite are included in Appendix C showing field conditions at the time of mapping. The investigation area is indicated to be wholly within the diabase bedrock.

## **INVESTIGATION RESULTS AND RECOMMENDATIONS**

The geological data collected and presented herein does not indicate areas of contact metamorphism within the diabase that could potentially contain NOA minerals. Mineral veining was observed on the southern highwall, and the mineral veins were sampled for subsequent



laboratory analysis for asbestos. Similarly, the drill cuttings from the adjacent drill holes in the area to be mined were sampled and sent for laboratory analysis.

The laboratory testing results determined that the drill cutting samples were homogeneous, brown to grey and 100% non-fibrous. Asbestos was not detected in any of the samples at the lowest PLM CARB 435 detection limit of 0.1%. The laboratory testing results from the southern highwall samples were also analyzed and asbestos was similarly not detected at the 0.1% limit in any of the samples. Overall, thirteen (13) samples were collected and analyzed in the area proposed for mining and the results did not indicate the presence NOA. The laboratory data is consistent with the mapping conducted at the site and the geological literature discussed and referenced in this report.

The 0.1% detection limit is 10 times lower than the material definition for ACM by EPA & OSHA and 2.5 times lower than what the California Air Resources Board defines as a "Restricted Material." The data and results indicate that mining at the site can commence upon the Department's approval.

If you have any questions or concerns regarding the presented investigation and results, please feel free to contact me at (215) 766-1211.

Sincerely,  
**EarthRes Group, Inc.**



Louis F. Vittorio, Jr., P.G.  
Vice President



- Appendices:**
- A – Figure 1
  - B – Boring Logs
  - C – Site and Sample Photographs
  - D – Laboratory Analytical Results

**References:**

- Bascom, F., Wherry, E.T., Stose, G.W., and Jonas, A.I. Geology and Mineral Resources of the Quakertown-Doylestown District Pennsylvania and New Jersey. United States Department of the Interior, Geological Survey Bulletin 828, 1931. <https://pubs.usgs.gov/bul/0828/report.pdf>
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- Occupational Safety and Health Administration; 29 CFR 1926.1101(b), Safety and Health Regulations for Construction, [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=10862&p\\_table=standards](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=10862&p_table=standards)
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- Van Gosen, Bradley S., Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Natural Asbestos Occurrences in the Eastern United States, 2006 U.S. Department of the Interior, U.S. Geological Survey Open File Report 2005-1189. <https://pubs.usgs.gov/of/2005/1189/pdf/Plate.pdf>

cc: Mark Kendrick, Hanson\*  
Andrew Gutshall, Hanson\*  
Mike Kutney, PA DEP\*  
John Stefanko, PA DEP\*  
William Plassio, PA DEP\*  
Gary Latsha, PA DEP\*  
Amiee Bollinger, PA DEP\*  
Ross Klock, PA DEP\*  
Sachin Shankar, PA DEP SERO\*  
James Rebarchak, PA DEP Air Quality\*  
Marianne Morano, East Rockhill Twp.\*  
Bucks County

(\*via electronic mail)



**APPENDIX A**

**FIGURE 1**



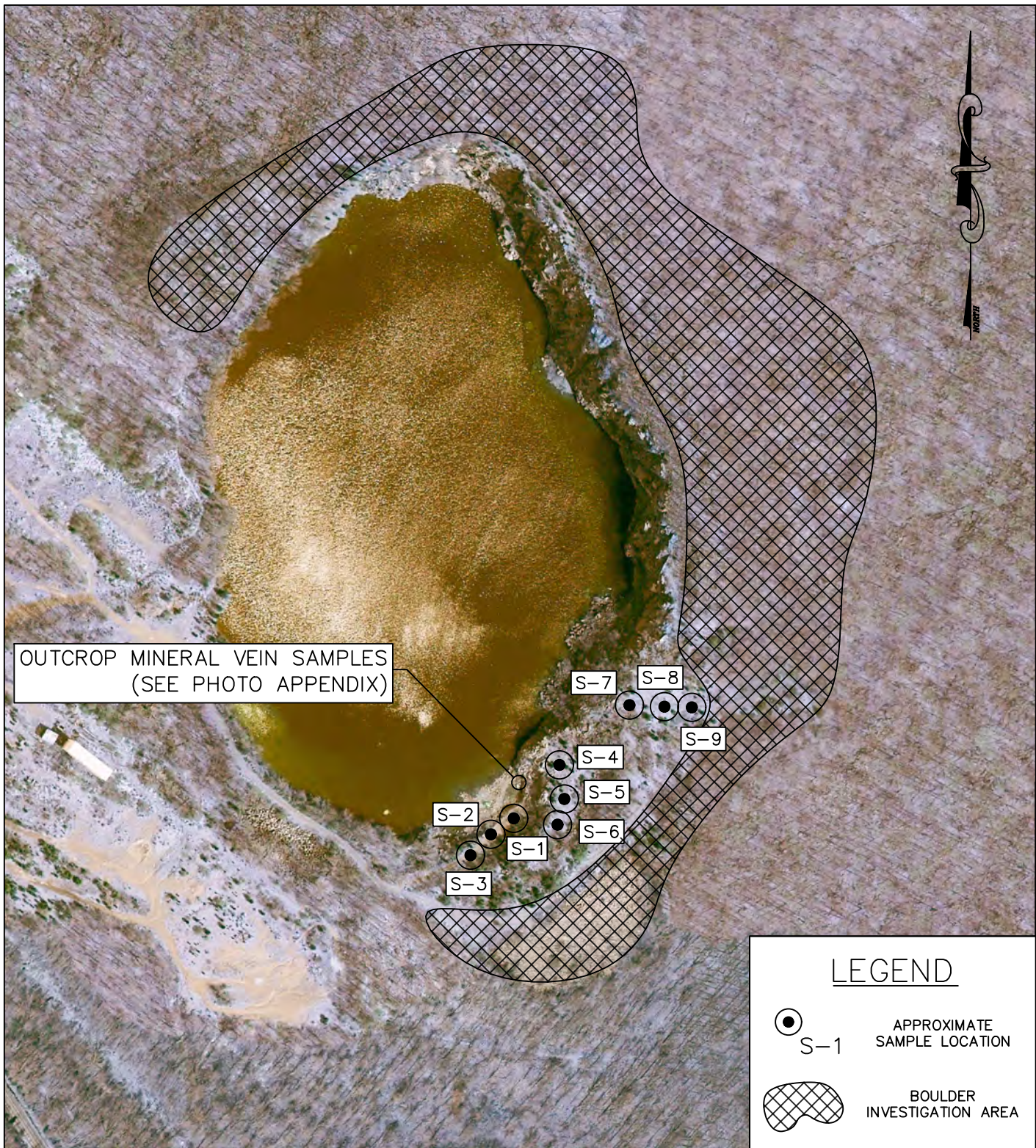


IMAGE SOURCE: PASDA AERIAL IMAGERY SERVICE (2015)



6912 Old Easton Road  
Pipersville, PA 18947 USA

8000 Combs Farm Drive  
Morgantown, WV 26508

www.earthres.com

PA office 215.766.1211  
WV office 304.212.6866  
toll free 800.264.4553

DRAWN BY:  
*JMK*

CHECKED BY:  
*LFV*

DATE:  
*1/16/2018*

PROJECT NO:  
*061003.051*

DRAWING SCALE:  
*1" = 300'*



**LEGEND**

S-1 APPROXIMATE SAMPLE LOCATION

BOULDER INVESTIGATION AREA

**FIGURE 1**  
**SAMPLE LOCATION MAP**

**ROCK HILL QUARRY**  
HANSON AGGREGATES PENNSYLVANIA, LLC  
EAST ROCKHILL TOWNSHIP  
BUCKS COUNTY, PENNSYLVANIA



**APPENDIX B**  
**BORING LOGS**

**Location:** Rock Hill Quarry

**Date:** January 8, 2018

**Driller/Logged by:** Maine Drilling and Blasting

<b>Boring #</b>	<b>Interval</b>	<b>Description:</b>
1	0-4 ft	Soil/overburden
	4-25 ft	Diabase
2	0-4 ft	Soil/overburden
	4-11 ft	Diabase
	11- 13 ft	Weathered rock
	13-19 ft	Diabase
3	0-9 ft	Soil/overburden
	9-10ft	Diabase
4	0-4 ft	Soil/overburden
	4-7 ft	Diabase
	7-10 ft	Weathered rock
	10 -12 ft	Diabase
5	0-4 ft	Soil/overburden
	4-17 ft	Diabase
6	0-4 ft	Soil/overburden
	4-5 ft	Diabase (boulder)
	5-9 ft	Soil/overburden
	9-10 ft	Diabase (boulder)
	10-39 ft	Soil/overburden
7	0-2 ft	Soil/overburden
	2-13 ft	Diabase
	13-15 ft	Weathered rock
	15-39 ft	Diabase
	39-42 ft	Weathered rock
42-50 ft	Diabase	
8	0-6 ft	Soil/overburden
	6-23 ft	Diabase
	23-26 ft	Weathered rock
	26-50 ft	Diabase
9	0-39 ft	Soil/overburden



**APPENDIX C**  
**SITE & SAMPLING PHOTOS**

SITE PHOTOS

Southern Quarry Working Area



Eastern Hill Top Diabase Outcrop





SITE PHOTOS

Typical Diabase Boulder



Typical Diabase Boulder





SITE PHOTOS

Diabase Boulder Field, south side of southern access road



Eastern Highwall Diabase





LOCATION OF SAMPLING



SAMPLE PHOTOS

SAMPLE N-1



SAMPLE S-1





SAMPLE PHOTOS

SAMPLE S-2



SAMPLE S-3



**APPENDIX D**

**DRILL CUTTING LABORATORY RESULTS and  
HIGHWALL HAND SAMPLING RESULTS**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

**EMSL Order:** 041800547  
**Customer ID:** ERG51  
**Customer PO:**  
**Project ID:**

**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947  
**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 01/09/2018 2:20 PM  
**Analysis Date:** 01/09/2018  
**Collected:** 01/09/2018  
**Project:** 061003.051

## Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
S-4 041800547-0001	Drill Cuttings - Fines	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-5 041800547-0002	Drill Cuttings - Fines	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-6 041800547-0003	Drill Cuttings - Fines	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-1 041800547-0004	Drill Cuttings - Fines	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-2 041800547-0005	Drill Cuttings - Fines	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-3 041800547-0006	Drill Cuttings - Fines	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-7 041800547-0007	Drill Cuttings - Fines	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-8 041800547-0008	Drill Cuttings - Fines	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-9 041800547-0009	Drill Cuttings - Fines	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from: 01/09/2018 23:20:39



# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnasblab@EMSL.com](mailto:cinnasblab@EMSL.com)

<b>EMSL Order:</b> 041800547 <b>Customer ID:</b> ERG51 <b>Customer PO:</b> <b>Project ID:</b>
--

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP,INC.) P.O. BOX 468 PIPERSVILLE, PA 18947  <b>Project:</b> 061003.051	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 01/09/2018 2:20 PM <b>Analysis Date:</b> 01/09/2018 <b>Collected:</b> 01/09/2018
--	---

## Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type

Analyst(s) \_\_\_\_\_

Will DiBella (9)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from: 01/09/2018 23:20:39





EMSL ANALYTICAL, INC.  
LABORATORY • PRODUCTS • TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

041800547

RECEIVED  
EMSL  
CINNAMINSON, N.J.

2010 JAN -9 P 2:19

Company Name: <u>Earth Res Group</u>		EMSL Customer ID:	
Street: <u>6912 Old Easton Rd</u>		City: <u>Pipersville</u>	State/Province: <u>PA</u>
Zip/Postal Code: <u>18947</u>	Country: <u>USA</u>	Telephone #: <u>215 766 1211</u>	Fax #:
Report To (Name): <u>Louis Vittorio</u>		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: <u>Lvittorio@earthres.com</u>		Purchase Order:	
Project Name/Number: <u>061003.051</u>		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only) <b>Other:</b> <input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (<0.1%)
--	--	--

Check For Positive Stop - Clearly Identify Homogenous Group Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: Jarrod Swiortek Samplers Signature: [Signature]

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
S-4	Drill Cuttings (Firm) ↓	1/2 gallon ↓	1/9/18 0917
S-5			1/9/18 0920
S-6			1/9/18 0923
S-1			1/9/18 0928
S-2			1/9/18 0931

Client Sample # (s):	-	Total # of Samples:	9
Relinquished (Client):	<u>[Signature]</u>	Date:	<u>1/9/17</u>
Received (Lab):	<u>[Signature]</u>	Date:	<u>1-9-17</u>
Comments/Special Instructions:			



EMSL ANALYTICAL INC.  
LABORATORY • PRODUCTS • TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

04160047

RECEIVED

EMSL  
CINNAMINSON, N.J.

PHONE:  
FAX:

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
S-3	Drill cuttings (Fines)	1/2 gallon	1/9/18 0935
S-7	Drill cuttings (Fines)	1/2 gallon	1/9/18 0944
S-8	Drill cuttings (Fines)	1/2 gallon	1/9/18 0947
S-9	Drill cuttings (Fines)	1/2 gallon	1/9/18 0953

\*Comments/Special Instructions:





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

**EMSL Order:** 041800978  
**Customer ID:** ERG51  
**Customer PO:**  
**Project ID:**

**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947  
**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 01/12/2018 2:05 PM  
**Analysis Date:** 01/15/2018  
**Collected:**  
**Project:** 061003.051

## Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
N-1 041800978-0001	Rock Sample	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-1 041800978-0002	Rock Sample	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-2 041800978-0003	Rock Sample	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-3 041800978-0004	Rock Sample	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s) \_\_\_\_\_

Andrew Castellano (4)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from: 01/15/2018 16:08:14



EMSL ANALYTICAL, INC.  
LABORATORY • PRODUCTS • TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041800978

PHONE:  
FAX:

Company Name : EarthRes Group, Inc.		EMSL Customer ID:	
Street: 6912 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 215-766-1211	Fax #: 215-766-1245
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* -- Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water:</b> EPA 100.2 Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/R-93/116) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-047004 - PLM/TEM (BC only) <b>Other:</b> <input checked="" type="checkbox"/> PLM CARB 435 Level B (reporting limit to <0.1%)
--	--	---

Check For Positive Stop - Clearly Identify Homogenous Group Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: John A. Yenchik Samplers Signature: *John A. Yenchik*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
N-1	Rock Sample	<1 lb.	1/12/18/1205
S-1	Rock Sample	<1 lb.	1/12/18/1205
S-2	Rock Sample	<1 lb.	1/12/18/1205
S-3	Rock Sample	<1 lb.	1/12/18/1205

Client Sample # (s):	Total # of Samples:
Relinquished (Client): <i>John A. Yenchik</i> Date: 1/12/18 Time: 1405	
Received (Lab): <i>[Signature]</i> Date: 1/12/18 Time: 205 pm	
Comments/Special Instructions:	

4RA



# **ERG's 2<sup>nd</sup> Quarter 2018 NOA Monitoring Report**

**July 27, 2018**

July 27, 2018

Andrew J. Gutshall, P.G.  
Environmental Manager  
Hanson Aggregates Pennsylvania, LLC  
7660 Imperial Way  
Allentown, PA 18195

**SUBJECT: 2<sup>nd</sup> Quarter 2018 NOA Monitoring Report  
Rock Hill Quarry Operation  
SMP No. 7974SM1  
East Rockhill Township, Bucks County  
EarthRes Project No. 061003.051**

Dear Mr. Gutshall:

Pursuant to the site monitoring plan approved by the Pennsylvania Department of Environmental Protection (PA DEP), EarthRes Group, Inc. (EarthRes) is pleased to provide the following 2<sup>nd</sup> Quarter 2018 Monitoring Report for the Rock Hill Quarry

## **INTRODUCTION**

Site work was completed in accordance with the Monitoring Plan prepared by Hanson Aggregates Pennsylvania, LLC (Hanson), as approved by PA DEP in their letter dated January 25, 2018. The ongoing work is being performed to assess the potential presence of naturally occurring asbestos (NOA) minerals in the areas to be mined. Prior site investigation and sampling detailed in our report of January 18, 2018 (1<sup>st</sup> Quarter 2018), did not indicate the presence of NOA in the proposed mining area.

The current monitoring and sampling effort included site observation, collection and analysis of rock and rock cuttings in the active southeast quarry development area. The work was performed onsite by EarthRes personnel on June 4, 2018, under the supervision of a Pennsylvania licensed Professional Geologist (P.G.). A site figure showing the quarry and sample locations is included in Appendix A.

## **SITE SPECIFIC INVESTIGATION**

Per the NOA Monitoring Plan, a single active bench (face) area was being prepared for drilling and subsequent blasting at the time of sampling. One (1) composite drill-cutting sample was collected



from two (2) drill holes on the active bench. The corresponding sampling locations are shown on the attached Figure in Appendix A. The composite samples were collected using a sterile plastic scoop that was used to mix and collect the drill cuttings. One (1)-gallon Ziplock® bags were filled with approximately 0.5 gallons of drill cuttings from each borehole. The two drill cutting samples were then combined into a single one-gallon Ziplock® bag evenly and mixed.

An outcrop hand sample of observed mineral veining from the bench face was collected while onsite. The hand sample was compared to previously collected samples, and was found to be similar and from the same location that was sampled and reported as non-detect for NOA in our report of January 18, 2018. The sample location is shown on the attached Figure in Appendix A. Pictures of the highwall, specific sampling locations and the collected sample are provided on the photographs in Appendix B.

The composite sample was shipped via FedEx priority overnight to EMSL Laboratory in Cinnaminson, NJ using standard chain-of-custody procedures. The sample was analyzed using Polarized Light Microscopy (PLM) via EPA 600/R-93/116 Method with preparation using the CARB 435 Method.

## SAMPLE RESULTS

The laboratory testing results determined that the composite drill cutting sample was homogeneous, grey and 100% non-fibrous. Asbestos was not detected in the sample at the lowest PLM CARB 435 detection limit of 0.1%. The laboratory report is in Appendix C.

Please feel free to contact me at (215) 766-1211 should you have any questions or require any additional information.

Sincerely,  
**EarthRes Group, Inc.**



Louis F. Vittorio, Jr., P.G.  
Vice President



- Appendices:**
- A – Figure 1
  - B – Site and Sample Photographs
  - C – Laboratory Analytical Results

**APPENDIX A**

**FIGURE 1**



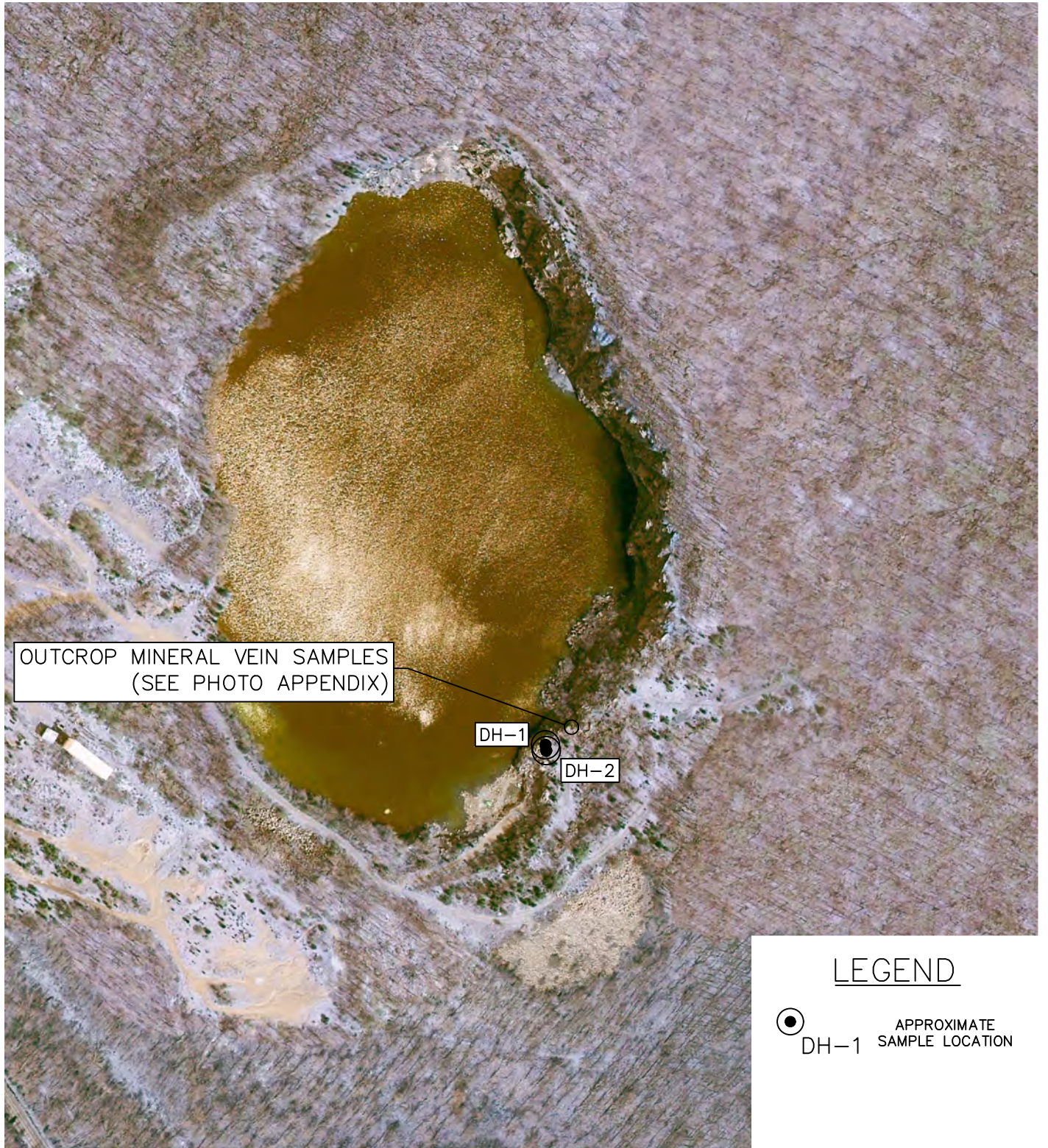


IMAGE SOURCE: PASDA AERIAL IMAGERY SERVICE (2015)



6912 Old Easton Road  
Pipersville, PA 18947 USA

8000 Combs Farm Drive  
Morgantown, WV 26508

www.earthres.com

PA office 215.766.1211  
WV office 304.212.6866  
toll free 800.264.4553

DRAWN BY:  
*JPS*

CHECKED BY:  
*LFV*

DATE:  
*6/20/2018*

PROJECT NO:  
*061003.051*

DRAWING SCALE:  
*1" = 300'*



**FIGURE 1**  
**SAMPLE LOCATION MAP**

**ROCK HILL QUARRY**  
**HANSON AGGREGATES PENNSYLVANIA, LLC**  
**EAST ROCKHILL TOWNSHIP**  
**BUCKS COUNTY, PENNSYLVANIA**



**APPENDIX B**  
**SITE & SAMPLING PHOTOS**



Photo 1: Vein exposed in active face.





Photo 2: DH-1 drill cuttings and sample location.





Photo 3: DH-2 drill cuttings and sample location.



**APPENDIX C**

**LABORATORY RESULTS**



# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

<b>EMSL Order:</b> 041817020
<b>Customer ID:</b> ERG51
<b>Customer PO:</b>
<b>Project ID:</b>

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP,INC.) P.O. BOX 468 PIPERSVILLE, PA 18947	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 06/05/2018 9:20 AM <b>Analysis Date:</b> 06/19/2018 <b>Collected:</b> 06/04/2018
<b>Project:</b> 061003.051	

## Test Report: Asbestos Analysis of Bulk Building Materials via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 041817020-0001	Drill Cuttings	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Samantha Rundstorm-Cruz

(1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 06/19/2018 19:22:38





EMSL ANALYTICAL, INC.  
LABORATORY • PRODUCTS • TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041817020

RECEIVED  
EMSL  
CINNATI, OHIO  
FAX: [unclear]  
PERSON, NJ

18 JUN -5 AM 10:54

Company Name: <u>Earth Res Group</u>		EMSL Customer ID:	
Street: <u>6912 Old Easton Rd</u>		City: <u>Pipersville</u>	State/Province: <u>PA</u>
Zip/Postal Code: <u>18947</u>	Country: <u>USA</u>	Telephone #: <u>215 7661211</u>	Fax #:
Report To (Name): <u>Louis Vittorio</u>		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: <u>L.vittorio@earthres.com</u>		Purchase Order:	
Project Name/Number: <u>061003.051</u>		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note Instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

**PCM - Air**  Check if samples are from NY  
 NIOSH 7400  
 w/ OSHA 8hr. TWA

**TEM - Air**  4-4.5hr TAT (AHERA only)

AHERA 40 CFR, Part 763  
 NIOSH 7402  
 EPA Level II  
 ISO 10312

**TEM - Dust**

Microvac - ASTM D 5755  
 Wipe - ASTM D6480  
 Carpet Sonication (EPA 600/J-93/167)

**PLM - Bulk (reporting limit)**

PLM EPA 600/R-93/116 (<1%)  
 PLM EPA NOB (<1%)

Point Count  
 400 (<0.25%)  1000 (<0.1%)

Point Count w/Gravimetric  
 400 (<0.25%)  1000 (<0.1%)

NYS 198.1 (friable in NY)  
 NYS 198.6 NOB (non-friable-NY)  
 NYS 198.8 SOF-V  
 NIOSH 9002 (<1%)

**TEM - Bulk**

TEM EPA NOB  
 NYS NOB 198.4 (non-friable-NY)  
 Chatfield SOP  
 TEM Mass Analysis-EPA 600 sec. 2.5

**TEM - Water:** EPA 100.2

Fibers >10µm  Waste  Drinking  
All Fiber Sizes  Waste  Drinking

**Soil/Rock/Vermiculite**

PLM EPA 600/R-93/116 with milling prep (<1%)  
 PLM EPA 600/R-93/116 with milling prep (<0.25%)  
 TEM EPA 600/R-93/116 with milling prep (<0.1%)  
 TEM Qualitative via Filtration Prep  
 TEM Qualitative via Drop Mount Prep  
 Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)

Other:  
 PLM Carb 435 Level B  
Reporting Limit (<0.1%)

Check For Positive Stop - Clearly Identify Homogenous Group

Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name:

Samplers Signature:

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite	Drill Cuttings	1/2 gallon	6/4/18 0830

Client Sample # (s):

Total # of Samples:

Relinquished (Client): Jarical Sivintak

Date: 6/4/18

Time: 10:00

Received (Lab): C/S

Date: 6-5-18

Time: 9:00

Comments/Special Instructions:

See Back Page.

Per Louis Switch to 400 pt w/milling at C+CO.017 6.7.18 8:00 AM

# **ERG's 3<sup>rd</sup> Quarter 2018 NOA Monitoring Report**

**October 24, 2018**



**EARTHRES**  
ENGINEERING FOR SUCCESS™

October 24, 2018

Andrew J. Gutshall, P.G.  
Environmental Manager  
Hanson Aggregates Pennsylvania, LLC  
7660 Imperial Way  
Allentown, PA 18195

**SUBJECT: 3<sup>rd</sup> Quarter 2018 NOA Monitoring Report  
Rock Hill Quarry Operation  
SMP No. 7974SM1  
East Rockhill Township, Bucks County  
EARTHRES Project No. 061003.051**

Dear Mr. Gutshall:

Pursuant to the site monitoring plan approved by the Pennsylvania Department of Environmental Protection (PA DEP), Earthres Group, Inc. (EARTHRES) is pleased to provide the following 3<sup>rd</sup> Quarter 2018 Monitoring Report for the Rock Hill Quarry.

## **INTRODUCTION**

Site work was completed in accordance with the Monitoring Plan prepared by Hanson Aggregates Pennsylvania, LLC (Hanson), as approved by PA DEP in their letter dated January 25, 2018. The ongoing work is being performed to assess the potential presence of naturally occurring asbestos (NOA) in the areas to be mined. Prior site investigation and sampling detailed in our reports of January 18, 2018 (1<sup>st</sup> Quarter 2018) and June 4, 2018 (2<sup>nd</sup> Quarter 2018), did not indicate the presence of NOA in the proposed mining area.

The current monitoring and sampling effort included site observation, collection and analysis of rock and rock cuttings in the active southeast quarry development area. The work was performed onsite by EARTHRES personnel on July 17<sup>th</sup>, July 18<sup>th</sup>, July 31<sup>st</sup>, August 22<sup>nd</sup>, September 6<sup>th</sup>, & September 24<sup>th</sup>, 2018, under the supervision of a Pennsylvania licensed Professional Geologist (P.G.). A site figure showing the quarry area and sample locations is included in Appendix A.

## **SITE SPECIFIC INVESTIGATION**

Per the NOA Monitoring Plan, one (1) composite drill-cutting sample was collected from two (2) drill holes on each active bench. The corresponding sampling locations are shown on the



attached Figure in Appendix A. The highwall faces below the bench were inspected and did not show evidence of mineral veining and additional samples were not collected.

The composite samples were collected using a sterile plastic scoop that was used to mix and collect the drill cuttings. One (1)-gallon Ziplock® bags were filled with approximately 0.5 gallons of drill cuttings from each borehole. The two drill cutting samples were then combined into a single one-gallon Ziplock® bag evenly and mixed. A total of two (2) composite samples were collected, one (1) from each active bench. The composite samples were identified as “Composite” on the laboratory chain-of custody (COC). A table is provided below indicating sample location and combination.

The sample location is shown on the attached Figure in Appendix A. Pictures of the highwall, specific sampling locations and the collected samples are provided on the photographs in Appendix B.

<b>Table 1</b>			
Rock Hill Quarry Drill Samples for Asbestos			
Sample	Location	Combination	Sample Date
S-1	Middle Bench	Composite #1	7/17/2018
S-2			
S-3	Lower Bench	Composite #2	7/18/2018
S-4			
S-5	Upper Bench	Composite #1	7/31/2018
S-6			
S-7	Middle Bench	Composite #1	8/22/2018
S-8			
S-9	Upper Bench	Composite #1	9/6/2018
S-10			
S-11	Middle Bench	Composite #1	9/24/2018
S-12			
See Figure 1 for sample locations.			

The composite samples were transported directly by EARTHRES to EMSL Analytical, Inc. laboratory in Cinnaminson, NJ. The samples were analyzed using Polarized Light Microscopy (PLM) via EPA 600/R-93/116 Method.

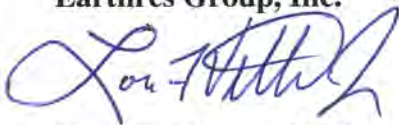
## SAMPLE RESULTS

The laboratory testing results determined that the drill cutting composite samples were homogeneous and 100% non-fibrous. NOA was not detected in any of the samples at the method detection limit of 0.1%. The laboratory reports are included as in Appendix C.

The sampling results from this quarter (6 samples) and prior sampling events (10 samples), continue to show the absence NOA in the mining area. Based upon the sampling conducted and field observations, a reduction in sampling frequency is warranted.

If you have any questions or concerns regarding the presented investigation and results, please feel free to contact me at (215) 766-1211.

Sincerely,  
**Earthres Group, Inc.**



Louis F. Vittorio, Jr., P.G.  
Vice President



- Appendices:** A – Figure 1  
B – Site and Sample Photographs  
C – Laboratory Analytical Results

**APPENDIX A**

**FIGURE 1**



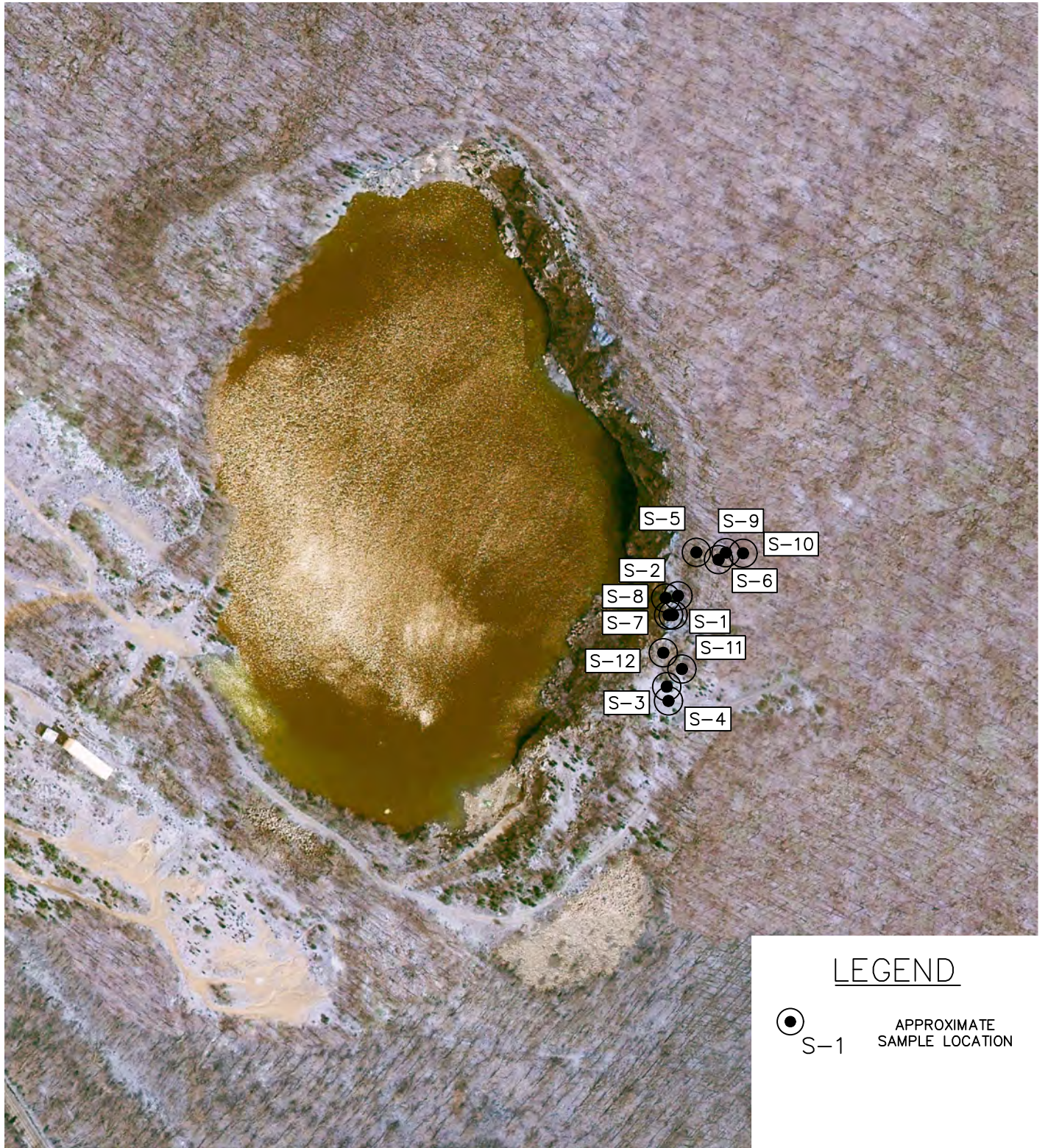


IMAGE SOURCE: PASDA AERIAL IMAGERY SERVICE (2015)



**EARTHRES**  
ENGINEERING FOR SUCCESS™

[www.earthres.com](http://www.earthres.com)

HEADQUARTERS  
PHILADELPHIA REGION  
P.O. Box 488  
6912 Old Eastern Road  
Pipersville, PA 18947

APPALACHIAN  
REGIONAL OFFICE  
P.O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

DRAWN BY:  
*JPS*

CHECKED BY:  
*LFV*

DATE:  
*7/19/2018*

PROJECT NO:  
*061003.051*

DRAWING SCALE:  
*1" = 300'*



**FIGURE 1**  
SAMPLE LOCATION MAP

ROCK HILL QUARRY  
HANSON AGGREGATES PENNSYLVANIA, LLC  
EAST ROCKHILL TOWNSHIP  
BUCKS COUNTY, PENNSYLVANIA

**APPENDIX B**

**SITE & SAMPLING PHOTOS**





Photo 1 – S-1 Drill Cuttings and Sample Location



Photo 2 – S-2 Drill Cuttings and Sample Location





Photo 3 – S-3 Drill Cuttings and Sample Location



Photo 4 – S-4 Drill Cuttings and Sample Location



Photo 5 – S-5 and S-6 Drill Cuttings and Sample Locations





Photo 6 – S-7 Drill Cuttings and Location



Photo 7 – S-8 Drill Cuttings and Location





Photo 8 – S-11 and S-12 Drill Cuttings and Locations



Photo 9 – Highwall of S-11 and S-12 Location



**APPENDIX C**

**DRILL CUTTING LABORATORY RESULTS**

**July 17-18, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order: 041821670  
Customer ID: ERG51  
Customer PO:  
Project ID:

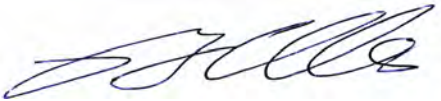
**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947  
**Project:** 061003.051

**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 07/18/2018 5:50 PM  
**Analysis Date:** 07/19/2018  
**Collected:**

## Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite #1 041821670-0001	Drill Cuttings Composite Sample	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
Composite #2 041821670-0002	Drill Cuttings Composite Sample	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)  
Andrew Castellano (2)

  
Benjamin Ellis, Laboratory Manager  
or other approved signatory

This report relates only to the samples listed above and may not be reproduced except in full, without EMSL's written approval. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. EMSL is not responsible for sample collection activities or method limitations. Some samples may contain asbestos fibers below the resolution limit of PLM. EMSL recommends that samples reported as none detected or less than the limit of detection undergo additional analysis via TEM. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from: 07/19/2018 12:00:06



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041821670  
EMSL  
CINCINNATI, OHIO

PHONE:  
FAX:

Company Name: <b>EarthRes Group</b>		2018 JUL 18 PM 5:51 EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	
EMSL-Bill to: <input type="checkbox"/> Same <input checked="" type="checkbox"/> Different - If Bill to is Different note instructions in Comments** Third Party Billing requires written authorization from third party			
Turnaround Time (TAT) Options* - Please Check			
<input type="checkbox"/> 3 Hour	<input type="checkbox"/> 6 Hour	<input checked="" type="checkbox"/> 24 Hour	<input type="checkbox"/> 48 Hour <input type="checkbox"/> 72 Hour <input type="checkbox"/> 96 Hour <input type="checkbox"/> 1 Week <input type="checkbox"/> 2 Week
*For TEM Air 3 hr through 6 hr, please call ahead to schedule. *There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.			
PCM - Air <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA		TEM - Air <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312	
PLM - Bulk (reporting limit) <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)		TEM - Bulk <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 TEM - Water: EPA 100.2 Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	
		TEM- Dust <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)	
		Soil/Rock/Vermiculite <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)	
		Other: <input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)	
<input type="checkbox"/> Check For Positive Stop - Clearly Identify Homogenous Group		Filter Pore Size (Air Samples): <input type="checkbox"/> 0.8µm <input type="checkbox"/> 0.45µm	
Samplers Name: <b>JPS</b>		Samplers Signature:	
Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite #1	Drill Cuttings Composite Sample	1 gallon	7/17/18 1020
Composite #2	"	1 gallon	7/18/18 1510
Client Sample # (s):		Total # of Samples: <b>2</b>	
Relinquished (Client): <i>[Signature]</i>		Date: 7/18/18 / 7/18/18	Time: 7:45
Received (Lab): <i>[Signature]</i>		Date: 7/18/18	Time: 5:50pm
Comments/Special Instructions:			
Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company Lehigh Hanson, Inc Address: 7660 Imperial Way Allentown, PA 18195 Office phone (610) 366-4819			

*ZRN*

*Rock Hill Quarry*  
*3<sup>rd</sup> Quarter 2018 NOA Monitoring Report*

**July 31, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

<b>EMSL Order:</b> 041823264
<b>Customer ID:</b> ERG51
<b>Customer PO:</b>
<b>Project ID:</b>

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP, INC.) P.O. BOX 468 PIPERSVILLE, PA 18947	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 08/01/2018 9:30 AM <b>Analysis Date:</b> 08/07/2018 <b>Collected:</b> 07/31/2018
<b>Project:</b> 061003.051	

## Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite #1 041823264-0001	Drill Cutting Sample - Composite	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Andrew Castellano (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from: 08/07/2018 09:44:10



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

041823264

RECEIVED  
EMSL  
PO BOX 100  
FAX  
MINNISON, NJ  
18 AUG - 1 AM 10:24

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)
<b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)
<input type="checkbox"/> Check For Positive Stop - Clearly Identify Homogenous Group		<b>Filter Pore Size (Air Samples):</b> <input type="checkbox"/> 0.8µm <input type="checkbox"/> 0.45µm

Samplers Name: JPS- Samplers Signature: *[Signature]*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite #1	Drill Cutting Sample (Composite)	1 gallon	7/31/18 1135

Client Sample # (s): - Total # of Samples: 1 *(1ch)*

Relinquished (Client): *[Signature]* Date: 7/31/18 Time: 1500

Received (Lab): *[Signature]* Date: 8-1-18 Time: 9:30

Comments/Special Instructions:  
5 Day turnaround time

*Rock Hill Quarry*  
*3<sup>rd</sup> Quarter 2018 NOA Monitoring Report*

**August 22, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

<b>EMSL Order:</b> 041825501
<b>Customer ID:</b> ERG51
<b>Customer PO:</b>
<b>Project ID:</b>

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP,INC.) P.O. BOX 468 PIPERSVILLE, PA 18947	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 08/22/2018 12:00 PM <b>Analysis Date:</b> 08/23/2018 <b>Collected:</b> 08/22/2018
<b>Project:</b> 061003.051	

## Test Report: Asbestos Analysis of Soils via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite #1 041825501-0001	Composite Drill Cuttings	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s) \_\_\_\_\_

Juli Patel (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 08/23/2018 10:08:55



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041825501

PHONE:  
FAX:

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

**Turnaround Time (TAT) Options\* - Please Check**

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312	<b>TEM - Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)
<b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only) <b>Other:</b> <input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)

RECEIVED  
 CINCINNATI, OH  
 8/22/18 10:00

Check For Positive Stop -- Clearly Identify Homogenous Group Filter Pore Size (Air Samples):  10µm  0.45µm

Samplers Name: JPS Samplers Signature: *[Signature]*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite #1	Composite Drill Cuttings	1 gallon	8/22/18 0845

Client Sample # (s): -	Total # of Samples: 1
Relinquished (Client): <i>Mary P. Shovel</i>	Date: <i>8/22/18</i> Time: <i>12:00 PM</i>
Received (Lab): <i>[Signature]</i>	Date: <i>8/22/18</i> Time: <i>12:00 PM</i>

Comments/Special Instructions:

Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company Lehigh Hanson, Inc Address: 7660 Inperial Way Allentown, PA 18195 Office phone (610) 366-4819

**September 6, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

<b>EMSL Order:</b> 041827054
<b>Customer ID:</b> ERG51
<b>Customer PO:</b>
<b>Project ID:</b>

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP,INC.) P.O. BOX 468 PIPERSVILLE, PA 18947	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 09/06/2018 4:25 PM <b>Analysis Date:</b> 09/07/2018 <b>Collected:</b>
<b>Project:</b> 061003.051	

## Test Report: Asbestos Analysis of Soils via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 041827054-0001	Composite Sample of Drill Cuttings	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Andrew Castellano (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 09/07/2018 14:58:10



EMSL ANALYTICAL, INC.  
LABORATORY • PRODUCTS • TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041827054

PHONE:  
FAX:

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

**PCM - Air**  Check if samples are from NY

NIOSH 7400  
 w/ OSHA 8hr. TWA

**PLM - Bulk (reporting limit)**

PLM EPA 600/R-93/116 (<1%)  
 PLM EPA NOB (<1%)

Point Count

400 (<0.25%)  1000 (<0.1%)

Point Count w/Gravimetric

400 (<0.25%)  1000 (<0.1%)

NYS 198.1 (friable in NY)

NYS 198.6 NOB (non-friable-NY)

NYS 198.8 SOF-V

NIOSH 9002 (<1%)

**TEM - Air**  4-4.5hr TAT (AHERA only)

AHERA 40 CFR, Part 763

NIOSH 7402

EPA Level II

ISO 10312

**TEM - Bulk**

TEM EPA NOB

NYS NOB 198.4 (non-friable-NY)

Chatfield SOP

TEM Mass Analysis-EPA 600 sec. 2.5

**TEM - Water:** EPA 100.2

Fibers >10µm  Waste  Drinking

All Fiber Sizes  Waste  Drinking

**TEM- Dust**

Microvac - ASTM D 5755

Wipe - ASTM D6480

Carpet Sonication (EPA 600/J-93/167)

**Soil/Rock/Vermiculite**

PLM EPA 600/R-93/116 with milling prep (<1%)

PLM EPA 600/R-93/116 with milling prep (<0.25%)

TEM EPA 600/R-93/116 with milling prep (<0.1%)

TEM Qualitative via Filtration Prep

TEM Qualitative via Drop Mount Prep

Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)

**Other:**

PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)

Check For Positive Stop - Clearly Identify Homogenous Group

Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: JPS

Samplers Signature:

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite	Composite Sample of Drill Cuttings	1 gallon	09/06/18 1355

Client Sample # (s): -

Total # of Samples:

Relinquished (Client):

Date:

Time:

Received (Lab):

Date: 9/6/18

Time: 4:25pm

Comments/Special Instructions:

Bill to: Andrew J Guzmall, Area Environmental Manager -ECPA/NJ Company, Lehigh Hanson, Inc. Address: 7660 Inperial Way Allentown, PA 18195 Office phone (610) 366-4819

PLM  
400 pt ct  
w/ milling

(IRL)

**September 24, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order: 041828867

Customer ID: ERG51

Customer PO:

Project ID:

**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947

**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 09/24/2018 3:30 PM  
**Analysis Date:** 09/25/2018  
**Collected:**

**Project:** 061003.051

## Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Compsite 1 041828867-0001	Drill Cuttings Composite	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Andrew Castellano (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from: 09/25/2018 17:24:02



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

041828867

RECEIVED  
PHONE:  
CINNATI, OH, NJ

2010 SEP 24 P 3:33

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

**Turnaround Time (TAT) Options\* - Please Check**

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

**PCM - Air**  Check if samples are from NY

NIOSH 7400  
 w/ OSHA 8hr. TWA

**PLM - Bulk (reporting limit)**

PLM EPA 600/R-93/116 (<1%)  
 PLM EPA NOB (<1%)  
Point Count  
 400 (<0.25%)  1000 (<0.1%)  
Point Count w/Gravimetric  
 400 (<0.25%)  1000 (<0.1%)  
 NYS 198.1 (friable in NY)  
 NYS 198.6 NOB (non-friable-NY)  
 NYS 198.8 SOF-V  
 NIOSH 9002 (<1%)

**TEM - Air**  4-4.5hr TAT (AHERA only)

AHERA 40 CFR, Part 763  
 NIOSH 7402  
 EPA Level II  
 ISO 10312

**TEM - Bulk**

TEM EPA NOB  
 NYS NOB 198.4 (non-friable-NY)  
 Chatfield SOP  
 TEM Mass Analysis-EPA 600 sec. 2.5

**TEM - Water:** EPA 100.2

Fibers >10µm  Waste  Drinking  
All Fiber Sizes  Waste  Drinking

**TEM- Dust**

Microvac - ASTM D 5755  
 Wipe - ASTM D6480  
 Carpet Sonication (EPA 600/J-93/167)

**Soil/Rock/Vermiculite**

PLM EPA 600/R-93/116 with milling prep (<1%)  
 PLM EPA 600/R-93/116 with milling prep (<0.25%)  
 TEM EPA 600/R-93/116 with milling prep (<0.1%)  
 TEM Qualitative via Filtration Prep  
 TEM Qualitative via Drop Mount Prep  
 Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)

**Other:**

PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)

Check For Positive Stop - Clearly Identify Homogenous Group

Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: JPS

Samplers Signature: *[Signature]*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite 1	Drill Cuttings Composite	1 gallon	9/24/18/1305

Client Sample # (s): - Total # of Samples:

Relinquished (Client): Date: Time:

Received (Lab): *[Signature]* Date: 9/24/18 Time: 15:30

Comments/Special Instructions:

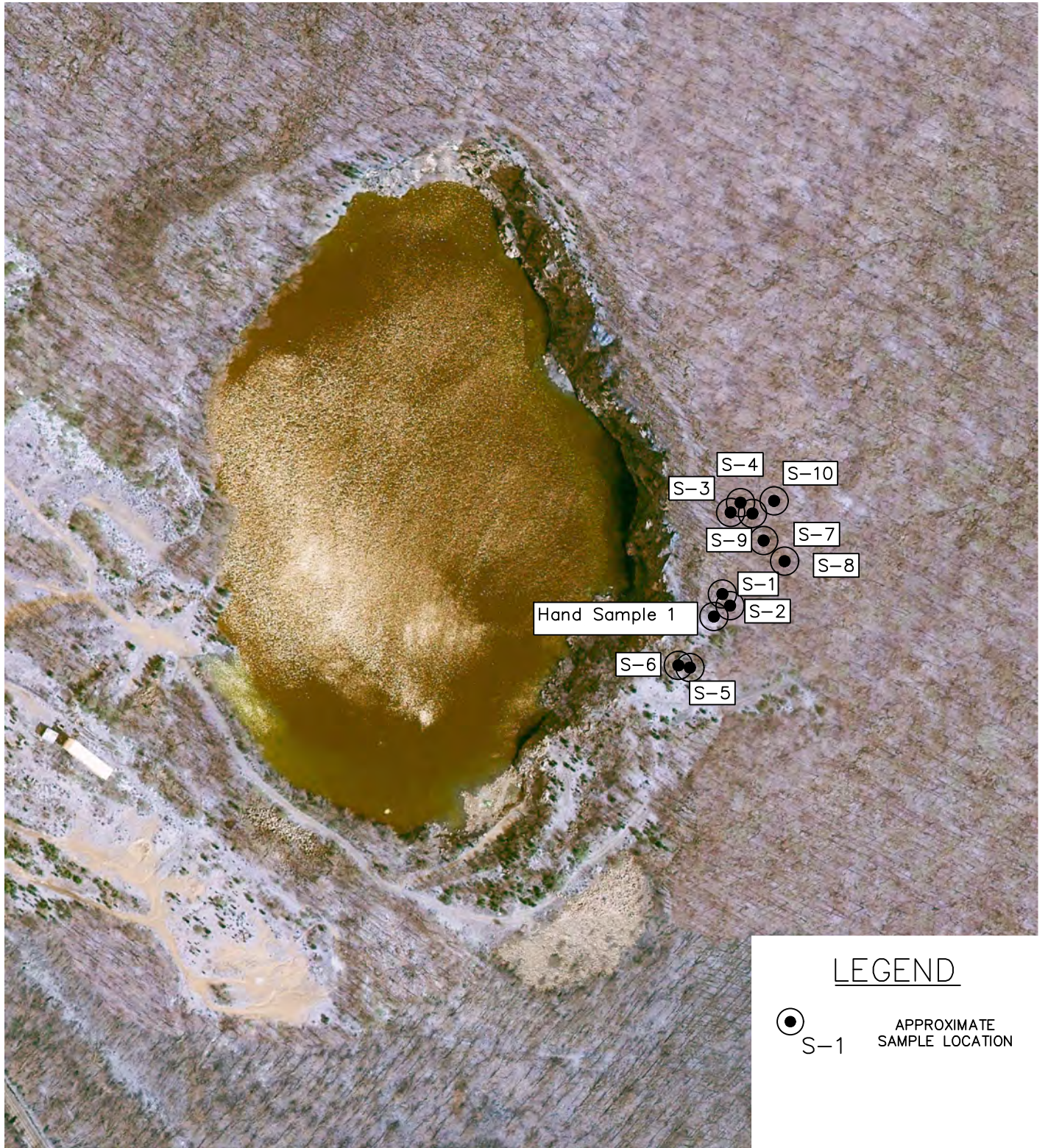
Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company: Lehigh Hanson, Inc. Address: 7660 Inpenal Way Allentown, PA 18195 Office phone (610) 386-4819

## **ERG's 4<sup>th</sup> Quarter 2018 NOA Data**



**APPENDIX A**

**FIGURE 1**



LEGEND


 S-1      APPROXIMATE  
 SAMPLE LOCATION

IMAGE SOURCE: PASDA AERIAL IMAGERY SERVICE (2015)




**EARTHRES**  
 ENGINEERING FOR SUCCESS™

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HEADQUARTERS  
 PHILADELPHIA REGION  
 P. O. Box 488  
 6912 Old Easton Road  
 Pipersville, PA 18947

APPALACHIAN  
 REGIONAL OFFICE  
 P. O. Box 794  
 8000 Coombs Farm Drive  
 Morgantown, WV 26505

DRAWN BY: <i>CJD</i>	CHECKED BY: <i>LFV</i>
DATE: <i>2/6/2018</i>	PROJECT NO: <i>061003.051</i>
DRAWING SCALE: <i>1" = 300'</i>	
	

**FIGURE 1**  
 SAMPLE LOCATION MAP

ROCK HILL QUARRY  
 HANSON AGGREGATES PENNSYLVANIA, LLC  
 EAST ROCKHILL TOWNSHIP  
 BUCKS COUNTY, PENNSYLVANIA



**APPENDIX B**

**SITE & SAMPLING PHOTOS**





Photo 1 – S-1 Drill Cuttings and Sample Location



Photo 2 – S-2 Drill Cuttings and Sample Location





Photo 3 – S-3 and S-4 Drill Cuttings and Sample Location



Photo 4 – S-5 Drill Cuttings and Sample Locations





Photo 5 – S-6 Drill Cuttings and Sample Locations



Photo 6 – S-7 and S-8 Drill Cuttings and Sample Locations





Photo 4 – S-9 and S-10 Drill Cuttings and Location



Photo 5 – Hand Sample Blast Pile and Location

**APPENDIX C**

**DRILL CUTTING LABORATORY RESULTS**

**October 10, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order: 041830600  
Customer ID: ERG51  
Customer PO:  
Project ID:

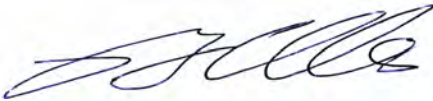
**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947  
**Project:** 061003.051

**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 10/10/2018 6:20 PM  
**Analysis Date:** 10/11/2018  
**Collected:**

## Test Report: Asbestos Analysis of Bulk Building Materials via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 1000 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 1 041830600-0001	Drill Cuttings Composite	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)  
Benjamin Verghese (1)

  
Benjamin Ellis, Laboratory Manager  
or other approved signatory

Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.1%. EMSL Analytical Inc suggests that samples reported as <0.1% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc. bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 10/11/2018 10:20:59



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

041830600

PHONE:  
FAX:

Company Name: EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)
<b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5	<b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)
<input type="checkbox"/> Check For Positive Stop - Clearly Identify Homogenous Group		<b>Other:</b> <input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)

2018 OCT 10  
 CINCINNATI  
 RECEIVED  
 EMSL

Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: CJD Samplers Signature: *Edwin G. Williams*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
S-1	Drill Cuttings	1 Gallon	10/10/18 1330
S-2	Drill Cuttings	1 Gallon	10/10/18 1330
Composite 1	Drill Cuttings Composite	1 Gallon	10/10/18 1330

Client Sample # (s): - Total # of Samples:

Relinquished (Client): *[Signature]* Date: Time:

Received (Lab): *[Signature]* Date: 10/10/18 Time: 6:20pm

Comments/Special Instructions:

Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company: Lehigh Hanson, Inc. Address: 7660 Inperial Way Allentown, PA 18195 Office phone (610) 366-4819

3R11

**October 19, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

<b>EMSL Order:</b> 041831563
<b>Customer ID:</b> ERG51
<b>Customer PO:</b>
<b>Project ID:</b>

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP,INC.) P.O. BOX 468 PIPERSVILLE, PA 18947	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 10/20/2018 10:30 AM <b>Analysis Date:</b> 10/24/2018 <b>Collected:</b> 10/19/2018
<b>Project:</b> 061003.051	

## Test Report: Asbestos Analysis of Bulk Building Materials via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 041831563-0001	Drill Cuttings	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Andrew Castellano (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 10/24/2018 11:34:48



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041831563

PHONE:  
FAX:

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	
EMSL-Bill to: <input type="checkbox"/> Same <input checked="" type="checkbox"/> Different - If Bill to is Different note instructions in Comments** Third Party Billing requires written authorization from third party			
Turnaround Time (TAT) Options* - Please Check			
<input type="checkbox"/> 3 Hour	<input type="checkbox"/> 6 Hour	<input type="checkbox"/> 24 Hour	<input type="checkbox"/> 48 Hour <input checked="" type="checkbox"/> 72 Hour <input type="checkbox"/> 96 Hour <input type="checkbox"/> 1 Week <input type="checkbox"/> 2 Week
*For TEM Air 3 hr through 6 hr, please call ahead to schedule. *There is a premium charge for 3-Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.			
PCM - Air <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA	TEM - Air <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312	TEM- Dust <u>Please by 10/23/18</u> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)	
PLM - Bulk (reporting limit) <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	TEM - Bulk <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 TEM - Water: EPA 100.2 Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	Soil/Rock/Vermiculite <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM, (BC only) Other: <input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)	
<input type="checkbox"/> Check For Positive Stop - Clearly Identify Homogenous Group		Filter Pore Size (Air Samples): <input checked="" type="checkbox"/> 0.8µm <input type="checkbox"/> 0.45µm	
Samplers Name: JPS		Samplers Signature: <i>[Signature]</i>	
Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite	Drill cuttings	1 gallon	2018 OCT 20 10:30A RECEIVED EMSL HANIMSON, N.J.
Client Sample # (s):		Total # of Samples: 1	
Relinquished (Client):		Date:	Time:
Received (Lab): <u>OMB-FX</u>		Date: <u>10-20-18</u>	Time: <u>1030A</u>
Comments/Special Instructions:			
Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company: Lehigh Hanson, Inc Address: 7660 Inperial Way Allentown, PA 18195 Office phone (610) 366-4819			

**October 30, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order: 041832561  
Customer ID: ERG51  
Customer PO:  
Project ID:

**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947  
**Project:** 061003.051

**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 10/30/2018 3:35 PM  
**Analysis Date:** 10/31/2018  
**Collected:**

## Test Report: Asbestos Analysis of Soils via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 1 041832561-0001	Composite Drill Cuttings	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s) \_\_\_\_\_

Andrew Castellano (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 10/31/2018 09:51:13



EMSL ANALYTICAL INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

## EMSL Order Number (Lab Use Only):

041832561

RECEIVED  
 EMSL  
 CINNAMINSON, NJ  
 2018 OCT 30 P 3:39  
 PHONE  
 FAX

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6912 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
 Third Party Billing requires written authorization from third party

**Turnaround Time (TAT) Options\* - Please Check**

3 Hour   
  6 Hour   
  24 Hour   
  48 Hour   
  72 Hour   
  96 Hour   
  1 Week   
  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <hr/> <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <hr/> <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <hr/> <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <hr/> <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only) Other: <input checked="" type="checkbox"/> - PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)
--	--	--

Check For Positive Stop - Clearly Identify Homogenous Group      Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: **CJD**      Samplers Signature: *[Signature]*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite 1	Composite Drill Cuttings	1 gallon	10/30/18 11:20

Client Sample # (s):	-	Total # of Samples:
Relinquished (Client):	Date:	Time:
Received (Lab): <i>[Signature]</i>	Date: 10-30-18	Time: 3:35pm

**Comments/Special Instructions:**  
 Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company, Lehigh Hanson, Inc. Address: 7660 Inperial Way Allentown, PA 18195 Office phone (610) 366-4819

**November 1, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

<b>EMSL Order:</b> 041832938
<b>Customer ID:</b> ERG51
<b>Customer PO:</b>
<b>Project ID:</b>

<b>Attention:</b> Louis Vittorio ERG (EARTHRES GROUP,INC.) P.O. BOX 468 PIPERSVILLE, PA 18947	<b>Phone:</b> (215) 766-1211 <b>Fax:</b> (215) 766-1245 <b>Received:</b> 11/02/2018 9:20 AM <b>Analysis Date:</b> 11/05/2018 <b>Collected:</b> 11/01/2018
<b>Project:</b> 061003.051	

## Test Report: Asbestos Analysis of Bulk Building Materials via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 1 041832938-0001	Composite Drilling Sample	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s) \_\_\_\_\_

Juli Patel (1)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 11/05/2018 14:48:15



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041832938

PHONE:  
FAX: -

RECEIVED  
 EMSL  
 CINCINNATI, OH, U.S.A.  
 2010 NOV - 2 A 10: 3

Company Name: EarthRes Group		EMSL Customer ID:	
Street: 6912 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<p><b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY</p> <p><input type="checkbox"/> NIOSH 7400</p> <p><input type="checkbox"/> w/ OSHA 8hr. TWA</p>	<p><b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only)</p> <p><input type="checkbox"/> AHERA 40 CFR, Part 763</p> <p><input type="checkbox"/> NIOSH 7402</p> <p><input type="checkbox"/> EPA Level II</p> <p><input type="checkbox"/> ISO.10312</p>	<p><b>TEM- Dust</b></p> <p><input type="checkbox"/> Microvac - ASTM D 5755</p> <p><input type="checkbox"/> Wipe - ASTM D6480</p> <p><input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)</p>
<p><b>PLM - Bulk (reporting limit)</b></p> <p><input type="checkbox"/> PLM EPA 600/R-93/116 (&lt;1%)</p> <p><input type="checkbox"/> PLM EPA NOB (&lt;1%)</p> <p>Point Count</p> <p><input type="checkbox"/> 400 (&lt;0.25%) <input type="checkbox"/> 1000 (&lt;0.1%)</p> <p>Point Count w/Gravimetric</p> <p><input type="checkbox"/> 400 (&lt;0.25%) <input type="checkbox"/> 1000 (&lt;0.1%)</p> <p><input type="checkbox"/> NYS 198.1 (friable in NY)</p> <p><input type="checkbox"/> NYS 198.6 NOB (non-friable-NY)</p> <p><input type="checkbox"/> NYS 198.8 SOF-V</p> <p><input type="checkbox"/> NIOSH 9002 (&lt;1%)</p>	<p><b>TEM - Bulk</b></p> <p><input type="checkbox"/> TEM EPA NOB</p> <p><input type="checkbox"/> NYS NOB 198.4 (non-friable-NY)</p> <p><input type="checkbox"/> Chatfield SOP</p> <p><input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5</p> <p><b>TEM - Water: EPA 100.2</b></p> <p>Fibers &gt;10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking</p> <p>All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking</p>	<p><b>Soil/Rock/Vermiculite</b></p> <p><input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (&lt;1%)</p> <p><input checked="" type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (&lt;0.25%)</p> <p><input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (&lt;0.1%)</p> <p><input type="checkbox"/> TEM Qualitative via Filtration Prep</p> <p><input type="checkbox"/> TEM Qualitative via Drop Mount Prep</p> <p><input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)</p> <p><b>Other:</b></p> <p><input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (&lt;0.1%) (See Order #041817020)</p>

400 pt of milling SC

Check For Positive Stop - Clearly Identify Homogenous Group

Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: CJD

Samplers Signature: *[Signature]*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite 1	Composite Drilling Sample	1 Gallon	1-1-18 11:15

Client Sample # (s): - Total # of Samples: 1

Relinquished (Client): Date: Time:

Received (Lab): *[Signature]* Date: 11-2-18 Time: 9:20

Comments/Special Instructions:  
Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company, Lehigh Hanson, Inc Address: 7660 Imperial Way Allentown, PA 18195 Office phone (610) 366-4819

① ELU

**November 9, 2018**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order: 041833717

Customer ID: ERG51

Customer PO:

Project ID:

**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947

**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 11/10/2018 10:30 AM  
**Analysis Date:** 11/12/2018  
**Collected:** 11/09/2018

**Project:** 061003.051

## Test Report: Asbestos Analysis of Bulk Building Materials via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
Composite 1 041833717-0001	Composite Drill Cuttings Sample	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
Hand Sample 1 041833717-0002	Hand Sampled Rock from Blast Pile	Gray Non-Fibrous Homogeneous		99.75% Non-fibrous (Other)	0.25% Actinolite

Analyst(s)

Juli Patel (2)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 11/12/2018 14:05:16



**EMSL Analytical, Inc.**  
 200 Route 130 North, Cinnaminson, NJ 08077  
 Phone: (800) 220-3675  
 Fax: (856) 858-1292  
 Email: [CinnAsblab@emsl.com](mailto:CinnAsblab@emsl.com)

EMSL Order: 041833717  
 Customer ID: ERG51  
 Customer PO:  
 Project ID:

Attn: *Louis Vittorio*  
 ERG (EARTHRES GROUP, INC.)  
 P.O. BOX 468  
 PIPERSVILLE, PA, 18947

Phone: (215) 766-1211  
 Fax: (215) 766-1245  
 Collected: 11/09/2018  
 Received: 11/10/18 10:30

Project: **061003.051**

Analyzed: 11/30/18

**SUMMARY REPORT :**

Sample ID	Minerals Present	Results	Structures	Reporting Limit	Asbestos Weight	Comments
Hand Sample 1	Actinolite	Regulated Asbestos	37	0.1%	0.8%	
041833717-0002		Other Minerals	0		< 0.1%	
Hand Sample Rock from Blast Pile		Unknown	0		-	
		<b>Total</b>	<b>37</b>		<b>0.8%</b>	

**S. BURANY**  
 Analyst

Approved Signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client. Regulated asbestos includes the 6 Federally regulated types: Chrysotile, Amosite, Crocidolite, Actinolite, Tremolite, Anthophyllite. Other minerals can include: Libby Amphibole, Erionite, and other Non-regulated minerals.



EMSL ANALYTICAL, INC.  
LABORATORY • PRODUCTS • TRAINING

**Asbestos Chain of Custody**  
EMSL Order Number (Lab Use Only):

041833717

PHONE:  
FAX:

Company Name : EarthRes Group		EMSL Customer ID:	
Street: 6913 Old Easton Road		City: Pipersville	State/Province: PA
Zip/Postal Code: 18947	Country: USA	Telephone #: 2157661211	Fax #:
Report To (Name): Louis Vittorio		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: Lvittorio@earthres.com		Purchase Order:	
Project Name/Number: 061003.051		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

EMSL-Bill to:  Same  Different - If Bill to is Different note instructions in Comments\*\*  
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options\* - Please Check

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/ Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%) <input checked="" type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%) <input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%) <input type="checkbox"/> TEM Qualitative via Filtration Prep <input type="checkbox"/> TEM Qualitative via Drop Mount Prep <input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only) <b>Other:</b> <input checked="" type="checkbox"/> PLM Carb 435 Level B Reporting Limit (<0.1%) (See Order #041817020)
---	--	--

Check For Positive Stop - Clearly Identify Homogenous Group Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: CJD Samplers Signature:

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
Composite 1	Composite Drill Cuttings Sample	1 gallon	11/9/18 1040
Hand Sample 1	Hand Sampled Rock from Blast Pit	Hand sample	11/9/18 1020

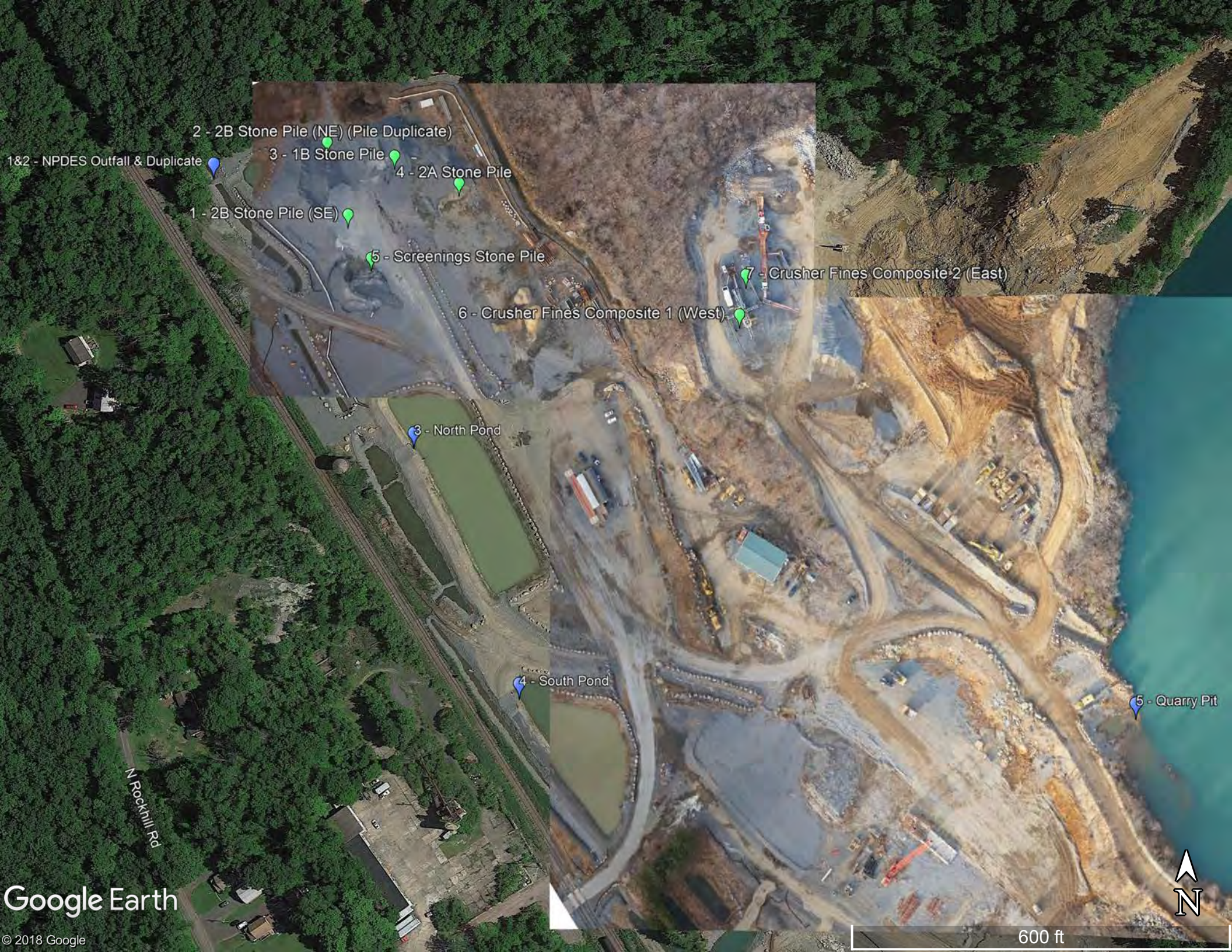
Client Sample # (s): -	Total # of Samples:
Relinquished (Client):	Date: Time:
Received (Lab): VG	Date: 11/10/18 Time: 10:30
Comments/Special Instructions:	
Bill to: Andrew J Gutshall, Area Environmental Manager -ECPA/NJ Company, Lehigh Hanson, Inc. Address 7660 Imperial Way Allentown, PA 18195 Office phone (610) 366-4819	

2VP



**EMSL Analytical, Inc. December 20, 2018 Aggregate and  
Surface Water Laboratory Results**





2 - 2B Stone Pile (NE) (Pile Duplicate)

3 - 1B Stone Pile

4 - 2A Stone Pile

1 - 2B Stone Pile (SE)

5 - Screenings Stone Pile

6 - Crusher Fines Composite 1 (West)

7 - Crusher Fines Composite 2 (East)

3 - North Pond

4 - South Pond

5 - Quarry Pit

N Rockhill Rd

Google Earth

© 2018 Google

600 ft







# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order: 041837322

Customer ID: ERG51

Customer PO:

Project ID:

**Attention:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947

**Phone:** (215) 766-1211  
**Fax:** (215) 766-1245  
**Received:** 12/20/2018 5:30 PM  
**Analysis Date:** 12/21/2018  
**Collected:**

**Project:** 061003.051

## Test Report: Asbestos Analysis of Soils via EPA 600/R-93/116 Method using PLM and Milling Prep. Quantitation using 400 Point Count Procedure

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1 041837322-0001	Aggregate	Gray Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected
2 041837322-0002	Aggregate	Gray Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected
3 041837322-0003	Aggregate	Gray Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected
4 041837322-0004	Aggregate	Gray Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected
5 041837322-0005	Aggregate	Gray Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected
6 041837322-0006	Aggregate	Gray Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected
7 041837322-0007	Aggregate	Tan Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	None Detected

Analyst(s)

Andrew Castellano (7)

Benjamin Ellis, Laboratory Manager  
or other approved signatory

Disclaimer: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval of EMSL Analytical Inc. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc., bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layered samples. EMSL Analytical Inc., liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367

Initial report from: 12/21/2018 16:32:33





EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

## EMSL Order Number (Lab Use Only):

041837322

EMSL ANALYTICAL, INC.  
200 ROUTE 130 NORTH  
CINNAMINSON, NJ 08077  
PHONE: (856)858-4800  
FAX: (856)858-1292

Company : Earthres Group, Inc.		EMSL-Bill to: <input type="checkbox"/> Same <input checked="" type="checkbox"/> Different <i># attached</i> If Bill to is Different note instructions in Comments** <i>3rd</i>	
Street: 6912 Old Easton Road		Third Party Billing requires written authorization from third party	
City: Pipersville	State/Province: PA	Zip/Postal Code: 18947	Country: USA
Report To (Name): Louis Vittorio		Fax #: 215-766-1245	
Telephone #: 215-766-1211		Email Address: lvittorio@earthres.com	
Project Name/Number: 061003.051			
Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email <input type="checkbox"/> Purchase Order: 3 <sup>rd</sup> Party Billing <input type="checkbox"/> U.S. State Samples Taken: PA			

**Turnaround Time (TAT) Options\* - Please Check**

3 Hour  6 Hour  24 Hour  48 Hour  72 Hour  96 Hour  1 Week  2 Week

*\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

<b>PCM - Air</b> <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM - Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative) <b>Other:</b> <input checked="" type="checkbox"/> PLM by EPA/600/R-93/116 with Milling Prep Level A (100 PPM, 0.25% DL)
--	--	--

Check For Positive Stop - Clearly Identify Homogenous Group

Samplers Name: LFV/CJD      Samplers Signature: *[Signature]*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
1	Aggregate	1 gallon zip lock	12/20 9:04
2	Aggregate	1 gallon zip lock	12/20 9:35
3	Aggregate	1 gallon zip lock	12/20 9:55
4	Aggregate	1 gallon zip lock	12/20 10:16
5	Aggregate	1 gallon zip lock	12/20 10:40
6	Aggregate	1 gallon zip lock	12/20 11:20
7	Aggregate	1 gallon zip lock	12/20 11:45

Client Sample # (s): 1 through 7      Total # of Samples: 7

Relinquished (Client): *[Signature]*      Date: 12/20/18      Time: 3:00 PM

Received (Lab): *[Signature]*      Date: 12/20/18      Time: 5:30 PM

Comments/Special Instructions:

*7RH*



# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order ID: 041837324  
Customer ID: ERG51  
Customer PO:  
Project ID:

**Attn:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947

Phone: (215) 766-1245  
Fax: (215) 766-1245  
Received: 12/20/2018  
Analyzed: 12/26/2018

**Proj:** 061003.051

## Test Report: Determination of Asbestos Structures $\geq 0.5 \mu\text{m}$ & $> 10\mu\text{m}$ in Water Performed by the 100.2 Method (EPA 600/R-94/134)

### ASBESTOS

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm <sup>2</sup> )	Area Analyzed (mm <sup>2</sup> )	ASBESTOS					
					Asbestos Types	Fibers Detected	Analytical Sensitivity	Concentration	Confidence Limits	
1 041837324-0001	12/24/2018 10:00 AM	2	1360	0.2580	$\geq 0.5 \mu\text{m}$	Actinolite	1	2.60	2.60	0.07 - 15.00
					$> 10 \mu\text{m}$ only	None Detected	ND	2.60	<2.60	0.00 - 9.70
Collection Date/Time:					Due to excessive particulate the analytical sensitivity of 0.2 MFL as required by the method was not reached.					
2 041837324-0002	12/24/2018 10:00 AM	2	1360	0.2580	$\geq 0.5 \mu\text{m}$	Actinolite	3	2.60	7.90	1.60 - 23.00
					$> 10 \mu\text{m}$ only	None Detected	ND	2.60	<2.60	0.00 - 9.70
Collection Date/Time:					Due to excessive particulate the analytical sensitivity of 0.2 MFL as required by the method was not reached.					
3 041837324-0003	12/24/2018 10:00 AM	3	1360	0.2580	$\geq 0.5 \mu\text{m}$	None Detected	ND	1.80	<1.80	0.00 - 6.50
					$> 10 \mu\text{m}$ only	None Detected	ND	1.80	<1.80	0.00 - 6.50
Collection Date/Time:					Due to excessive particulate the analytical sensitivity of 0.2 MFL as required by the method was not reached.					
4 041837324-0004	12/24/2018 10:00 AM	0.50	1360	0.3999	$\geq 0.5 \mu\text{m}$	Actinolite	3	6.80	20.00	4.20 - 60.00
					$> 10 \mu\text{m}$ only	None Detected	ND	6.80	<6.80	0.00 - 25.00
Collection Date/Time:					Due to excessive particulate the analytical sensitivity of 0.2 MFL as required by the method was not reached.					

Analyst(s)

Sarah Richey (5)

Benjamin Ellis, Laboratory Manager  
or Other Approved Signatory

Any questions please contact Benjamin Ellis.

Report amended: 01/09/2019 10:22:33 Replaces initial report from: 12/27/2018 00:25:21 Reason Code: Client-Additional Analysis

Sample collection and containers provided by the client, acceptable bottle blank level is defined as  $\leq 0.01\text{MFL} > 10\mu\text{m}$ . ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to the samples reported above. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NELAC NJ DEP 03036, PA ID# 68-00367



# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

EMSL Order ID: 041837324  
Customer ID: ERG51  
Customer PO:  
Project ID:

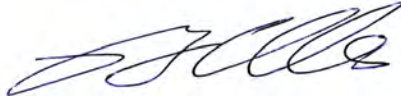
**Attn:** Louis Vittorio  
ERG (EARTHRES GROUP, INC.)  
P.O. BOX 468  
PIPERSVILLE, PA 18947  
**Phone:** (215) 766-1245  
**Fax:** (215) 766-1245  
**Received:** 12/20/2018  
**Analyzed:** 12/26/2018  
**Proj:** 061003.051

## Test Report: Determination of Asbestos Structures $\geq 0.5 \mu\text{m}$ & $> 10\mu\text{m}$ in Water Performed by the 100.2 Method (EPA 600/R-94/134)

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm <sup>2</sup> )	Area Analyzed (mm <sup>2</sup> )	ASBESTOS					
					Asbestos Types	Fibers Detected	Analytical Sensitivity	Concentration	Confidence Limits	
5 041837324-0005	12/24/2018 10:00 AM	2	1360	0.2580	$\geq 0.5 \mu\text{m}$ None Detected	ND	2.60	<2.60	0.00 - 9.70	
<i>Collection Date/Time:</i>					$> 10 \mu\text{m}$ only	None Detected	ND	2.60	<2.60	0.00 - 9.70

Due to excessive particulate the analytical sensitivity of 0.2 MFL as required by the method was not reached.

Analyst(s)  
Sarah Richey (5)

  
Benjamin Ellis, Laboratory Manager  
or Other Approved Signatory

Any questions please contact Benjamin Ellis.

Report amended: 01/09/2019 10:22:33 Replaces initial report from: 12/27/2018 00:25:21 Reason Code: Client-Additional Analysis

Sample collection and containers provided by the client, acceptable bottle blank level is defined as  $\leq 0.01\text{MFL} > 10\mu\text{m}$ . ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to the samples reported above. Samples received in good condition unless otherwise noted.  
Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NELAC NJ DEP 03036, PA ID# 68-00367

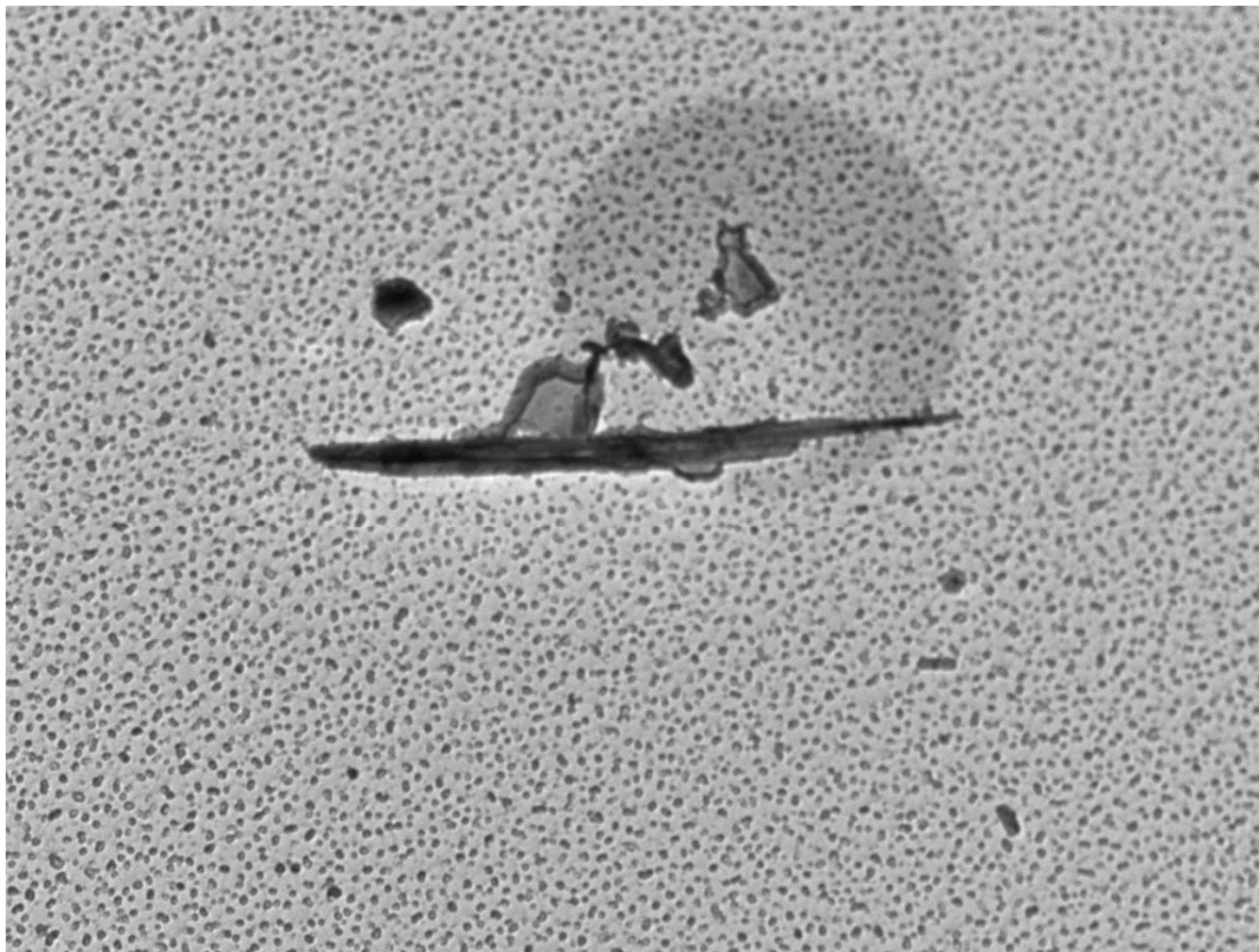




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Microscopist: Burany, Sandy

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Direct Mag: 19000x  
EMSL



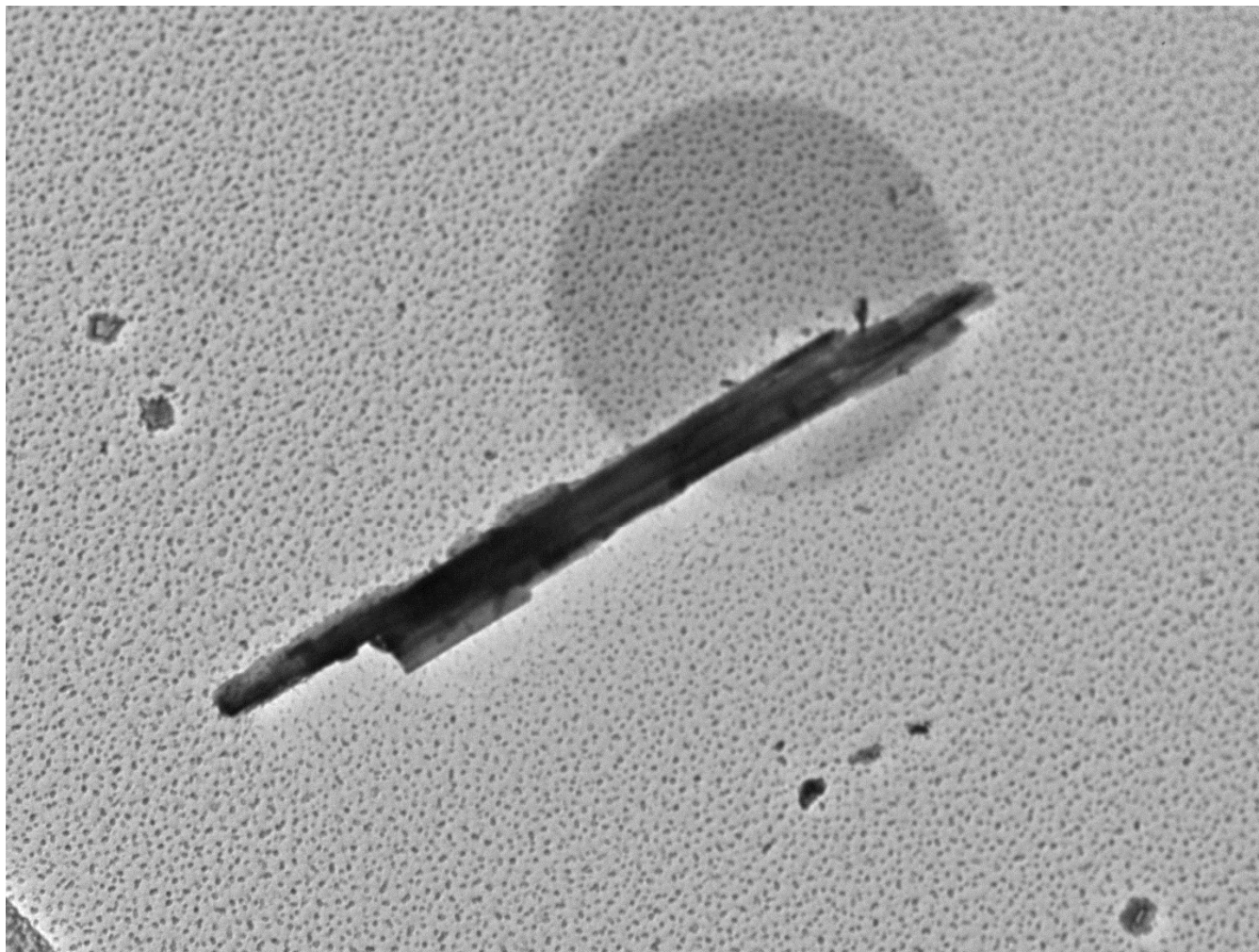


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Direct Mag: 19000x  
EMSL





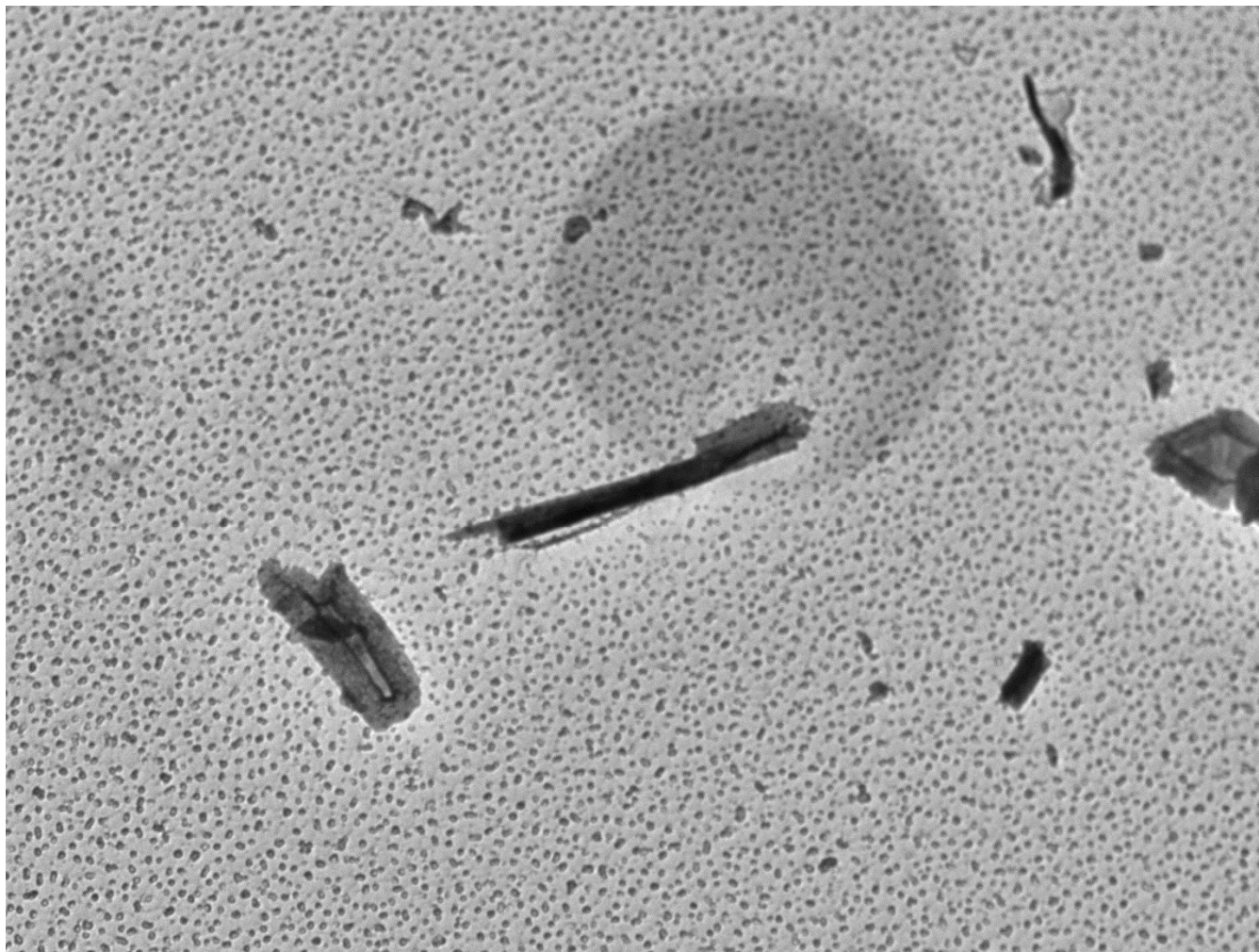


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Direct Mag: 14000x  
EMSL



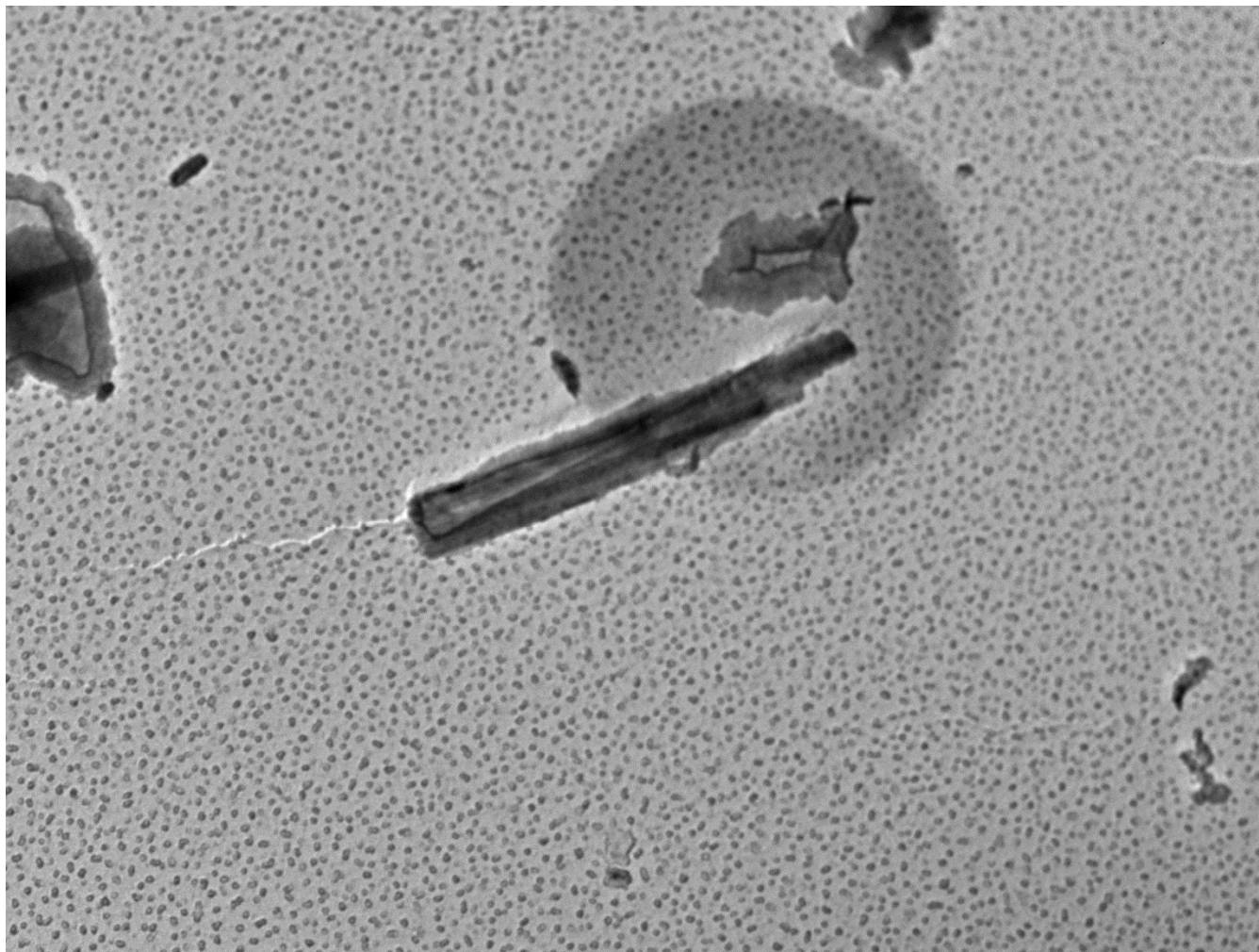




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Direct Mag: 19000x  
EMSL



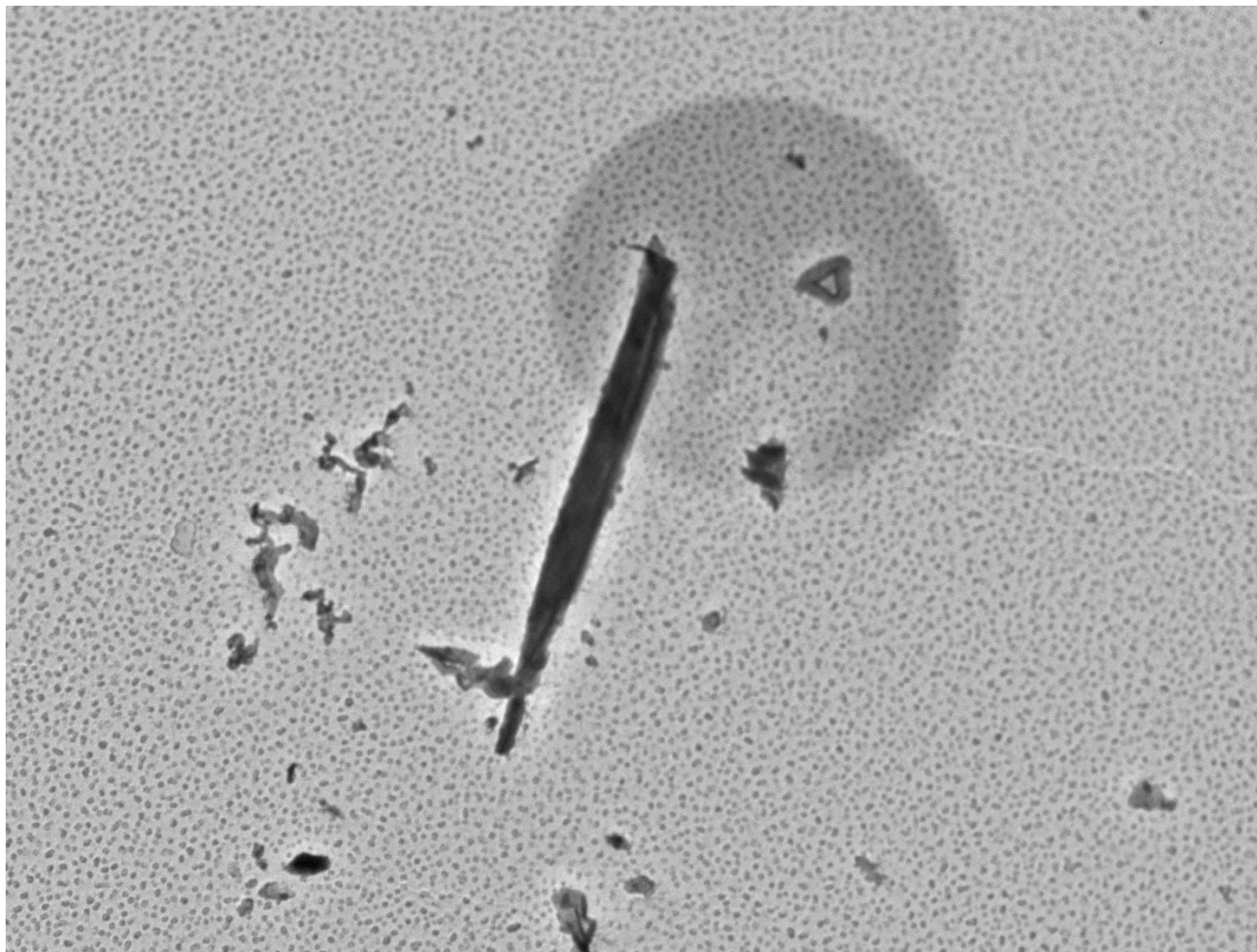


2019\_04-02\_041837324-0004\_STR\_1\_04-02\_2019\_FILES\_MG\_225  
13:36:39 3/12/2019

600 nm  
Direct Mag: 19000x  
EMSL





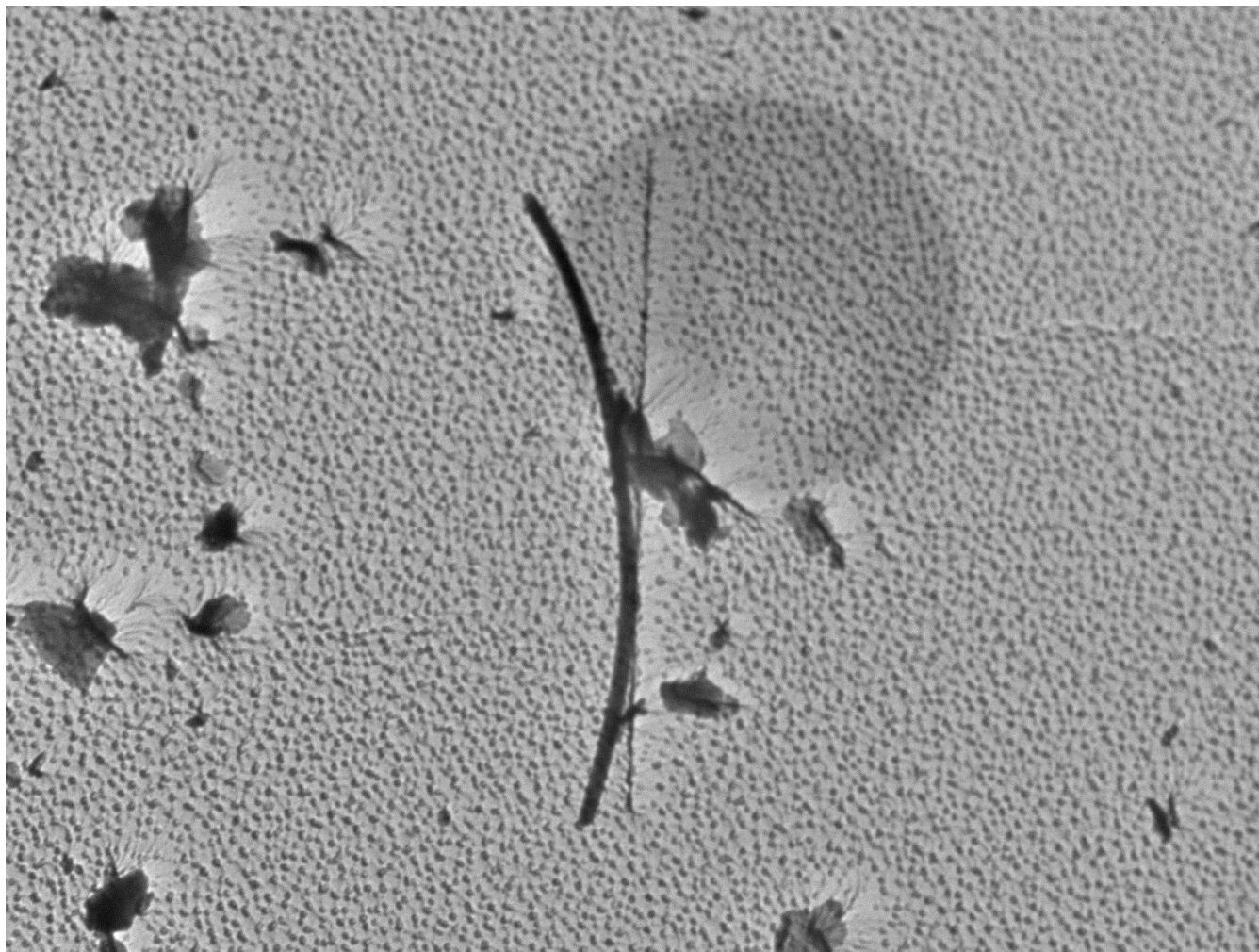


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13:40:16 3/12/2019

800 nm  
Direct Mag: 14000x  
EMSL







2019\_04-02\_041837324-0004\_STR\_3\_04-02\_2019\_FILES\_MG\_227  
13:45:26 3/12/2019

600 nm  
Direct Mag: 19000x  
EMSL



## **Appendix E - Core Vein Measurement and Data Summary Tables**

Core CB-1 Vein Calculation								Percent Asbestos
Depth of Vein	Thickness (T)	Length across Core (L)	Width (W)	Vein Angle	Vein Volume	*Lithologic Description	Comments	via PLM**
(ft)	(inches)	(inches)	(inches)	(Degree)	(ft3)			
19.5-20.9	2.63	6.00	2.00	55	0.0143172	Plagioclase, Chlorite, Albite, Actinolite	CB-1#1 at 19.9'	0.20%
74-79.6	0.06	65.00	2.00	88	0.0036929	Hornblende, Pyroxene	DB-1 at 78.0'	0.60%
90.4-90.8	2.50	3.25	2.00	50	0.0073858	Actinolite	CB-1#3 at 90.4'	ND
<b>Total</b>					<b>0.0217030</b>	<b>1.09% Actinolite Veining</b>		<b>0.0212%</b>

Notes:

\*Lithology and total depth (D) of corehole was obtained from May 2019 boring logs in Appendix G.

\*\*Percent asbestos as determined by RJ Lee Group by PLM US EPA 600/R-93/116

ND: Not Detected

Total Core Volume =  $V = \pi r^2 D$ , where  $r$  is  $1/2W$  and  $D$  is total depth of core hole = 1.985310347 ft<sup>3</sup>



Core CB #2 Vein Calculation								Percent Asbestos
Depth of Vein	Thickness ( <i>T</i> )	Length across Core ( <i>L</i> )	Width ( <i>W</i> )	Vein Angle	Vein Volume	*Lithologic Description	Comments	via PLM**
(ft)	(inches)	(inches)	(inches)	(Degree)	(ft <sup>3</sup> )			
84.3-84.5	0.50	4.00	2.00	60	0.0018181	Plagioclase, Mica, Actinolite	CB-2#4 at 84.3	ND
85.0-86.3	1.00	5.00	2.00	60	0.0045451	Plagioclase, Mica, Quartz, Actinolite	CB-2#5 at 85.2', CB-2#6 at 86.0'	ND, 0.10%
<b>Total</b>					<b>0.0063632</b>	<b>0.32% Actinolite Veining</b>		<b>0.0278%</b>

Notes:

\*Lithology and total depth (*D*) of corehole was obtained from May 2019 boring logs in Appendix G.

\*\*Percent asbestos as determined by RJ Lee Group by PLM US EPA 600/R-93/116

ND: Not Detected

Total Core Volume =  $V = \pi r^2 D$ , where *r* is 1/2*W* and *D* is total depth of core hole = 1.96349375 ft<sup>3</sup>

Core CB #3 Vein Calculation								Percent Asbestos
Depth of Vein	Thickness ( <i>T</i> )	Length across Core ( <i>L</i> )	Width ( <i>W</i> )	Vein Angle	Vein Volume	*Lithologic Description	Comments	via PLM**
(ft)	(inches)	(inches)	(inches)	(Degree)	(ft <sup>3</sup> )			
18.0-18.2	0.13	2.13	2.00	50	0.0002415	Plagioclase	CB-3#7 at 17.8'	ND
36.4	0.13	2.25	2.00	40	0.0002557	Quartz	DB-3 at 30.5'	ND
146.2-146.8	2.00	3.50	2.00	55	0.0063632	Quartz, Actinolite, Augite	CB-3#8 at 146.2'	ND
<b>Total</b>					<b>0.0171472</b>	<b>0.18% Actinolite Veining</b>		<b>0.0091%</b>

Notes:

\*Lithology and total depth (*D*) of corehole was obtained from May 2019 boring logs in Appendix G.

\*\*Percent asbestos as determined by RJ Lee Group by PLM US EPA 600/R-93/116

ND: Not Detected

Total Core Volume =  $V = \pi r^2 D$ , where *r* is 1/2*W* and *D* is total depth of core hole = 3.501563854 ft<sup>3</sup>

Core CB #4 Vein Calculation								Percent Asbestos
Depth of Vein	Thickness ( <i>T</i> )	Length across Core ( <i>L</i> )	Width ( <i>W</i> )	Vein Angle	Vein Volume	*Lithologic Description	Comments	via PLM**
(ft)	(inches)	(inches)	(inches)	(Degree)	(ft <sup>3</sup> )			
70.3	0.13	2.63	2.00	50	0.0002983	Quartz	DB-4 at 69.0'	ND
147.5-148.0	0.88	5.50	2.00	75	0.0043747	Plagioclase, Actinolite, Chlorite	CB-4#10 at 147.5'	ND
<b>Total</b>					<b>0.0207371</b>	<b>0.13% Actinolite Veining</b>		<b>0.0063%</b>

Notes:

\*Lithology and total depth (*D*) of corehole was obtained from May 2019 boring logs in Appendix G.

\*\*Percent asbestos as determined by RJ Lee Group by PLM US EPA 600/R-93/116

ND: Not Detected

Total Core Volume =  $V = \pi r^2 D$ , where *r* is 1/2*W* and *D* is total depth of core hole = 3.490655556 ft<sup>3</sup>



**Table 6 - 2019 All Data Listings**

Location	ID	Date	ID On COC	% Asbestos	ND = 1/2 RL
2B Pile	1	4/18/2019	1	ND	0.05
2B Pile	2	4/18/2019	2	ND	0.05
2B Pile	3	4/18/2019	3 (PLM)	<0.1 TR	0.05
2B Pile	3	4/18/2019	3 (TEM)	< 0.00003	0.000015
2B Pile	4	4/18/2019	4	ND	0.05
2B Pile	5	4/18/2019	5 (PLM)	<0.1 AC	0.05
2B Pile	5	4/18/2019	5 (TEM)	< 0.00004	0.00002
2B Pile	6	4/18/2019	6	ND	0.05
2B Pile	7	4/18/2019	7	ND	0.05
2B Pile	8	4/18/2019	8 (PLM)	<0.1 AC, <0.1 TR	0.05
2B Pile	8	4/18/2019	8 (TEM)	< 0.00006	0.00003
2B Pile	9	4/18/2019	9	ND	0.05
2B Pile	10	4/18/2019	10	ND	0.05
1B Pile	11	4/18/2019	11 (PLM)	ND	0.05
1B Pile	11	4/18/2019	11 (TEM)	0.0048	0.0048
1B Pile	12	4/18/2019	12	ND	0.05
2A Pile	13	4/18/2019	13 (PLM)	ND	0.05
2A Pile	13	4/18/2019	13 (TEM 9/10)	0.05	0.05
2A Pile	14	4/18/2019	14	ND	0.05
Screening	15	4/18/2019	15 (PLM)	ND	0.05
Screening	15	4/18/2019	15 (TEM)	0.016	0.016
Screening	16	4/18/2019	16	ND	0.05
Boulder	RH#1	5/8/2019	RH#1	ND	0.05
Boulder	RH#2	5/8/2019	RH#2	<0.10 AC	0.05
Boulder	RH#3	5/8/2019	RH#3	ND	0.05
Boulder	RH#4	5/8/2019	RH#4	ND	0.05
Boulder	RH#5	5/8/2019	RH#5	ND	0.05
Boulder	RH#6	5/8/2019	RH#6	ND	0.05
Boulder	RH#7	5/8/2019	RH#7	<0.10 TR	0.05
Boulder	RH#8	5/8/2019	RH#8	ND	0.05
Boulder	RH#10	5/8/2019	RH#10	ND	0.05
Boulder	RH#11	5/8/2019	RH#11	<0.10 AC	0.05
Boulder	RH#12	5/8/2019	RH#12	<0.10 AC	0.05
Boulder	RH#14	5/8/2019	RH#14	<0.10 AC	0.05
Boulder	RH#18	5/7/2019	RH#18	ND	0.05
Boulder	RH#22	5/7/2019	RH#22	ND	0.05
Boulder	RH#23	5/7/2019	RH#23	ND	0.05
Boulder	RH#24	5/7/2019	RH#24	ND	0.05
Boulder	RH#25	5/7/2019	RH#25	ND	0.05
Boulder	RH#26	5/7/2019	RH#26	<0.10 AC	0.05
Boulder	RH#27	5/7/2019	RH#27	ND	0.05
Boulder	RH#28	5/8/2019	RH#28	ND	0.05
Boulder	RH#29	5/8/2019	RH#29	<0.10 AC	0.05
Boulder	RH#30	5/8/2019	RH#30	ND	0.05
Boulder	RH#31	5/7/2019	RH#31	ND	0.05
Boulder	RH#32	5/7/2019	RH#32	ND	0.05
Boulder	RH#33	5/13/2019	RH#33	ND	0.05
Core	CB-1 #1	5/23/2019	CB-1 #1	0.20 AC	0.20
Core	CB-1 #3	5/23/2019	CB-1 #3	ND	0.05
Core	DB-1	5/23/2019	DB-1 (PLM)	0.10 AC	0.1
Core	DB-1	5/23/2019	DB-1 Dup (PLM)	0.60 TR	0.6
Core	DB-1	5/23/2019	DB-1 Dup (TEM)	< 0.00004	0.00002
Core	CB-2 #4	5/23/2019	CB-2 #4	ND	0.05
Core	CB-2 #5	5/23/2019	CB-2 #5	ND	0.05
Core	CB-2 #6	5/23/2019	CB-2 #6	0.10 TR	0.10
Core	DB-2	5/23/2019	DB-2	ND	0.05
Core	CB-3 #7	5/23/2019	CB-3 #7	ND	0.05
Core	CB-3 #8	5/23/2019	CB-3 #8	ND	0.05
Core	CB-3 #9	5/23/2019	CB-3 #9	ND	0.05
Core	DB-3	5/23/2019	DB-3	ND	0.05
Core	CB-4 #10	5/23/2019	CB-4 #10	ND	0.05
Core	DB-4	5/23/2019	DB-4	ND	0.05
Hand Sample	Hand Sample 1	5/23/2019	Hand Sample 1	ND	0.05
Hand Sample	Hand Sample 2	5/23/2019	Hand Sample 2	ND	0.05
Hand Sample	Vein 7	5/23/2019	Vein 7	0.10 AC	0.10

ND = 1/2 DL	
<b>Geomean (All):</b>	<b>0.03214708</b>
<b>Number of Samples:</b>	<b>65</b>
<b>Geomean (All PLM Only):</b>	<b>0.05540225</b>
<b>Number of Samples:</b>	<b>58</b>
<b>Geomean (All TEM Only):</b>	<b>0.0003536</b>
<b>Number of Samples:</b>	<b>7</b>

<b>Average (All):</b>	<b>0.05878285</b>
<b>Number of Samples:</b>	<b>65</b>
<b>Average (All PLM Only):</b>	<b>0.06465517</b>
<b>Number of Samples:</b>	<b>58</b>
<b>Average (All TEM Only):</b>	<b>0.01013</b>
<b>Number of Samples:</b>	<b>7</b>

**Table 6 - 2019 Composite Data Listing**

Location	ID	Date	ID On COC	% Asbestos	ND = 1/2 RL
2B Pile	1	4/18/2019	1	ND	0.05
2B Pile	2	4/18/2019	2	ND	0.05
2B Pile	3	4/18/2019	3 (PLM)	<0.1 TR	0.05
2B Pile	3	4/18/2019	3 (TEM)	< 0.00003	0.000015
2B Pile	4	4/18/2019	4	ND	0.05
2B Pile	5	4/18/2019	5 (PLM)	<0.1 AC	0.05
2B Pile	5	4/18/2019	5 (TEM)	< 0.00004	0.00002
2B Pile	6	4/18/2019	6	ND	0.05
2B Pile	7	4/18/2019	7	ND	0.05
2B Pile	8	4/18/2019	8 (PLM)	<0.1 AC, <0.1 TR	0.05
2B Pile	8	4/18/2019	8 (TEM)	< 0.00006	0.00003
2B Pile	9	4/18/2019	9	ND	0.05
2B Pile	10	4/18/2019	10	ND	0.05
1B Pile	11	4/18/2019	11 (PLM)	ND	0.05
1B Pile	11	4/18/2019	11 (TEM)	0.0048	0.0048
1B Pile	12	4/18/2019	12	ND	0.05
2A Pile	13	4/18/2019	13 (PLM)	ND	0.05
2A Pile	13	4/18/2019	13 (TEM)	0.05	0.05
2A Pile	14	4/18/2019	14	ND	0.05
Screening	15	4/18/2019	15 (PLM)	ND	0.05
Screening	15	4/18/2019	15 (TEM)	0.016	0.016
Screening	16	4/18/2019	16	ND	0.05

	ND = 1/2 DL
<b>Geomean (Composite):</b>	<b>0.01476339</b>
<b>Number of Samples:</b>	<b>22</b>
<b>Geomean (Composite PLM Only):</b>	<b>0.05</b>
<b>Number of Samples:</b>	<b>16</b>
<b>Geomean (All TEM Only):</b>	<b>0.000570728</b>
<b>Number of Samples:</b>	<b>6</b>

<b>Average (Composite):</b>	<b>0.039584773</b>
<b>Number of Samples:</b>	<b>22</b>
<b>Average (Composite PLM Only):</b>	<b>0.05</b>
<b>Number of Samples:</b>	<b>16</b>
<b>Average Compo. TEM Only:</b>	<b>0.011810833</b>
<b>Number of Samples:</b>	<b>6</b>

**Table 6 - 2019 Target Sample Listing**

Type	ID	Date	ID On COC	% Asbestos	ND = 1/2 RL
Boulder	RH#1	5/8/2019	RH#1	ND	0.05
Boulder	RH#2	5/8/2019	RH#2	<0.10 AC	0.05
Boulder	RH#3	5/8/2019	RH#3	ND	0.05
Boulder	RH#4	5/8/2019	RH#4	ND	0.05
Boulder	RH#5	5/8/2019	RH#5	ND	0.05
Boulder	RH#6	5/8/2019	RH#6	ND	0.05
Boulder	RH#7	5/8/2019	RH#7	<0.10 TR	0.05
Boulder	RH#8	5/8/2019	RH#8	ND	0.05
Boulder	RH#10	5/8/2019	RH#10	ND	0.05
Boulder	RH#11	5/8/2019	RH#11	<0.10 AC	0.05
Boulder	RH#12	5/8/2019	RH#12	<0.10 AC	0.05
Boulder	RH#14	5/8/2019	RH#14	<0.10 AC	0.05
Boulder	RH#18	5/7/2019	RH#18	ND	0.05
Boulder	RH#22	5/7/2019	RH#22	ND	0.05
Boulder	RH#23	5/7/2019	RH#23	ND	0.05
Boulder	RH#24	5/7/2019	RH#24	ND	0.05
Boulder	RH#25	5/7/2019	RH#25	ND	0.05
Boulder	RH#26	5/7/2019	RH#26	<0.10 AC	0.05
Boulder	RH#27	5/7/2019	RH#27	ND	0.05
Boulder	RH#28	5/8/2019	RH#28	ND	0.05
Boulder	RH#29	5/8/2019	RH#29	<0.10 AC	0.05
Boulder	RH#30	5/8/2019	RH#30	ND	0.05
Boulder	RH#31	5/7/2019	RH#31	ND	0.05
Boulder	RH#32	5/7/2019	RH#32	ND	0.05
Boulder	RH#33	5/13/2019	RH#33	ND	0.05
Core	CB-1 #1	5/23/2019	CB-1 #1	0.20 AC	0.20
Core	CB-1 #3	5/23/2019	CB-1 #3	ND	0.05
Core	DB-1	5/23/2019	DB-1	0.10 AC	0.10
Core	DB-1	5/23/2019	DB-1 Dup (PLM)	0.60 TR	0.6
Core	DB-1	5/23/2019	DB-1 Dup (TEM)	< 0.00004	0.00002
Core	CB-2 #4	5/23/2019	CB-2 #4	ND	0.05
Core	CB-2 #5	5/23/2019	CB-2 #5	ND	0.05
Core	CB-2 #6	5/23/2019	CB-2 #6	0.10 TR	0.10
Core	DB-2	5/23/2019	DB-2	ND	0.05
Core	CB-3 #7	5/23/2019	CB-3 #7	ND	0.05
Core	CB-3 #8	5/23/2019	CB-3 #8	ND	0.05
Core	CB-3 #9	5/23/2019	CB-3 #9	ND	0.05
Core	DB-3	5/23/2019	DB-3	ND	0.05
Core	CB-4 #10	5/23/2019	CB-4 #10	ND	0.05
Core	DB-4	5/23/2019	DB-4	ND	0.05
Hand Sample	Hand Sample 1	5/23/2019	Hand Sample 1	ND	0.05
Hand Sample	Hand Sample 2	5/23/2019	Hand Sample 2	ND	0.05
Hand Sample	Vein 7	5/23/2019	Vein 7	0.10 AC	0.10

	ND = 1/2 DL
<b>Geomean (Targeted):</b>	<b>0.047868395</b>
<b>Number of Samples:</b>	<b>43</b>
<b>Geomean (Targeted PLM Only):</b>	<b>0.057610507</b>
<b>Number of Samples:</b>	<b>42</b>
<b>Geomean (All TEM Only):</b>	<b>0.00002</b>
<b>Number of Samples:</b>	<b>1</b>

<b>Average (Targeted):</b>	<b>0.068605116</b>
<b>Number of Samples:</b>	<b>43</b>
<b>Average (Targeted PLM Only):</b>	<b>0.070238095</b>
<b>Number of Samples:</b>	<b>42</b>
<b>Average (All TEM Only):</b>	<b>0.00002</b>
<b>Number of Samples:</b>	<b>1</b>



**Table 7 - 2018-2019 All Data Listing**

Location	ID	Date	ID On COC	% Asbestos	ND = 1/2 RL
1st Quarter 2018	S-1	1/9/2018	S-1	ND	0.05
	S-2	1/9/2018	S-2	ND	0.05
	S-3	1/9/2018	S-3	ND	0.05
	S-4	1/9/2018	S-4	ND	0.05
	S-5	1/9/2018	S-5	ND	0.05
	S-6	1/9/2018	S-6	ND	0.05
	S-7	1/9/2018	S-7	ND	0.05
	S-8	1/9/2018	S-8	ND	0.05
	S-9	1/9/2018	S-9	ND	0.05
	Hand Sample S-1	1/12/2018	S-1	ND	0.05
	Hand Sample S-2	1/12/2018	S-2	ND	0.05
	Hand Sample S-3	1/12/2018	S-3	ND	0.05
	Hand Sample N-1	1/12/2018	N-1	ND	0.05
2nd Quarter 18	DH-1 & DH-2	6/4/2018	Composite*	ND	0.125
3rd Quarter 2018	S-1 & S-2	7/17/2018	Composite #1	ND	0.05
	S-3 & S-4	7/18/2018	Composite #2	ND	0.05
	S-5 & S-6	7/31/2018	Composite #1	ND	0.05
	S-7 & S-8	8/22/2018	Composite #1*	ND	0.125
	S-9 & S-10	9/6/2018	Composite*	ND	0.125
	S-11 & S-12	9/24/2018	Composite #1	ND	0.05
	4th Quarter 2018	S-1 & S-2	10/10/2018	Composite #1	ND
S-3 & S-4		10/19/2018	Composite #1	ND	0.125
S-5 & S-6		10/30/2018	Composite #1	ND	0.125
S-7 & S-8		11/1/2018	Composite #1	ND	0.125
S-9 & S-10		11/9/2018	Composite #1	ND	0.125
Hand Sample 1		11/9/2018	Hand Sample 1*	0.25 (PLM)	0.25
Hand Sample 1		11/9/2018	Hand Sample 1	0.8 (TEM)	0.8
2B Aggregate		12/20/2018	1*	ND	0.125
2B Aggregate		12/20/2018	2*	ND	0.125
1B Aggregate		12/20/2018	3*	ND	0.125
2A Aggregate		12/20/2018	4*	ND	0.125
Screenings		12/20/2018	5*	ND	0.125
Crusher Fines (West)		12/20/2018	6*	ND	0.125
Crusher Fines (East)	12/20/2018	7*	ND	0.125	
2B Pile	1	4/18/2019	1	ND	0.05
2B Pile	2	4/18/2019	2	ND	0.05
2B Pile	3	4/18/2019	3 (PLM)	<0.1 TR	0.05
2B Pile	3	4/18/2019	3 (TEM)	< 0.00003	0.000015
2B Pile	4	4/18/2019	4	ND	0.05
2B Pile	5	4/18/2019	5 (PLM)	<0.1 AC	0.05
2B Pile	5	4/18/2019	5 (TEM)	< 0.00004	0.00002
2B Pile	6	4/18/2019	6	ND	0.05
2B Pile	7	4/18/2019	7	ND	0.05
2B Pile	8	4/18/2019	8 (PLM)	<0.1 AC, <0.1 TR	0.05
2B Pile	8	4/18/2019	8 (TEM)	< 0.00006	0.00003
2B Pile	9	4/18/2019	9	ND	0.05
2B Pile	10	4/18/2019	10	ND	0.05
1B Pile	11	4/18/2019	11 (PLM)	ND	0.05
1B Pile	11	4/18/2019	11 (TEM)	0.0048	0.0048
1B Pile	12	4/18/2019	12	ND	0.05
2A Pile	13	4/18/2019	13 (PLM)	ND	0.05
2A Pile	13	4/18/2019	13 (TEM 9/10)	0.05	0.0500
2A Pile	14	4/18/2019	14	ND	0
Screening	15	4/18/2019	15 (PLM)	ND	0.0500
Screening	15	4/18/2019	15 (TEM)	0.016	0
Screening	16	4/18/2019	16	ND	0.0500
Boulder	RH#1	5/8/2019	RH#1	ND	0
Boulder	RH#2	5/8/2019	RH#2	<0.10 AC	0.05
Boulder	RH#3	5/8/2019	RH#3	ND	0.0500
Boulder	RH#4	5/8/2019	RH#4	ND	0
Boulder	RH#5	5/8/2019	RH#5	ND	0.0500
Boulder	RH#6	5/8/2019	RH#6	ND	0
Boulder	RH#7	5/8/2019	RH#7	<0.10 TR	0.0500
Boulder	RH#8	5/8/2019	RH#8	ND	0
Boulder	RH#10	5/8/2019	RH#10	ND	0.05
Boulder	RH#11	5/8/2019	RH#11	<0.10 AC	0.05
Boulder	RH#12	5/8/2019	RH#12	<0.10 AC	0.05
Boulder	RH#14	5/8/2019	RH#14	<0.10 AC	0.05
Boulder	RH#18	5/7/2019	RH#18	ND	0.05
Boulder	RH#22	5/7/2019	RH#22	ND	0.05
Boulder	RH#23	5/7/2019	RH#23	ND	0.05
Boulder	RH#24	5/7/2019	RH#24	ND	0.05
Boulder	RH#25	5/7/2019	RH#25	ND	0.05
Boulder	RH#26	5/7/2019	RH#26	<0.10 AC	0.05
Boulder	RH#27	5/7/2019	RH#27	ND	0.05
Boulder	RH#28	5/8/2019	RH#28	ND	0.05
Boulder	RH#29	5/8/2019	RH#29	<0.10 AC	0.05
Boulder	RH#30	5/8/2019	RH#30	ND	0.05
Boulder	RH#31	5/7/2019	RH#31	ND	0.05
Boulder	RH#32	5/7/2019	RH#32	ND	0.05
Boulder	RH#33	5/13/2019	RH#33	ND	0.05
Core	CB-1 #1	5/23/2019	CB-1 #1	0.20 AC	0.20
Core	CB-1 #3	5/23/2019	CB-1 #3	ND	0.05
Core	DB-1	5/23/2019	DB-1 (PLM)	0.10 AC	0.1
Core	DB-1	5/23/2019	DB-1 Dup (PLM)	0.60 TR	0.6
Core	DB-1	5/23/2019	DB-1 Dup (TEM)	< 0.00004	0.00002
Core	CB-2 #4	5/23/2019	CB-2 #4	ND	0.05
Core	CB-2 #5	5/23/2019	CB-2 #5	ND	0.05
Core	CB-2 #6	5/23/2019	CB-2 #6	0.10 TR	0.10
Core	DB-2	5/23/2019	DB-2	ND	0.05
Core	CB-3 #7	5/23/2019	CB-3 #7	ND	0.05
Core	CB-3 #8	5/23/2019	CB-3 #8	ND	0.05
Core	CB-3 #9	5/23/2019	CB-3 #9	ND	0.05
Core	DB-3	5/23/2019	DB-3	ND	0.05
Core	CB-4 #10	5/23/2019	CB-4 #10	ND	0.05
Core	DB-4	5/23/2019	DB-4	ND	0.05
Hand Sample	Hand Sample 1	5/23/2019	Hand Sample 1	ND	0.05
Hand Sample	Hand Sample 2	5/23/2019	Hand Sample 2	ND	0.05
Hand Sample	Vein 7	5/23/2019	Vein 7	0.10 AC	0.10

ND = 1/2 DL

Geomean (All):	0.0445
Number of Samples:	99
Geomean (All PLM Only):	0.0626
Number of Samples:	91
Geomean (All TEM Only):	0.0009
Number of Samples:	8

Average (All):	0.0760
Number of Samples:	99
Average (All PLM Only):	0.0731
Number of Samples:	91
Average (All TEM Only):	0.1089
Number of Samples:	8

**Table 7 - 2018-2019 Composite Data Listing**

Location	ID	Date	ID On COC	% Asbestos	ND = 1/2 RL
1st Quarter 2018	S-1	1/9/2018	S-1	ND	0.05
	S-2	1/9/2018	S-2	ND	0.05
	S-3	1/9/2018	S-3	ND	0.05
	S-4	1/9/2018	S-4	ND	0.05
	S-5	1/9/2018	S-5	ND	0.05
	S-6	1/9/2018	S-6	ND	0.05
	S-7	1/9/2018	S-7	ND	0.05
	S-8	1/9/2018	S-8	ND	0.05
	S-9	1/9/2018	S-9	ND	0.05
2nd Q 2018	DH-1 & DH-2	6/4/2018	Composite*	ND	0.125
3rd Quarter 2018	S-1 & S-2	7/17/2018	Composite #1	ND	0.05
	S-3 & S-4	7/18/2018	Composite #2	ND	0.05
	S-5 & S-6	7/31/2018	Composite #1	ND	0.05
	S-7 & S-8	8/22/2018	Composite #1*	ND	0.125
	S-9 & S-10	9/6/2018	Composite*	ND	0.125
	S-11 & S-12	9/24/2018	Composite #1	ND	0.05
4th Quarter 2018	S-1 & S-2	10/10/2018	Composite #1	ND	0.05
	S-3 & S-4	10/19/2018	Composite #1	ND	0.125
	S-5 & S-6	10/30/2018	Composite #1	ND	0.125
	S-7 & S-8	11/1/2018	Composite #1	ND	0.125
	S-9 & S-10	11/9/2018	Composite #1	ND	0.125
	2B Aggregate	12/20/2018	1*	ND	0.125
	2B Aggregate	12/20/2018	2*	ND	0.125
	1B Aggregate	12/20/2018	3*	ND	0.125
	2A Aggregate	12/20/2018	4*	ND	0.125
	Screenings	12/20/2018	5*	ND	0.125
	Crusher Fines (West)	12/20/2018	6*	ND	0.125
Crusher Fines (East)	12/20/2018	7*	ND	0.125	
2B Pile	1	4/18/2019	1	ND	0.05
2B Pile	2	4/18/2019	2	ND	0.05
2B Pile	3	4/18/2019	3 (PLM)	<0.1 TR	0.05
2B Pile	3	4/18/2019	3 (TEM)	< 0.00003	0.000015
2B Pile	4	4/18/2019	4	ND	0.05
2B Pile	5	4/18/2019	5 (PLM)	<0.1 AC	0.05
2B Pile	5	4/18/2019	5 (TEM)	< 0.00004	0.00002
2B Pile	6	4/18/2019	6	ND	0.05
2B Pile	7	4/18/2019	7	ND	0.05
2B Pile	8	4/18/2019	8 (PLM)	<0.1 AC, <0.1 TR	0.05
2B Pile	8	4/18/2019	8 (TEM)	< 0.00006	0.00003
2B Pile	9	4/18/2019	9	ND	0.05
2B Pile	10	4/18/2019	10	ND	0.05
1B Pile	11	4/18/2019	11 (PLM)	ND	0.05
1B Pile	11	4/18/2019	11 (TEM)	0.0048	0.0048
1B Pile	12	4/18/2019	12	ND	0.05
2A Pile	13	4/18/2019	13 (PLM)	ND	0.05
2A Pile	13	4/18/2019	13 (TEM)	0.05	0.05
2A Pile	14	4/18/2019	14	ND	0.05
Screening	15	4/18/2019	15 (PLM)	ND	0.05
Screening	15	4/18/2019	15 (TEM)	0.016	0.016
Screening	16	4/18/2019	16	ND	0.05

	ND = 1/2 DL
<b>Geomean (Composite):</b>	<b>0.0378</b>
<b>Number of Samples:</b>	<b>50</b>
<b>Geomean (Composite PLM Only):</b>	<b>0.0669</b>
<b>Number of Samples:</b>	<b>44</b>
<b>Geomean (All TEM Only):</b>	<b>0.0006</b>
<b>Number of Samples:</b>	<b>6</b>

<b>Average (Composite):</b>	<b>0.0664</b>
<b>Number of Samples:</b>	<b>50</b>
<b>Average (Composite PLM Only):</b>	<b>0.0739</b>
<b>Number of Samples:</b>	<b>44</b>
<b>Average Compo. TEM Only):</b>	<b>0.0118</b>
<b>Number of Samples:</b>	<b>6</b>

**Table 7 - 2018-2019 Target Sample Listing**

Type	ID	Date	ID On COC	% Asbestos	ND = 1/2 RL
<b>1st Quarter 2018</b>	Hand Sample S-1	1/12/2018	S-1	ND	0.05
	Hand Sample S-2	1/12/2018	S-2	ND	0.05
	Hand Sample S-3	1/12/2018	S-3	ND	0.05
	Hand Sample N-1	1/12/2018	N-1	ND	0.05
<b>4th Quarter 2018</b>	Hand Sample 1	11/9/2018	Hand Sample 1*	0.25 (PLM)	0.25
	Hand Sample 1	11/9/2018	Hand Sample 1	0.8 (TEM)	0.8
Boulder	RH#1	5/8/2019	RH#1	ND	0.05
Boulder	RH#2	5/8/2019	RH#2	<0.10 AC	0.05
Boulder	RH#3	5/8/2019	RH#3	ND	0.05
Boulder	RH#4	5/8/2019	RH#4	ND	0.05
Boulder	RH#5	5/8/2019	RH#5	ND	0.05
Boulder	RH#6	5/8/2019	RH#6	ND	0.05
Boulder	RH#7	5/8/2019	RH#7	<0.10 TR	0.05
Boulder	RH#8	5/8/2019	RH#8	ND	0.05
Boulder	RH#10	5/8/2019	RH#10	ND	0.05
Boulder	RH#11	5/8/2019	RH#11	<0.10 AC	0.05
Boulder	RH#12	5/8/2019	RH#12	<0.10 AC	0.05
Boulder	RH#14	5/8/2019	RH#14	<0.10 AC	0.05
Boulder	RH#18	5/7/2019	RH#18	ND	0.05
Boulder	RH#22	5/7/2019	RH#22	ND	0.05
Boulder	RH#23	5/7/2019	RH#23	ND	0.05
Boulder	RH#24	5/7/2019	RH#24	ND	0.05
Boulder	RH#25	5/7/2019	RH#25	ND	0.05
Boulder	RH#26	5/7/2019	RH#26	<0.10 AC	0.05
Boulder	RH#27	5/7/2019	RH#27	ND	0.05
Boulder	RH#28	5/8/2019	RH#28	ND	0.05
Boulder	RH#29	5/8/2019	RH#29	<0.10 AC	0.05
Boulder	RH#30	5/8/2019	RH#30	ND	0.05
Boulder	RH#31	5/7/2019	RH#31	ND	0.05
Boulder	RH#32	5/7/2019	RH#32	ND	0.05
Boulder	RH#33	5/13/2019	RH#33	ND	0.05
Core	CB-1 #1	5/23/2019	CB-1 #1	0.20 AC	0.20
Core	CB-1 #3	5/23/2019	CB-1 #3	ND	0.05
Core	DB-1	5/23/2019	DB-1	0.10 AC	0.10
Core	DB-1	5/23/2019	DB-1 Dup (PLM)	0.60 TR	0.6
Core	DB-1	5/23/2019	DB-1 Dup (TEM)	< 0.00004	0.00002
Core	CB-2 #4	5/23/2019	CB-2 #4	ND	0.05
Core	CB-2 #5	5/23/2019	CB-2 #5	ND	0.05
Core	CB-2 #6	5/23/2019	CB-2 #6	0.10 TR	0.10
Core	DB-2	5/23/2019	DB-2	ND	0.05
Core	CB-3 #7	5/23/2019	CB-3 #7	ND	0.05
Core	CB-3 #8	5/23/2019	CB-3 #8	ND	0.05
Core	CB-3 #9	5/23/2019	CB-3 #9	ND	0.05
Core	DB-3	5/23/2019	DB-3	ND	0.05
Core	CB-4 #10	5/23/2019	CB-4 #10	ND	0.05
Core	DB-4	5/23/2019	DB-4	ND	0.05
Hand Sample	Hand Sample 1	5/23/2019	Hand Sample 1	ND	0.05
Hand Sample	Hand Sample 2	5/23/2019	Hand Sample 2	ND	0.05
Hand Sample	Vein 7	5/23/2019	Vein 7	0.10 AC	0.10

	ND = 1/2 DL
<b>Geomean (Targeted):</b>	<b>0.0526</b>
<b>Number of Samples:</b>	<b>49</b>
<b>Geomean (Targeted PLM Only):</b>	<b>0.0587</b>
<b>Number of Samples:</b>	<b>47</b>
<b>Geomean (All TEM Only):</b>	<b>0.0040</b>
<b>Number of Samples:</b>	<b>2</b>

<b>Average (Targeted):</b>	<b>0.0857</b>
<b>Number of Samples:</b>	<b>49</b>
<b>Average (Targeted PLM Only):</b>	<b>0.0723</b>
<b>Number of Samples:</b>	<b>47</b>
<b>Average (All TEM Only):</b>	<b>0.4000</b>
<b>Number of Samples:</b>	<b>2</b>



## **Appendix F - 2019 Laboratory Results**

**SURFACE WATER ANALYTICAL RESULTS**

## Final Laboratory Report

### TEM EPA Water Analysis

Mr. David Raphael  
K & L Gates  
17 North Second Street  
18th Floor  
Harrisburg, PA 17101  
US

Report Date: 05/01/2019  
Sample Receipt Date: 04/23/2019  
RJ Lee Group Job No.: LLH901997-4  
Authorization/P.O. No.:  
Samples Received: 7  
Client Job No.:

Method: EPA Method 100.2 600/R-94-134

Client Sample Number	RJLG Sample Number	Date Prepped	Date Analyzed	Filter Area (mm <sup>2</sup> )	Volume (ml)	Area Analyzed (mm <sup>2</sup> )	Confidence Interval >10 μm	Asbestos Structures >10 μm		Analytical Sensitivity (MFL) >10 μm	Concentration (MFL) >10 μm
								Chry	Amph		
#1 NPDES Outfall	3158173.HTW1	04/24/2019	04/29/2019	1220	20	0.31072	0-4	0	0	0.2	< 0.2
#2 Sed. Trap 2	3158174.HTW1	04/24/2019	04/29/2019	1220	2	0.61203	0-4	0	0	1.0	< 1.0
#3 Sed. Basin 2	3158175.HTW1	04/24/2019	04/29/2019	1220	10	0.12241	0-4	0	0	1.0	< 1.0
#4 Sed. Basin 1	3158176.HTW2	04/24/2019	04/29/2019	1220	10	0.12241	0-4	0	0	1.0	< 1.0
#5 Quarry Pit	3158177.HTW1	04/24/2019	04/30/2019	1220	20	0.31072	0-4	0	0	0.2	< 0.2
#6 Sed. Trap 1	3158178.HTW3	04/29/2019	04/30/2019	1220	0.5	2.44812	0-4	0	0	1.0	< 1.0
#7 Sed. Trap 3	3158179.HTW1	04/24/2019	04/29/2019	1220	5	0.24481	0-4	0	0	1.0	< 1.0

**NOTES**

- Water samples collected more than 24 hours before receipt may be out of compliance. Drinking water samples are filtered within 24 hours of receipt.
- "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, MFL-million fibers per liter.
- Samples will be held for 30 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

**DISCLAIMER**

RJ Lee Group, Inc. is accredited by the New York Department of Health Environmental Laboratory Program (NY ELAP) and the Pennsylvania Department of Environmental Protection (PA DEP) for asbestos in water analysis by TEM. This report may not be used to claim product endorsement by NY ELAP, PA DEP or any other regulatory or laboratory accrediting agency. Any reproduction of this document must be in full in order for the report to be valid. This report is not valid unless it bears the name of a NY ELAP and PA-DEP approved signatory.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limiting provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any sample.



# RJ Lee Group, Inc.

RJ Lee Group Job No: LLH901997-4  
Client Job No/Name:

## Final Laboratory Report (cont'd)

Client: K & L Gates  
Report Date: 05/01/2019



Authorized Signature: \_\_\_\_\_

Monica McGrath-Koerner, Scientist

### NOTES

1. Water samples collected more than 24 hours before receipt may be out of compliance. Drinking water samples are filtered within 24 hours of receipt.
2. "<" indicates results less than analytical sensitivity. "----" indicates that sample was not analyzed.
3. Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
4. If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
5. Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, MFL-million fibers per liter.
6. Samples will be held for 30 days and then disposed of per Federal regulations.
7. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

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These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limiting provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any sample.

RJL: LLH901997-4	3158173.HTW1	Microscope tem2000fx1	Grid Openings	33
#1 NPDES Outfall	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 20.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44199	Operator: Ashleigh Sload		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							

10% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/29/2019 3:29:16 PM approve by Ashleigh Sload

Final Review: 5/1/19 12:57 PM approve by Monica Mcgrath

RJL: LLH901997-4	3158174.HTW1	Microscope tem2000fx2	Grid Openings	65
#2 Sed. Trap 2	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 2.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44199	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							
41				NSD							
42				NSD							
43				NSD							
44				NSD							



RJL: LLH901997-4	3158174.HTW1	Microscope tem2000fx2	Grid Openings	65
#2 Sed. Trap 2	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 2.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44199	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
45				NSD							
46				NSD							
47				NSD							
48				NSD							
49				NSD							
50				NSD							
51				NSD							
52				NSD							
53				NSD							
54				NSD							
55				NSD							
56				NSD							
57				NSD							
58				NSD							
59				NSD							
60				NSD							
61				NSD							
62				NSD							
63				NSD							
64				NSD							
65				NSD							

12% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/29/2019 3:10:21 PM approve by Jon Swope

Final Review: 4/30/19 3:49 PM approve by Monica Mcgrath

RJL: LLH901997-4	3158175.HTW1	Microscope tem2000fx1	Grid Openings	13
#3 Sed. Basin 2	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 10.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44199	Operator: Ashleigh Sload		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							

20% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/29/2019 4:04:12 PM approve by Ashleigh Sload

Final Review: 4/30/19 3:50 PM approve by Monica Mcgrath

RJL: LLH901997-4	3158176.HTW2	Microscope tem2000fx1	Grid Openings	13
#4 Sed. Basin 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 10. mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Ashleigh Sload		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							

10% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/30/2019 7:29:05 AM approve by Ashleigh Sload

Final Review: 4/30/19 3:50 PM approve by Monica Mcgrath



RJL: LLH901997-4	3158177.HTW1	Microscope tem2000fx1	Grid Openings	33
#5 Quarry Pit	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 20.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Ashleigh Sload		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							

**8% Particulate**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/30/2019 8:15:53 AM approve by Ashleigh Sload

Final Review: 5/1/19 12:57 PM approve by Monica Mcgrath

RJL: LLH901997-4	3158178.HTW3	Microscope tem2000fx2	Grid Openings	260
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: .5 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							
41				NSD							
42				NSD							
43				NSD							
44				NSD							

RJL: LLH901997-4	3158178.HTW3	Microscope tem2000fx2	Grid Openings	260
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: .5 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
45				NSD							
46				NSD							
47				NSD							
48				NSD							
49				NSD							
50				NSD							
51				NSD							
52				NSD							
53				NSD							
54				NSD							
55				NSD							
56				NSD							
57				NSD							
58				NSD							
59				NSD							
60				NSD							
61				NSD							
62				NSD							
63				NSD							
64				NSD							
65				NSD							
66				NSD							
67				NSD							
68				NSD							
69				NSD							
70				NSD							
71				NSD							
72				NSD							
73				NSD							
74				NSD							
75				NSD							
76				NSD							
77				NSD							
78				NSD							
79				NSD							
80				NSD							
81				NSD							
82				NSD							
83				NSD							
84				NSD							
85				NSD							
86				NSD							
87				NSD							
88				NSD							



RJL: LLH901997-4	3158178.HTW3	Microscope tem2000fx2	Grid Openings	260
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: .5 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
89				NSD							
90				NSD							
91				NSD							
92				NSD							
93				NSD							
94				NSD							
95				NSD							
96				NSD							
97				NSD							
98				NSD							
99				NSD							
100				NSD							
101				NSD							
102				NSD							
103				NSD							
104				NSD							
105				NSD							
106				NSD							
107				NSD							
108				NSD							
109				NSD							
110				NSD							
111				NSD							
112				NSD							
113				NSD							
114				NSD							
115				NSD							
116				NSD							
117				NSD							
118				NSD							
119				NSD							
120				NSD							
121				NSD							
122				NSD							
123				NSD							
124				NSD							
125				NSD							
126				NSD							
127				NSD							
128				NSD							
129				NSD							
130				NSD							
131				NSD							
132				NSD							

RJL: LLH901997-4	3158178.HTW3	Microscope tem2000fx2	Grid Openings	260
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: .5 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
133				NSD							
134				NSD							
135				NSD							
136				NSD							
137				NSD							
138				NSD							
139				NSD							
140				NSD							
141				NSD							
142				NSD							
143				NSD							
144				NSD							
145				NSD							
146				NSD							
147				NSD							
148				NSD							
149				NSD							
150				NSD							
151				NSD							
152				NSD							
153				NSD							
154				NSD							
155				NSD							
156				NSD							
157				NSD							
158				NSD							
159				NSD							
160				NSD							
161				NSD							
162				NSD							
163				NSD							
164				NSD							
165				NSD							
166				NSD							
167				NSD							
168				NSD							
169				NSD							
170				NSD							
171				NSD							
172				NSD							
173				NSD							
174				NSD							
175				NSD							
176				NSD							

RJL: LLH901997-4	3158178.HTW3	Microscope tem2000fx2	Grid Openings	260
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: .5 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
177				NSD							
178				NSD							
179				NSD							
180				NSD							
181				NSD							
182				NSD							
183				NSD							
184				NSD							
185				NSD							
186				NSD							
187				NSD							
188				NSD							
189				NSD							
190				NSD							
191				NSD							
192				NSD							
193				NSD							
194				NSD							
195				NSD							
196				NSD							
197				NSD							
198				NSD							
199				NSD							
200				NSD							
201				NSD							
202				NSD							
203				NSD							
204				NSD							
205				NSD							
206				NSD							
207				NSD							
208				NSD							
209				NSD							
210				NSD							
211				NSD							
212				NSD							
213				NSD							
214				NSD							
215				NSD							
216				NSD							
217				NSD							
218				NSD							
219				NSD							
220				NSD							



RJL: LLH901997-4	3158178.HTW3	Microscope tem2000fx2	Grid Openings	260
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: .5 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
221				NSD							
222				NSD							
223				NSD							
224				NSD							
225				NSD							
226				NSD							
227				NSD							
228				NSD							
229				NSD							
230				NSD							
231				NSD							
232				NSD							
233				NSD							
234				NSD							
235				NSD							
236				NSD							
237				NSD							
238				NSD							
239				NSD							
240				NSD							
241				NSD							
242				NSD							
243				NSD							
244				NSD							
245				NSD							
246				NSD							
247				NSD							
248				NSD							
249				NSD							
250				NSD							
251				NSD							
252				NSD							
253				NSD							
254				NSD							
255				NSD							
256				NSD							
257				NSD							
258				NSD							
259				NSD							
260				NSD							

12% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/30/2019 1:28:01 PM approve by Jon Swope

Final Review: 4/30/19 3:50 PM approve by Monica Mcgrath

RJL: LLH901997-4	3158179.HTW1	Microscope tem2000fx2	Grid Openings	26
#7 Sed. Trap 3	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 5.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44200	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							

10% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 4/29/2019 2:17:20 PM approve by Jon Swope

Final Review: 4/30/19 3:50 PM approve by Monica Mcgrath

# Request for Environmental and IH Laboratory Analytical Services

<b>ATTENTION TO:</b>			Purchase Order No.:			Client Job No.: <b>Rock Hill Quarry</b>		
<b>Lab Use Only</b>	Project No.:		Client No.:		<b>Date Results Needed</b>	Rush Charges Authorized? (check one)		<input type="checkbox"/> YES
	Date Logged In:		Logged In By:			<b>Std. TAT</b>		<input checked="" type="checkbox"/> NO
<b>Report Results To</b>	Name: <b>Andrew Gutshall</b>		Company: <b>Hanson Aggregates Pa, LLC</b>		<b>Drinking Water Sample Only</b>	Sample Purpose: Information <input type="checkbox"/> Regulatory <input type="checkbox"/> Accreditation (please list below):		
	Address: <b>7660 Imperial Way</b>		City, State, Zip: <b>Allentown, PA 18195</b>			System ID #: <b>N/A</b>	DOH Source #: <b>N/A</b> <span style="float:right">N/A</span>	
	Phone: <b>610-366-4819</b>		Fax:		Multiple Sources #s: <b>N/A</b>	Sample Purpose: A <input type="checkbox"/> B <input type="checkbox"/> Other <input type="checkbox"/> N/A		
	Email Results To:		<a href="mailto:Andrew.Gutshall@Lehighhanson.com">Andrew.Gutshall@Lehighhanson.com</a>		<b>Chemistry Analysis Key</b>	<b>Preservation:</b> Unpres H <sub>2</sub> SO <sub>4</sub> 4°C HCl HNO <sub>3</sub> NaOH Other Na <sub>2</sub> SO <sub>4</sub>		
						<b>Matrix:</b> WW=Wastewater GW=Groundwater S=Soil/Sludge E=Extract		
		If a hard copy of invoice is needed, check here <input type="checkbox"/>				<b>Container:</b> P=Plastic G=Glass W=Wipe A=Air (filter or tube)		
		Email:						
		Address:						
		City, State, Zip:						
		Phone:						
		Fax:						
<b>Special Instructions</b>		Invoice per project setup with Drew Van Orden						

Client Sample ID	Sample Description	Sample Date	Sample Time		Wipe Area / Air Volume	Sample Location (Please specify if NY state)	NOA Per EPA Method 100.2	Analysis Requested					Pres. Upon Receipt (Y/N)	Preservation	Matrix	Container Type	pH	No. Containers
			Start	Stop														
1	NPDES Outfall	4/18	9:41	Grab	N/A	N/A	✓							Ice	SW	P	7.0	1
2	Sed. Trap 2	4/18	9:55	Grab	N/A	N/A	✓							Ice	SW	P	7.2	1
3	Sed. Basin 2	4/18	10:12	Grab	N/A	N/A	✓							Ice	SW	P	7.7	1
4	Sed. Basin 1	4/18	10:25	Grab	N/A	N/A	✓							Ice	SW	P	7.8	1
5	Quarry Pit	4/18	10:50	Grab	N/A	N/A	✓							Ice	SW	P	8.0	1
6	Sed. Trap 1	4/18	11:05	Grab	N/A	N/A	✓							Ice	SW	P	8.2	1
7	Sed. Trap 3	4/18	11:15	Grab	N/A	N/A	✓							Ice	SW	P	8.0	1

<b>Chain of Custody</b>	Relinquished By (Signature): <i>Lou Vittorio</i>	Date: <b>4/18/19</b>	Time: <b>12:30</b>	<b>Chain of Custody</b>	Received By (Signature): <i>Liz Varley</i>	Date: <b>4/19/19</b>	Time:
	Relinquished By (Print Name): <b>Lou Vittorio</b>	Relinquished To:			Received By (Print Name): <b>Liz Varley</b>	Relinquished To:	
	Company Name: <b>Earthres</b>	Method of Shipment: <b>Fedex</b>			Company Name: <b>RJLG</b>	Method of Shipment:	
<b>Chain of Custody</b>	Relinquished By (Signature):	Date:	Time:	<b>Chain of Custody</b>	Received By (Signature):	Date:	Time:
	Relinquished By (Print Name):	Relinquished To:			Received By (Print Name):	Relinquished To:	
	Company Name:	Method of Shipment:			Company Name:	Method of Shipment:	

Pennsylvania - HQ  
 350 Hochberg Road  
 Monroeville, PA 15146

724.325.1776 Phone  
 724.733.1799 Fax

Washington  
 Columbia Basin Analytical Laboratories  
 2710 North 20th Avenue  
 Pasco, WA 99301

509.545.4989 Phone  
 509.544.6010 Fax





## Attachment 1

### Sample Analysis Procedures and Methods

For obtaining a representative sample from a large bulk sample, the AASHTO procedures for reducing the sample should be used. The subsequent analyses of the submitted samples will follow a three step procedure: 1) Basic microscopic analysis to assess the presence of asbestiform mineral habitat; 2) Polarized Light Microscopy (PLM) to determine the presence and asbestos mineral type, if present; and, 3) Should positive results be indicated by PLM, follow-up Transmission Electron Microscopy (TEM) analysis will be completed to confirm the minerals present and their morphology. The techniques and methods to be employed in sample analysis are provided below:

- A geologist will inspect hand and core samples initially using a stereo binocular microscope, with magnification ranging from 10x to 60x. Using a fine steel pick (dental pick) the geologist will scrape the surface of the suspect mineralization to determine if any of the minerals display typical asbestiform habit and characteristics such as fiber bundles, splayed ends, or matted or fibrous masses.
- Further examination of the sample will then be conducted using the Polarized Light Microscope (PLM) using EPA 600/R-93/116.
- If asbestiform minerals are found, representative samples will be further analyzed by Transmission Electron Microscopy per EPA 600/R-93/116 to confirm mineral identification and morphology.
- Where appropriate, the microscopic PLM and/or TEM analyses will include a count of the asbestiform fibers, representative digital images, and measurements of the width and length dimensions of found fibers counted.

Water samples will be collected as grab samples and will be analyzed by TEM per EPA 100.2.

The samples will be analyzed using the above procedures by RJ Lee Group, which is accredited by the American Industrial Hygiene Association and is in the NIST National Voluntary Laboratory Accreditation Program for asbestos analysis. RJ Lee Group has mineralogical expertise and has vast experience to detect asbestos fibers in the natural environment (e.g. rocks, soils, water, etc.).

Do Not Lift Using This Tag

ORIGIN ID: ABEA (215) 766-1211  
MARY SHIREL

SHIP DATE: 18APR19  
ACTWGT: 36.00 LB  
CAD: 106811403/INET4100

6912 OLD EASTON ROAD

PIPERSVILLE, PA 18947  
UNITED STATES US

BILL SENDER

TO **DREW VAN ORDEN**  
**RJ LEE GROUP**  
**350 HOCHBERG ROAD**

**MONROEVILLE PA 15146**

(724) 325-1776  
INV  
PO

REF: 061003.051 (01)

DEPT PA

565J107E5/23AD



FedEx  
Express



FRI - 19 APR 3:00P

STANDARD OVERNIGHT

TRK# 7750 0859 6031  
0201

**EV LBEA**

15146

PA-US PIT



Do Not Lift Using This Tag

Do Not Lift Using This Tag

## Final Laboratory Report

### TEM EPA Water Analysis

Attention: David Raphael  
K & L Gates  
17 North Second Street  
Harrisburg, PA 17101  
US

Report Date: 08/06/2019  
Sample Receipt Date: 04/23/2019  
RJ Lee Group Job No.: LLH901997-13  
Authorization/P.O. No.:  
Samples Received: 7  
Client Job No.:

Method: EPA Method 100.1 600/4-83-043

Client Sample Number	RJLG Sample Number	Date Prepped	Date Analyzed	Filter Area (mm <sup>2</sup> )	Volume (ml)	Area Analyzed (mm <sup>2</sup> )	Confidence Interval >5 μ m	Asbestos Structures >5 μ m		Analytical Sensitivity (MFL) >5 μ m	Concentration (MFL) >5 μ m
								Chry	Amph		
#1 NPDES Outfall	3158173.HTW1	04/24/2019	08/01/2019	1220	20	0.37663	0-4	0	1	0.2	0.2
#2 Sed. Trap 2	3158174.HTW1	04/24/2019	08/01/2019	1220	2	0.65911	0-4	0	0	0.9	< 0.9
#3 Sed. Basin 2	3158175.HTW1	04/24/2019	08/01/2019	1220	10	0.37663	0-4	0	0	0.3	< 0.3
#4 Sed. Basin 1	3158176.HTW1	04/24/2019	08/01/2019	1220	20	0.37663	0-4	0	0	0.2	< 0.2
#5 Quarry Pit	3158177.HTW1	04/24/2019	08/01/2019	1220	20	0.37663	0-4	0	0	0.2	< 0.2
#6 Sed. Trap 1	3158178.HTW2	04/24/2019	08/04/2019	1220	1	1.22406	0-4	0	0	1.0	< 1.0
#7 Sed. Trap 3	3158179.HTW1	04/24/2019	08/02/2019	1220	5	0.37663	0-4	0	0	0.6	< 0.6

**NOTES**

- Water samples collected more than 24 hours before receipt may be out of compliance. Drinking water samples are filtered within 24 hours of receipt.
- "<" indicates results less than analytical sensitivity. "----" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, MFL-million fibers per liter.
- Samples will be held for 30 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

**DISCLAIMER**

RJ Lee Group, Inc. is accredited by the New York Department of Health Environmental Laboratory Program (NY ELAP) and the Pennsylvania Department of Environmental Protection (PA DEP) for asbestos in water analysis by TEM. This report may not be used to claim product endorsement by NY ELAP, PA DEP or any other regulatory or laboratory accrediting agency. Any reproduction of this document must be in full in order for the report to be valid. This report is not valid unless it bears the name of a NY ELAP and PA-DEP approved signatory.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limiting provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any sample.



# RJ Lee Group, Inc.

RJ Lee Group Job No: LLH901997-13  
Client Job No/Name:

## Final Laboratory Report (cont'd)

Client: K & L Gates  
Report Date: 08/06/2019



Authorized Signature: \_\_\_\_\_

Monica McGrath-Koerner, Scientist

### NOTES

1. Water samples collected more than 24 hours before receipt may be out of compliance. Drinking water samples are filtered within 24 hours of receipt.
2. "<" indicates results less than analytical sensitivity. "----" indicates that sample was not analyzed.
3. Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
4. If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
5. Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, MFL-million fibers per liter.
6. Samples will be held for 30 days and then disposed of per Federal regulations.
7. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

### DISCLAIMER

RJ Lee Group, Inc. is accredited by the New York Department of Health Environmental Laboratory Program (NY ELAP) and the Pennsylvania Department of Environmental Protection (PA DEP) for asbestos in water analysis by TEM. This report may not be used to claim product endorsement by NY ELAP, PA DEP or any other regulatory or laboratory accrediting agency. Any reproduction of this document must be in full in order for the report to be valid. This report is not valid unless it bears the name of a NY ELAP and PA-DEP approved signatory.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limiting provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any sample.

RJL: LLH901997-13	3158179.HTW1	Microscope tem2000fx2	Grid Openings	40
#7 Sed. Trap 3	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 5.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							

10% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 8/2/2019 8:09:21 AM approve by Jon Swope

Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath

RJL: LLH901997-13	3158173.HTW1	Microscope tem2000fx2	Grid Openings	40
#1 NPDES Outfall	K & L Gates	Magnification 21 KX	Asbestos	1.0
Vol: 20.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0.024		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18	1	6.8	0.1	Amphibole	F	MgSiCaFeAl	15892D	Image4	Diff2	Acti	Asb
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							

9% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 8/1/2019 10:38:16 AM approve by Jon Swope

Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath



RJL: LLH901997-13	3158174.HTW1	Microscope tem2000fx1	Grid Openings	70
#2 Sed. Trap 2	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 2.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							
41				NSD							
42				NSD							
43				NSD							
44				NSD							

RJL: LLH901997-13	3158174.HTW1	Microscope tem2000fx1	Grid Openings	70
#2 Sed. Trap 2	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 2.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
45				NSD							
46				NSD							
47				NSD							
48				NSD							
49				NSD							
50				NSD							
51				NSD							
52				NSD							
53				NSD							
54				NSD							
55				NSD							
56				NSD							
57				NSD							
58				NSD							
59				NSD							
60				NSD							
61				NSD							
62				NSD							
63				NSD							
64				NSD							
65				NSD							
66				NSD							
67				NSD							
68				NSD							
69				NSD							
70				NSD							

10% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 8/1/2019 11:05:41 AM approve by Jon Swope

Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath

RJL: LLH901997-13	3158175.HTW1	Microscope tem2000fx2	Grid Openings	40
#3 Sed. Basin 2	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 10.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							

15% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 8/1/2019 11:51:34 AM approve by Jon Swope

Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath



RJL: LLH901997-13	3158176.HTW1	Microscope tem2000fx2	Grid Openings	40
#4 Sed. Basin 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 20.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							

12% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 8/1/2019 1:07:24 PM approve by Jon Swope

Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath

RJL: LLH901997-13	3158177.HTW1	Microscope tem2000fx2	Grid Openings	40
#5 Quarry Pit	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 20.0 mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							

12% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 8/1/2019 1:50:58 PM approve by Jon Swope

Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath

RJL: LLH901997-13	3158178.HTW2	Microscope tem2000fx1	Grid Openings	130
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 1. mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							
26				NSD							
27				NSD							
28				NSD							
29				NSD							
30				NSD							
31				NSD							
32				NSD							
33				NSD							
34				NSD							
35				NSD							
36				NSD							
37				NSD							
38				NSD							
39				NSD							
40				NSD							
41				NSD							
42				NSD							
43				NSD							
44				NSD							



RJL: LLH901997-13	3158178.HTW2	Microscope tem2000fx1	Grid Openings	130
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 1. mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
45				NSD							
46				NSD							
47				NSD							
48				NSD							
49				NSD							
50				NSD							
51				NSD							
52				NSD							
53				NSD							
54				NSD							
55				NSD							
56				NSD							
57				NSD							
58				NSD							
59				NSD							
60				NSD							
61				NSD							
62				NSD							
63				NSD							
64				NSD							
65				NSD							
66				NSD							
67				NSD							
68				NSD							
69				NSD							
70				NSD							
71				NSD							
72				NSD							
73				NSD							
74				NSD							
75				NSD							
76				NSD							
77				NSD							
78				NSD							
79				NSD							
80				NSD							
81				NSD							
82				NSD							
83				NSD							
84				NSD							
85				NSD							
86				NSD							
87				NSD							
88				NSD							

RJL: LLH901997-13	3158178.HTW2	Microscope tem2000fx1	Grid Openings	130
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 1. mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
89				NSD							
90				NSD							
91				NSD							
92				NSD							
93				NSD							
94				NSD							
95				NSD							
96				NSD							
97				NSD							
98				NSD							
99				NSD							
100				NSD							
101				NSD							
102				NSD							
103				NSD							
104				NSD							
105				NSD							
106				NSD							
107				NSD							
108				NSD							
109				NSD							
110				NSD							
111				NSD							
112				NSD							
113				NSD							
114				NSD							
115				NSD							
116				NSD							
117				NSD							
118				NSD							
119				NSD							
120				NSD							
121				NSD							
122				NSD							
123				NSD							
124				NSD							
125				NSD							
126				NSD							
127				NSD							
128				NSD							
129				NSD							
130				NSD							

16% Particulate

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

EPA Water

**RJ Lee Group, Inc.**  
**TEM Count Sheet**

Date Analyzed: 8/4/2019

RJL: LLH901997-13	3158178.HTW2	Microscope tem2000fx1	Grid Openings	130
#6 Sed. Trap 1	K & L Gates	Magnification 21 KX	Asbestos	0.0
Vol: 1. mL	Grid: 0.0094 mm <sup>2</sup>	Acc. Voltage 120 KV		
Filter Size: 47 mm	HQ44494	Operator: Jon Swope		
		Cv = 0		

Initial Review: 8/4/2019 11:59:24 AM approve by Jon Swope  
Final Review: 8/5/19 12:41 PM approve by Monica Mcgrath



# AGGREGATE ANALYTICAL RESULTS

## Laboratory Report

K & L Gates  
 17 North Second Street  
 18th Floor  
 Harrisburg, PA 17101  
 United States  
 Attention: Mr. David Raphael  
 Telephone: 717-231-4504

Report Date 05/29/2019  
 Sample Receipt Date 04/24/2019  
 RJ Lee Group Job No. LLH901997-5  
 Authorization/P.O. No.  
 Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count  
 Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158163.HPL	1	Yes	1	ND	<0.1 OF	100.00	Q, CA, AM, OP, M	WT-05/29/2019
Description:		Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%.						
Weight Loss:		0.0%						
3158164.HPL	2	Yes	1	ND	<0.1 OF	100.00	Q, CA, AM, OP, M	WT-05/29/2019
Description:		Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%.						
Weight Loss:		0.0%						
3158165.HPL	3	Yes	1	<0.1 TR		100.00	Q, CA, AM, OP, M	WT-05/29/2019
Description:		Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%.						
Weight Loss:		0.0%						

Client Job No./Name:

RJ Lee Group Job No:

LLH901997-5

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158166.HPL	4	Yes	1	ND	0.70 OF	99.30	CA, AM, OP, M	JM-05/29/2019
Description:		Gray Crushed Rock 1000 points counted. Detection limit of 0.1%.						
Weight Loss:		0.0%						
3158167.HPL	5	Yes	1	<0.1 AC	<0.1 OF	100.00	CA, AM, OP, M	JM-05/29/2019
Description:		Gray Crushed Rock 1000 points counted. Detection limit of 0.1%.						
Weight Loss:		0.0%						
3158168.HPL	6	Yes	1	ND	0.10 OF	99.90	CA, AM, OP, M	JM-05/29/2019
Description:		Gray Crushed Rock 1000 points counted. Detection limit of 0.1%.						
Weight Loss:		0.0%						
3158169.HPL	7	Yes	1	ND	<0.1 OF	100.00	AM, OP, M	WT-05/29/2019
Description:		Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%.						
Weight Loss:		0.0%						
3158170.HPL	8	Yes	1	<0.1 AC <0.1 TR	<0.1 OF	100.00	Q, AM, OP, M	WT-05/29/2019
Description:		Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%.						
Weight Loss:		0.0%						



Client Job No./Name:

RJ Lee Group Job No: LLH901997-5

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
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Authorized Signature: \_\_\_\_\_

Wei Tseng, Microscopist

**ASBESTOS**

- AM = Amosite
- AC = Actinolite
- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite

**NON-ASBESTOS**

- CE = Cellulose
- MW = Mineral Wool
- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
- OF = Other Fibers

**NON-FIBROUS MATERIALS**

- AM = Amphibole
- B = Binder
- CA = Carbonates
- CL = Clay
- F = Feldspar
- G = Gypsum
- HY = Hydromagnesite
- M = Miscellaneous
- MI = Mica
- OP = Opaque
- OR = Organic
- P = Perlite
- Q = Quartz
- T = Tar
- V = Vermiculite

**DISCLAIMER NOTES**

- "ND" indicates no asbestos was detected; the method detection limit is 0.1%.
- "Trace" or "<" indicates asbestos was identified in the sample, but the concentration is less than the method quantitation limit. PLM coefficients of variance range from approximately 1.8 at the quantitation limit of 0.1% to 0.32 at high fiber concentrations.
- Samples are archived for three months following analysis and are then properly discarded.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
- This test report relates to the items tested.
- This report is not valid unless it bears the name of a NVLAP Lab Code 101208-0 approved signatory.
- Any reproduction of this document must be in full in order for the report to be valid.
- This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0, any agency of the U.S. Government or any other laboratory accrediting agency.
- Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar nonfriable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as "non-asbestos-containing."
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratorys results are limited to the reported values.
- ((100-A)/B)\*C = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.

## Laboratory Report

K & L Gates  
 17 North Second Street  
 18th Floor  
 Harrisburg, PA 17101  
 United States  
 Attention: Mr. David Raphael  
 Telephone: 717-231-4504

Report Date 05/29/2019  
 Sample Receipt Date 04/24/2019  
 RJ Lee Group Job No. LLH901997-6  
 Authorization/P.O. No.  
 Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count  
 Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158157.HPL	11	Yes	1	ND		100.00	Q, CA, AM, OP, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%						
Weight Loss:		0.0%						
3158158.HPL	12	Yes	1	ND	1.00 OF	99.00	Q, CA, AM, OP	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit= 0.1%						
Weight Loss:		0.0%						
3158159.HPL	13	Yes	1	ND		100.00	Q, CA, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit - 0.1%						
Weight Loss:		0.0%						

Client Job No./Name:

RJ Lee Group Job No:

LLH901997-6


RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158160.HPL	14	Yes	1	ND		100.00	Q, CA, AM, OP, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit =0.1%						
Weight Loss:		0.0%						
3158161.HPL	15	Yes	1	ND	0.40 OF	99.60	Q, CA, OP, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%						
Weight Loss:		0.0%						
3158162.HPL	16	Yes	1	ND		100.00	Q, CA, AM, OP, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%						
Weight Loss:		0.0%						
3158171.HPL	9	Yes	1	ND		100.00	Q, CA, AM, OP, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%						
Weight Loss:		0.0%						
3158172.HPL	10	Yes	1	ND		100.00	Q, CA, OP, M	DF-05/29/2019
Description:		Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%						
Weight Loss:		0.0%						



Client Job No./Name:

RJ Lee Group Job No: LLH901997-6

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
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Authorized Signature: 

Donald Fike

**ASBESTOS**

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- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite

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- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
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- T = Tar
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- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratorys results are limited to the reported values.
- ((100-A)/B)\*C = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/15/19 Analyst: WT Scope: 023-OPF

Sample Description: Gray Crushed Rock -

RJ Lee Group  
 Sample Number: 3158163  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments /  
 # of Layers: \_\_\_\_\_

Stereo-scope		Asbestos Type		Morphology		Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:	
%	%				⊥		⊥	L M	P N	Y N	Y N	NFM% <u>100%</u>		
			W C S					L M	P N			<input checked="" type="checkbox"/> Quartz	Carbonates	Vermiculite
			W C S					L M	P N			Tar	Binder	Opales
			W C S					L M	P N			Perlite	Amphibole	Gypsum
		% Non-Asbestos Fibers	Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix			Talc	Feldspar	Mica
		<u>20.1%</u>	<u>Tremolite Cleavage</u>		<u>R.I.</u>							Clay	Organic Part.	Diatoms
												Misc Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/15/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158163 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/16/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158164  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments / # of Layers: 100 Point Count, Detection Limit = 0.1%

Stereo-scope		Asbestos Type		Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
%	%		Morphology		⊥		⊥	L M	P N		NFM% <u>100%</u>
			W C S					L M	P N		Quartz Tar Perlite Talc Clay Misc Particles Carbonates Binder Amphibole Feldspar Organic Part. Foam Vermiculite Opaques Gypsum Mica Diatoms Foil
			W C S					L M	P N		
			W C S					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	<u>&lt;0.1%</u>	<u>Tremolite Cleavage</u>		<u>R.I.</u>							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/16/19 Analyst: WT Microscope: 023-DPT

RJ Lee Group Sample Number: 3158164 RJ Lee Group Project Number: LLH901997

Type	Slide 9	Slide 10	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
ASB	0	0							0
CLC	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/16/14 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rocks.  
100 Point Count. Detection Limit = 0.1%

RJ Lee Group  
 Sample Number: 3158165  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments /  
 # of Layers:

Stereo-scope	# of Preps: <u>10</u>		Homogenous <u>(Y)</u> N		QC Y N		QC Analyst:					
	%	%	Asbestos Type	Morphology	Color/Pleochroism    ⊥		Indices of Refraction    ⊥		Birefringence	Sign of Elongation	Extinction Angle	NFM% <u>100%</u>
	<u>&lt;0.1%</u>		<u>Tremolite</u>	<u>W C S</u>	<u>CDL</u>	<u>N</u>	<u>1.608</u>	<u>1.601</u>	<u>L (M)</u>	<u>(P) N</u>	<u>PL</u>	<u>Quartz</u>
				<u>W C S</u>					<u>L M</u>	<u>P N</u>		<u>Carbonates</u>
				<u>W C S</u>					<u>L M</u>	<u>P N</u>		<u>Binder</u>
												<u>Opaque</u>
												<u>Perlite</u>
												<u>Amphibole</u>
												<u>Gypsum</u>
												<u>Talc</u>
												<u>Feldspar</u>
												<u>Mica</u>
												<u>Clay</u>
												<u>Organic Part.</u>
												<u>Diatoms</u>
												<u>Mist Particles</u>
												<u>Foam</u>
												<u>Foil</u>

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>ASB</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>CLE</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/16/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158165 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
<b>Total</b>	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/21/19 Analyst: JM Scope: 055-OPT

Sample Description: Gray Crushed rock

RJ Lee Group  
 Sample Number: 3158166  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments / # of Layers: 1000 points counted. Detection limit of 0.1%.

Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence		Sign of Elongation	Extinction Angle	QC Analyst:	
						⊥		⊥	L	M				Y
				W C S					L	M	P	N	NFM% <u>99.3</u>	
				W C S					L	M	P	N		Quartz
				W C S					L	M	P	N		Tar
													Perlite	
			% Non-Asbestos Fibers		Optical Properties	Layered Results		Asbestos	Non-Asb.	Matrix			Amphibole	
			<u>0.7</u>	<u>Hornblende</u>	<u>1.665</u>								Gypsum	
					⊥ <u>1.655</u>								Talc	
													Mica	
													Clay	
													Organic Part.	
													Diatoms	
													Foam	
													Foil	

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	99	99	99	100	99	99	795
Hornblende	0	0	1	1	1	0	1	1	5
Total	100	100	100	100	100	100	100	100	800

$$\text{Detection limit} = \frac{1}{1000} \times 100\% = 0.1\%$$



**PLM Point Count Additional Slides Worksheet**

Date: 05/21/19 Analyst: JM Microscope: 055-OPT

RJ Lee Group Sample Number: 3158166 RJ Lee Group Project Number: 44901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
NAS	99	99							198
Hornblend	1	1							2
Total	100	100							200

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/21/19 Analyst: JM Scope: 055-0PT

Sample Description: Gray crushed rock

RJ Lee Group  
 Sample Number: 3158167  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments / # of Layers: 1000 points counted. Detection limit of 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
					⊥		⊥				
	<0.1	Actinolite	WCS	COL	COL	1.640	1.630	L (M)	P (N)	0°	NFM% 100
			WCS					L M	P N		
			WCS					L M	P N		
	% Non-Asbestos Fibers			Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	<0.1	Actinolite	cleavage	<del>1.63</del>	1.63	05/22/19 JM					
					1.640						
				⊥	1.630						

- Quartz
- Tar
- Perlite
- Talc
- Clay
- Misc Particles
- Carbonates
- Binder
- Amphibole
- Feldspar
- Organic Part.
- Foam
- Vermiculite
- Opaques
- Gypsum
- Mica
- Diatoms
- Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

$$\text{Detection limit} = \frac{1}{1000} \times 100\% = 0.1\%$$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/22/19 Analyst: JM Microscope: 055 - OPT

RJ Lee Group Sample Number: 3158167 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
<u>NAS</u>	<u>100</u>	<u>100</u>							<u>200</u>
Total	<u>100</u>	<u>100</u>							<u>200</u>

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/22/19 Analyst: JM Scope: 055-OPT

Sample Description: Gray crushed rock

RJ Lee Group  
Sample Number: 3158168  
RJ Lee Group  
Project Number: LLH901997  
Analysis Method:

Comments /  
# of Layers: 1000 points counted. Detection limit of 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
					⊥		⊥				
			W C S					L M	P N		99.9
			W C S					L M	P N		
			W C S					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	0.1	Actinolite cleavage		+.630		1.640					
				⊥ +.62		1.630					
				05/22/19 JM							

- Quartz
- Tar
- Perlite
- Talc
- Clay
- Misc Particles
- Carbonates
- Binder
- Amphibole
- Feldspar
- Organic Part.
- Foam
- Vermiculite
- Opales
- Gypsum
- Mica
- Diatoms
- Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	99	100	100	100	100	100	799
Actinolite cleavage	0	0	1	0	0	1000	0	0	1
						05/23/19 JM			
Total	2 100	100	100	100	100	106	100	100	800

05/22/19  
JM

$$\text{Detection limit} = \frac{1}{1000} \times 100\% = 0.1\%$$



PLM Point Count Additional Slides Worksheet

Date: 05/23/19 Analyst: JM Microscope: 055-0PT

RJ Lee Group Sample Number: 3158168 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
<u>NAS</u>	<u>100</u>	<u>100</u>							<u>200</u>
<u>Actinolite cleavage</u>	<u>0</u>	<u>0</u>							<u>0</u>
<b>Total</b>	<u>100</u>	<u>100</u>							<u>200</u>

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
<b>Total</b>									

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/23/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158169  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments / # of Layers: 1000 Point Count, Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Y N	QC Analyst:
					⊥		⊥					
			W C S					L M	P N			
			W C S					L M	P N			
			W C S					L M	P N			
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM% <u>100%</u>	
	<u>&lt;0.1%</u>	<u>Horakleude</u>		<u>1.665/1.654</u>							Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil	

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/23/19 Analyst: WT Scope: 023-OPT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158170  
 RJ Lee Group  
 Project Number: LL14901997  
 Analysis Method:

Comments /  
 # of Layers:

1000 Point Count, Detection Limit = 0.1%

Stereo-scope		Asbestos Type		Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM% <u>(100%)</u>
%	%					⊥		⊥				
	<u>50.1%</u>	<u>Actinolite</u>	<u>WCS</u>	<u>GR</u>	<u>N</u>		<u>1.638</u>	<u>1.632</u>	<u>L M</u>	<u>P N</u>	<u>PL</u>	<u>Quartz</u>
	<u>20.1%</u>	<u>Tremolite</u>	<u>WCS</u>	<u>COL</u>	<u>N</u>		<u>1.633</u>	<u>1.625</u>	<u>L M</u>	<u>P N</u>	<u>PL</u>	<u>Tar</u>
			<u>WCS</u>						<u>L M</u>	<u>P N</u>		<u>Carbonates</u>
												<u>Vermiculite</u>
												<u>Opaque</u>
												<u>Binder</u>
												<u>Gypsum</u>
												<u>Perlite</u>
												<u>Amphibole</u>
												<u>Gypsum</u>
												<u>Talc</u>
												<u>Feldspar</u>
												<u>Mica</u>
												<u>Clay</u>
												<u>Organic Part.</u>
												<u>Diatoms</u>
												<u>Misc Particles</u>
												<u>Foam</u>
												<u>Foil</u>

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>ASB</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>CLE</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/23/19 Analyst: WT Microscope: 023-01T

RJ Lee Group Sample Number: 3158170 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLB	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/21/19 Analyst: DF Scope: 036-ePT

Sample Description: Gray Crushed Rock

Comments / # of Layers: 1000 pt count Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1$

RJ Lee Group Sample Number: <u>3158157</u> RJ Lee Group Project Number: <u>LLH901997</u> Analysis Method:				# of Preps:		Homogenous Y N		QC Y N		QC Analyst:	
Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism    ⊥		Indices of Refraction    ⊥		Birefringence L M	Sign of Elongation P N	Extinction Angle	NFM%
			W C S					L M	P N		Quartz
			W C S					L M	P N		Carbonates
			W C S					L M	P N		Vermiculite
		% Non-Asbestos Fibers	Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		Tar
											Binder
											Opacues
											Perlite
											Amphibole
											Gypsum
											Talc
											Feldspar
											Mica
											Clay
											Organic Part.
											Diatoms
											Misc Particles
											Foam
											Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
ASB	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/21/19 Analyst: DF Microscope: 03G-OPT

RJ Lee Group Sample Number: LLH901997 RJ Lee Group Project Number: 3158157

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
ASB	0	0							
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/14/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158158  
 RJ Lee Group  
 Project Number:  
 Analysis Method: LLH 901997

Comments / # of Layers: 1000 pt Count Detection Limit  $\frac{1}{1000} \times 100\% = 0.1$

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:	
					⊥		⊥	Y	N	Y	N		
			WCS					L M	P N				
			WCS					L M	P N				
			WCS					L M	P N				
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM%		
		1% Trem. Clev									Quartz	Carbonates	Vermiculite
											Tar	Binder	Opaque
											Perlite	Amphibole	Gypsum
											Talc	Feldspar	Mica
											Clay	Organic Part.	Diatoms
											Misc Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	98	100	100	99	98	99	99	99	792
ASB	0	0	0	0	0	0	0	0	0
clev	2	0	0	1	2	1	1	1	8
Total	100	100	100	100	100	100	100	100	800



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/14/19 Analyst: DF Microscope: 03G-OPT

RJ Lee Group Sample Number: 3158158 RJ Lee Group Project Number: LLH 901 997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	99	100							199
ASB	0	0							0
Clev	1	<sup>of slide</sup> <del>0</del> 1							2
<b>Total</b>	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/21/19 Analyst: DF Scope: 036-0PT

Sample Description: Crushed Gray Rock

RJ Lee Group  
 Sample Number: 3159159  
 RJ Lee Group  
 Project Number: LL4961997  
 Analysis Method:

Comments / # of Layers: 100 ppt count  $\frac{1}{1000} \times 1000\% = 0.1$   
 Detection Limit:

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:	
					⊥		⊥	Y	N	Y	N		
			W C S					L M	P N				
			W C S					L M	P N				
			W C S					L M	P N				
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM%		
											Quartz	Carbonates	Vermiculite
											Tar	Binder	Opaques
											Perlite	Amphibole	Gypsum
											Talc	Feldspar	Mica
											Clay	Organic Part.	Diatoms
											Misc. Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
ABS	0	0	0	0	0	0	0	0	
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/21/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158159 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
ABS	0	0							0
<b>Total</b>	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/22/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158160  
 RJ Lee Group  
 Project Number: LLH901997  
 Analysis Method:

Comments /  
 # of Layers: 100pt Count Detection Limit =  $\frac{1}{100} \times 100\% = 0.1$

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:
					⊥		⊥	Y	N	Y	N	
			W C S					L M	P N			NFM% Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
			W C S					L M	P N			
			W C S					L M	P N			
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
ASB	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{100} \times 100\% = 0.1$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/22/19 Analyst: DF Microscope: 036-OPT

RJ Lee Group Sample Number: 3158160 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<u>NAS</u>	<u>100</u>	<u>100</u>							<u>200</u>
<b>Total</b>									<u>1000</u>

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/16/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158161  
 RJ Lee Group  
 Project Number: LLH 901997  
 Analysis Method:

Comments / # of Layers: 1000 pt count Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1$

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Y N	QC Analyst:
					⊥		⊥					
			W C S					L M	P N			
			W C S					L M	P N			
			W C S					L M	P N			
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		

- Quartz
- Carbonates
- Vermiculite
- Tar
- Binder
- Opacities
- Perlite
- Amphibole
- Gypsum
- Talc
- Feldspar
- Mica
- Clay
- Organic Part.
- Diatoms
- Misc Particles
- Foam
- Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
ASB	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/16/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158161 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
ASB	0	0							
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/22/19 Analyst: DF Scope: 03G-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158162  
 RJ Lee Group  
 Project Number:  
 Analysis Method: LLH901997

Comments / # of Layers: 1000 pt count Detection Limit  $\frac{1}{1000} \times 100\% = 0.1$

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:	
					⊥		⊥	Y	N	Y	N		
			W C S					L M	P N				
			W C S					L M	P N				
			W C S					L M	P N				
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM%		
											Quartz	Carbonates	Vermiculite
											Tar	Binder	Opauques
											Perlite	Amphibole	Gypsum
											Talc	Feldspar	Mica
											Clay	Organic Part.	Diatoms
											Misc Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAs	100	100	100	100	100	100	100	100	800
Total									800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/22/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158162 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
	<u>100</u>	<u>100</u>							<u>200</u>
<b>Total</b>									<u>1000</u>

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/22/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

Comments / # of Layers: 1000 pt count Detection Limit:  $\frac{1}{1000} \times 100\% = 0.1$

RJ Lee Group Sample Number: 3158171 RJ Lee Group Project Number: LLH901997 Analysis Method:										# of Preps:		Homogenous Y N		QC Y N		QC Analyst:	
Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism    ⊥		Indices of Refraction    ⊥		Birefringence L M	Sign of Elongation P N	Extinction Angle	NFM%					
				W C S					L M	P N		Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil					
				W C S					L M	P N							
				W C S					L M	P N							
	% Non-Asbestos Fibers			Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
ABS	0	0	0	0	0	0	0	0	
Total	100	100	100	100	100	100	100	100	800

Detection Limits:  $\frac{1}{1000} \times 100\% = 0.1$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/22/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158171 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
ABS	0	0							0
<b>Total</b>	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 05/22/19 Analyst: DF Scope: 036-OPT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 315 8172  
 RJ Lee Group  
 Project Number:  
 Analysis Method: LLH 901997

Comments / # of Layers: 100pt count - Detection Limit:  $\frac{1}{1000} \times 100\% = 0.1$

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:	
					⊥		⊥	Y	N	Y	N		
			WCS					L M	P N				
			WCS					L M	P N				
			WCS					L M	P N				
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM%		
											Quartz	Carbonates	Vermiculite
											Tar	Binder	Opâques
											Perlite	Amphibole	Gypsum
											Talc	Feldspar	Mica
											Clay	Organic Part.	Diatoms
											Misc Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
	0	0	0	0	0	0	0	0	
Total	100	100	100	100	100	100	100	100	800



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 05/22/19 Analyst: DF Microscope: 036-OPT

RJ Lee Group Sample Number: 3158172 RJ Lee Group Project Number: LLH901997

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
ASB	0	0							
Total									1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

# Request for Environmental and IH Laboratory Analytical Services

ATTENTION TO:

Project No.: Client No.:  
 Date Logged In: Logged In By:

Purchase Order No.: Client Job No.: Rock Hill Quarry  
 Rush Charges Authorized?  Yes  No  
 Accreditation (please list below):

Name: Andrew Gurtshall  
 Company: Hanson Aggregates Pa, LLC  
 Address: 7660 Imperial Way  
 City, State, Zip: Allentown, PA 18195  
 Phone: 610-366-4819 Fax:  
 Email Results To: Andrew.Gurtshall@lehighhanson.com

Drinking Water Sample Only  
 System ID #: N/A  
 DOH Source #: N/A  
 Multiple Sources #: N/A  
 Sample Purpose: A  B  Other  N/A  
 Regulatory  Accreditation (please list below):  
 Matrix: WW=Wastewater GW=Groundwater S=Soil/Sludge E=Extract  
 Container: P=Plastic G=Glass W=Wipe A=Air (filter or tube)

Invoice To: Company: Name: Andrew Gurtshall  
 Address: City, State, Zip: Phone: Fax:  
 Email: If a hard copy of invoice is needed, check here

Special Instructions: Invoice per project setup with Drew Van Orden

Client Sample ID	Sample Description	Sample Date	Sample Time		Wipe Area / Air Volume	Sample Location (Please specify if NY state)	Analysis Requested	PLM/TEM EPA 600/R-93/116 (see Attach. 1)	Pres. Upon Receipt (Y/N)	Preservation	Matrix	Container Type	pH	No. Containers
			Start	Stop										

1	2B Aggregate	4/18	11:00	11:30	N/A			X	N/A	N/A	X	P	N/A	1
2	2B Aggregate	4/18	11:10	11:30	N/A			X	N/A	N/A	X	P	N/A	1
3	2B Aggregate	4/18	11:20	11:30	N/A			X	N/A	N/A	X	P	N/A	1
4	2B Aggregate	4/18	11:30	11:40	N/A			X	N/A	N/A	X	P	N/A	1
5	2B Aggregate	4/18			N/A			X	N/A	N/A	X	P	N/A	1

Chain of Custody	Relinquished By (Signature): <i>Andrew Gurtshall</i> Relinquished By (Print Name): Andrew Gurtshall Company Name: Hanson Aggregates Pa, LLC Date: 4/18/19 Time: 15:30 Relinquished To: <i>FedEx</i> Method of Shipment: <i>FedEx</i>	Chain of Custody	Received By (Signature): Received By (Print Name): Company Name: Date: Relinquished To: Method of Shipment:
Chain of Custody	Relinquished By (Signature): Relinquished By (Print Name): Company Name: Date: Relinquished To: Method of Shipment:	Chain of Custody	Received By (Signature): Received By (Print Name): Company Name: Date: Relinquished To: Method of Shipment:

Pennsylvania - HQ  
 350 Hochberg Road  
 Montroeville, PA 15146  
 724.325.1776 Phone  
 724.733.1799 Fax

Washington  
 Columbia Basin Analytical Laboratories  
 2710 North 20th Avenue  
 Pasco, WA 99301  
 509.545.4989 Phone  
 509.544.6010 Fax





# Request for Environmental and IH Laboratory Analytical Services

ATTENTION TO:

Project No.: **Andrew Gutschall** Client No.: **Andrew Gutschall** Logged In By: **Andrew Gutschall**  
 Date Logged In: **4/18/19**

Report Results To: **Andrew Gutschall**  
 Name: **Andrew Gutschall**  
 Company: **Hanson Aggregates Pa, LLC**  
 Address: **7660 Imperial Way**  
 City, State, Zip: **Allentown, PA 18195**  
 Phone: **610-366-4819** Fax:   
 Email Results To: **Andrew.Gutschall@LehighHanson.com**

Invoice To: **Hanson Aggregates Pa, LLC**  
 Name: **Andrew Gutschall** Email:   
 Address: **7660 Imperial Way**  
 City, State, Zip: **Allentown, PA 18195**  
 Phone: **610-366-4819** Fax:

Special Instructions: **Invoice per project setup with Drew Van Orden**

Client Sample ID	Sample Description	Sample Date	Sample Time		Wipe Area / Air Volume	Sample Location (Please specify if NY state)	PLM/TEM EPA 600/R-93/116 (see Attach. 1)	Pres. Upon Receipt (Y/N)	Preservation	Matrix	Container Type	pH	No. Containers
			Start	Stop									
6	2B Aggregate	4/18	11:50	Gut- 12:00	N/A		X	N/A	N/A	X	P	N/A	1
7	2B Aggregate	4/18	12:00	12:10	N/A		X	N/A	N/A	X	P	N/A	1
8	2B Aggregate	4/18	12:10	12:30	N/A		X	N/A	N/A	X	P	N/A	1
9	2B Aggregate	4/18	12:30	12:30	N/A		X	N/A	N/A	X	P	N/A	1
10	2B Aggregate	4/18	12:30	12:30	N/A		X	N/A	N/A	X	P	N/A	1

Chain of Custody: Relinquished By (Signature): **John A. Gutschall** Date: **4/18/19** Time: **15:30**  
 Relinquished By (Print Name): **John A. Gutschall** Relinquished To: **Reddy**  
 Company Name: **Forbes** Method of Shipment: **Reddy**

Chain of Custody: Relinquished By (Signature):  Date:  Time:   
 Relinquished By (Print Name):  Relinquished To:   
 Company Name:  Method of Shipment:

Chain of Custody: Relinquished By (Signature):  Date:  Time:   
 Relinquished By (Print Name):  Relinquished To:   
 Company Name:  Method of Shipment:

Pennsylvania - HQ  
 350 Hochberg Road  
 Monroeville, PA 15146  
 724.325.1776 Phone  
 724.733.1799 Fax

Washington  
 Columbia Basin Analytical Laboratories  
 2710 North 20th Avenue  
 Pasco, WA 99301  
 509.545.4989 Phone  
 509.544.6010 Fax



## Attachment 1

### Sample Analysis Procedures and Methods

For obtaining a representative sample from a large bulk sample, the AASHTO procedures for reducing the sample should be used. The subsequent analyses of the submitted samples will follow a three step procedure: 1) Basic microscopic analysis to assess the presence of asbestiform mineral habitat; 2) Polarized Light Microscopy (PLM) to determine the presence and asbestos mineral type, if present; and, 3) Should positive results be indicated by PLM, follow-up Transmission Electron Microscopy (TEM) analysis will be completed to confirm the minerals present and their morphology. The techniques and methods to be employed in sample analysis are provided below:

- A geologist will inspect hand and core samples initially using a stereo binocular microscope, with magnification ranging from 10x to 60x. Using a fine steel pick (dental pick) the geologist will scrape the surface of the suspect mineralization to determine if any of the minerals display typical asbestiform habit and characteristics such as fiber bundles, splayed ends, or matted or fibrous masses.
- Further examination of the sample will then be conducted using the Polarized Light Microscope (PLM) using EPA 600/R-93/116.
- If asbestiform minerals are found, representative samples will be further analyzed by Transmission Electron Microscopy per EPA 600/R-93/116 to confirm mineral identification and morphology.
- Where appropriate, the microscopic PLM and/or TEM analyses will include a count of the asbestiform fibers, representative digital images, and measurements of the width and length dimensions of found fibers counted.

Water samples will be collected as grab samples and will be analyzed by TEM per EPA 100.2.

The samples will be analyzed using the above procedures by RJ Lee Group, which is accredited by the American Industrial Hygiene Association and is in the NIST National Voluntary Laboratory Accreditation Program for asbestos analysis. RJ Lee Group has mineralogical expertise and has vast experience to detect asbestos fibers in the natural environment (e.g. rocks, soils, water, etc.).



# Request for Environmental and IH Laboratory Analytical Services

**ATTENTION TO:**

Lab Use Only	Project No.:	Client No.:	Purchase Order No.:	Client Job No.:	Rock Hill Quarry
	Date Logged In:	Logged In By:	Date Results Needed	Rush Charges Authorized ?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Name:	Andrew Gutshall	Sample Purpose: Information <input type="checkbox"/> Regulatory <input type="checkbox"/> Accreditation (please list below):	Regulatory <input type="checkbox"/> Accreditation (please list below):	

Report Results To	Company:	Hanson Aggregates Pa, LLC	Drinking Water Sample Only	System ID #:	N/A	DOH Source #:	N/A	Multiple Sources #:	N/A	Sample Purpose: A <input type="checkbox"/> B <input type="checkbox"/> Other <input type="checkbox"/> N/A	Matrix:	Container:
	Address:	7660 Imperial Way								WW=Wastewater GW=Groundwater S=Soil/Sludge E=Extract	SW=Surface Water DW=Drinking Water O=Oil X=Other	P=Plastic G=Glass W=Wipe A=Air (filter or tube)
	City, State, Zip:	Allentown, PA 18195										
	Phone:	610-366-4819										
	Email Results To:	Andrew.Gutshall@lehight-hanson.com										

Invoice To	Name:	if a hard copy of invoice is needed, check here <input type="checkbox"/>									
	Company:										
	Address:										
	City, State, Zip:										
	Phone:										
	Fax:										

Special Instructions	Invoice per project setup with Drew Van Orden										
----------------------	---	--	--	--	--	--	--	--	--	--	--

Client Sample ID	Sample Description	Sample Date	Sample Time		Wipe Area / Air Volume	Sample Location (Please specify if NY state)	Analysis Requested				Pres. Upon Receipt (Y/N)	Preservation	Matrix	Container Type	pH	No. Containers	
			Start	Stop			PLM/TEM EPA 600/R-93/116 (see Attach. 1)										
11	1B Aggregate	4/18	13:30	Grab	N/A		X					N/A	N/A	X	P	N/A	1
12	1B Aggregate	4/18	13:35		N/A		X					N/A	N/A	X	P	N/A	1
13	2A Aggregate	4/18	13:40		N/A		X					N/A	N/A	X	P	N/A	1
14	2A Aggregate	4/18	13:45		N/A		X					N/A	N/A	X	P	N/A	1
15	Screenings	4/18	13:50		N/A		X					N/A	N/A	X	P	N/A	1
16	Screenings	4/18	13:55		N/A		X					N/A	N/A	X	P	N/A	1

Chain of Custody	Relinquished By (Signature):	Andrew Gutshall	Date:	4/18/19	Time:	15:30	Chain of Custody	Received By (Signature):		Date:		Time:	
	Relinquished By (Print Name):	Andrew Gutshall	Relinquished To:					Received By (Print Name):		Relinquished To:			
	Company Name:	Lehigh Hanson	Method of Shipment:	FedEx				Company Name:		Method of Shipment:			
Chain of Custody	Relinquished By (Signature):		Date:		Time:		Chain of Custody	Received By (Signature):		Date:		Time:	
	Relinquished By (Print Name):		Relinquished To:					Received By (Print Name):		Relinquished To:			
	Company Name:		Method of Shipment:					Company Name:		Method of Shipment:			

Pennsylvania - HQ  
350 Hochberg Road  
Monroeville, PA 15146  
724.325.1776 Phone  
724.733.1799 Fax

Washington  
Columbia Basin Analytical Laboratories  
2710 North 20th Avenue  
Pasco, WA 99301  
509.545.4989 Phone  
509.544.6010 Fax



## Attachment 1

### Sample Analysis Procedures and Methods

For obtaining a representative sample from a large bulk sample, the AASHTO procedures for reducing the sample should be used. The subsequent analyses of the submitted samples will follow a three step procedure: 1) Basic microscopic analysis to assess the presence of asbestiform mineral habitat; 2) Polarized Light Microscopy (PLM) to determine the presence and asbestos mineral type, if present; and, 3) Should positive results be indicated by PLM, follow-up Transmission Electron Microscopy (TEM) analysis will be completed to confirm the minerals present and their morphology. The techniques and methods to be employed in sample analysis are provided below:

- A geologist will inspect hand and core samples initially using a stereo binocular microscope, with magnification ranging from 10x to 60x. Using a fine steel pick (dental pick) the geologist will scrape the surface of the suspect mineralization to determine if any of the minerals display typical asbestiform habit and characteristics such as fiber bundles, splayed ends, or matted or fibrous masses.
- Further examination of the sample will then be conducted using the Polarized Light Microscope (PLM) using EPA 600/R-93/116.
- If asbestiform minerals are found, representative samples will be further analyzed by Transmission Electron Microscopy per EPA 600/R-93/116 to confirm mineral identification and morphology.
- Where appropriate, the microscopic PLM and/or TEM analyses will include a count of the asbestiform fibers, representative digital images, and measurements of the width and length dimensions of found fibers counted.

Water samples will be collected as grab samples and will be analyzed by TEM per EPA 100.2.

The samples will be analyzed using the above procedures by RJ Lee Group, which is accredited by the American Industrial Hygiene Association and is in the NIST National Voluntary Laboratory Accreditation Program for asbestos analysis. RJ Lee Group has mineralogical expertise and has vast experience to detect asbestos fibers in the natural environment (e.g. rocks, soils, water, etc.).

## Final Laboratory Report

### TEM Bulk Protocol

Attention: David Raphael  
K & L Gates  
17 North Second Street  
Harrisburg, PA 17101  
US

Report Date: 11/14/2019  
Sample Receipt Date: 09/03/2019  
RJ Lee Group Job No.: LLH901997-14  
Authorization/P.O. No.:  
Samples Received: 6  
Client Job No.:

Method: EPA/R-93/600/116

**TABLE 1 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos**

Client Sample Number	RJLG Sample Number	Total Structures				-----Weight Percent----- Total Structures Analytical Sensitivity			
		Chry	Amph	Cleavage	Non Asbestos	Chry	Amph Asb	Amph Cleavage Fragment	Non Asbestos
11	3158157	0	10	9	1	< <b>1.9E-6</b> 1.9E-6	<b>6.2E-3</b> 2.4E-6	<b>2.2E-2</b> 1.5E-6	<b>2.7E-3</b> 1.4E-6
13	3158159	0	48	39	19	< <b>1.4E-6</b> 1.4E-6	<b>5.4E-2</b> 1.7E-6	<b>2.7E-1</b> 1.1E-6	<b>5.3E-2</b> 1.0E-6

**NOTES**

- "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA LAP, LLC #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole:  $3.2 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

**DISCLAIMER**

This report may not be used to claim product endorsement by NVLAP, NY ELAP, AIHA LAP, LLC, or any other regulatory or laboratory accrediting agency. Any reproduction of this document must be in full in order for the report to be valid. This report is not valid unless it bears a RJ Lee Group approved signatory.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limiting provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of ninety (90) days before discarding. A shipping and handling fee will be assessed for the return of any sample.

RJ Lee Group Job No: LLH901997-14  
 Client Job No/Name:

Client: K & L Gates  
 Report Date: 11/14/2019

**TABLE 1 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos**

Client Sample Number	RJLG Sample Number	Total Structures				-----Weight Percent----- Total Structures Analytical Sensitivity			
		Chry	Amph	Cleavage	Non Asbestos	Chry	Amph Asb	Amph Cleavage Fragment	Non Asbestos
15	3158161	0	7	6	0	< <b>4.8E-6</b> 4.8E-6	<b>2.5E-2</b> 6.0E-6	<b>4.2E-2</b> 3.8E-6	< <b>3.6E-6</b> 3.6E-6
3	3158165	0	0	1	2	< <b>2.4E-6</b> 2.4E-6	< <b>3.0E-6</b> 3.0E-6	<b>8.8E-4</b> 1.9E-6	<b>7.7E-4</b> 1.8E-6
5	3158167	0	0	3	1	< <b>3.2E-6</b> 3.2E-6	< <b>4.0E-6</b> 4.0E-6	<b>1.6E-3</b> 2.6E-6	<b>3.9E-3</b> 2.4E-6
8	3158170	0	0	1	1	< <b>4.8E-6</b> 4.8E-6	< <b>6.0E-6</b> 6.0E-6	<b>2.0E-3</b> 3.8E-6	<b>3.0E-2</b> 3.6E-6

**NOTES**

- "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA LAP, LLC #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole:  $3.2 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

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RJ Lee Group Job No: LLH901997-14  
 Client Job No/Name:

Client: K & L Gates  
 Report Date: 11/14/2019

**TABLE 2 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos 5 μm**

Client Sample Number	RJLG Sample Number	-----Structures 5 μm-----				-----Weight Percent----- Structures 5 μm Analytical Sensitivity Amphibole			
		Chry	Amph	Cleavage	Non-Asbestos	Chry	Asb	Cleavage Fragment	Non-Asbestos
11	3158157	0	1	1	0	<u>&lt; 1.9E-5</u> 1.9E-5	<u>4.8E-3</u> 2.4E-5	<u>1.5E-2</u> 1.5E-5	<u>&lt; 1.4E-5</u> 1.4E-5
13	3158159	0	27	2	4	<u>&lt; 1.4E-5</u> 1.4E-5	<u>5.0E-2</u> 1.7E-5	<u>2.5E-1</u> 1.1E-5	<u>3.6E-2</u> 1.0E-5
15	3158161	0	4	1	0	<u>&lt; 4.8E-5</u> 4.8E-5	<u>1.6E-2</u> 6.0E-5	<u>3.0E-2</u> 3.8E-5	<u>&lt; 3.6E-5</u> 3.6E-5
3	3158165	0	0	0	0	<u>&lt; 2.4E-5</u> 2.4E-5	<u>&lt; 3.0E-5</u> 3.0E-5	<u>&lt; 1.9E-5</u> 1.9E-5	<u>&lt; 1.8E-5</u> 1.8E-5
5	3158167	0	0	0	0	<u>&lt; 3.2E-5</u> 3.2E-5	<u>&lt; 4.0E-5</u> 4.0E-5	<u>&lt; 2.6E-5</u> 2.6E-5	<u>&lt; 2.4E-5</u> 2.4E-5
8	3158170	0	0	0	1	<u>&lt; 4.8E-5</u> 4.8E-5	<u>&lt; 6.0E-5</u> 6.0E-5	<u>&lt; 3.8E-5</u> 3.8E-5	<u>3.0E-2</u> 3.6E-5

**NOTES**

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- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole: 3.2 \* 10<sup>-3</sup> ng/ μ m<sup>3</sup>, density of chrysotile: 2.55 \* 10<sup>-3</sup> ng/ μ m<sup>3</sup>, density of non-asbestos: 3.00 \* 10<sup>-3</sup> ng/ μ m<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

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# RJ Lee Group, Inc.

RJ Lee Group Job No: LLH901997-14  
Client Job No/Name:

## Final Laboratory Report (cont'd)

Client: K & L Gates  
Report Date: 11/14/2019

Client Sample Number	RJLG Sample Number	Material Used (gm)	Area Analyzed Total (mm <sup>2</sup> )	Area Analyzed 5 μm (mm <sup>2</sup> )	Effective Filter Area (mm <sup>2</sup> )	Dilution Factor
11	3158157	0.0005	0.31704	0.31704	1220	1.0
13	3158159	0.0007	0.31704	0.31704	1220	1.0
15	3158161	0.0002	0.31704	0.31704	1220	1.0
3	3158165	0.0004	0.31704	0.31704	1220	1.0
5	3158167	0.0003	0.31704	0.31704	1220	1.0
8	3158170	0.0002	0.31704	0.31704	1220	1.0

Authorized Signature: \_\_\_\_\_



Monica McGrath-Koerner, Scientist

### NOTES

- "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA LAP, LLC #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole:  $3.2 \times 10^{-3}$  ng/μm<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/μm<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/μm<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

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RJL: LLH901997-14	3158157.HTA2	Microscope tem2000fx1	Grid Openings	10
11	K & L Gates	Magnification 21 KX	Asbestos	9.0
Wt: 0.0005 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	10.0
HQ44614		Cv = 0.89	Nonasbestos >= 5µm	1.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	1.95	0.05	Amphibole	F	MgSiCaFe	15649C	Image1	X	Acti	Asb
								Image2			
1	2	1.95	0.05	Amphibole	B	MgSiCaFe	15650C	Image3	Diff1	Acti	Asb
								Image4			
1	3	2.3	0.25	Amphibole		MgSiCaFe	15651C	Image5	Diff2	Acti	Cle
1	4	1.85	0.2	Amphibole		MgSiCaFe		Image6	X	Acti	Cle
1	5	2.3	0.18	Amphibole		MgSiCaFe		Image7	X	Acti	Cle
								Image8			
1	6	2.5	0.22	Amphibole	B	MgSiCaFe	15652C	Image9	Diff3	Acti	Asb
2	1	3.45	0.05	Amphibole	F	MgSiCaFe		Image10	X	Acti	Asb
3	1	2.8	0.06	Amphibole	F	MgSiCaFe		Image11	X	Acti	Asb
								Image12			
4	1	3.22	0.46	Amphibole		MgSiCaFe		Image13	X	Acti	Cle
4	2	3.3	0.06	Amphibole	F	MgSiCaFe		Image14	X	Acti	Asb
5	1	1.15	0.08	Amphibole		MgSiCaFe		Image15	X	Acti	Cle
5	2	2.45	0.1	Amphibole	F	MgSiCaFe	15653C	Image16	Diff4	Acti	Asb
6	1	2.9	0.3	Amphibole		MgSiCaFe		Image17	X	Acti	Cle
7	1	3.2	0.46	Non-Asbestos		AlSiCaFeNa	15654C	Image18	X		
7	2	7.1	0.7	Amphibole		MgSiCaFe		Image19	X	Acti	Cle
8	1	0.95	0.1	Amphibole		MgSiCaFe		Image20	X	Acti	Cle
9				NSD							
10	1	3.75	0.4	Amphibole		MgSiCaFeAl	15655C	Image21	X	Acti	Cle
10	2	1.5	0.05	Amphibole	F	MgSiCaFe		Image22	X	Acti	Asb
10	3	2.5	0.1	Amphibole	F	MgSiCaFe		Image23	X	Acti	Asb

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 1:18:07 PM approve by Jon Swope

Final Review: 9/10/2019 9:40:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158157.HTA2	Microscope tem2000fx1	Grid Openings	25
11	K & L Gates	Magnification 10 KX	Asbestos	1.0
Wt: 0.0005 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	% Wt of largest asbestos structure	%
HQ44614		Cv = 0.038		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11	1	9.1	0.45	Amphibole	B	MgSiCaFe15656C	Image1	Diff1	Acti	Asb	
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 2:41:51 PM approve by Jon Swope

Final Review: 9/10/2019 9:40:00 AM approve by Monica McGrath



RJL: LLH901997-14	3158159.HTA1	Microscope tem1200_2	Grid Openings	10
13	K & L Gates	Magnification 21 KX	Asbestos	36.0
Wt: 0.0007 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	15.0
Dil: 1.0	Filter Size: 47 mm	Operator: Ashleigh Sload	Nonasbestos	54.0
HQ44614		Cv = 3.44	Nonasbestos >= 5µm	2.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	15.9	0.4	Amphibole	B	MgSiCaFe15642C		Image1 Image2 Image3	Diff1	Acti	Asb
1	2	2.8	0.5	Non-Asbestos		MgAlSiFe 15643C		Image4	X		
1	3	1.38	0.2	Amphibole		MgSiCaFe		Image5	X	Acti	Cle
1	4	0.9	0.12	Non-Asbestos		MgAlSiFe			X		
1	5	1.12	0.12	Non-Asbestos		MgAlSiFe			X		
1	6	3.68	0.1	Amphibole	F	MgSiCaFe		Image6	X	Acti	Asb
1	7	3.22	0.6	Amphibole		MgSiCaFe		Image7	X	Acti	Cle
1	8	2.9	0.05	Amphibole	M	MgSiCaFe		Image8	X	Acti	Asb
1	9	1.84	0.15	Amphibole		MgSiCaFe		Image9	X	Acti	Cle
1	10	2.3	0.7	Non-Asbestos		MgAlSiFe			X		
2	1	2.45	0.25	Non-Asbestos		MgAlSiFe			X		
2	2	3.22	0.05	Amphibole	F	MgSiCaFe		Image10	X	Acti	Asb
2	3	9.89	0.05	Amphibole	F	MgSiCaFe		Image11	X	Acti	Asb
2	4	1.84	0.05	Amphibole	F	MgSiCaFe		Image12	X	Acti	Asb
2	5	2.99	0.25	Amphibole	B	MgSiCaFe			X	Acti	Asb
2	6	10.1	0.12	Amphibole	B	MgSiCaFeAl15644C		Image13	Diff2	Acti	Asb
2	7	3.45	0.66	Non-Asbestos		MgAlSiFe			X		
2	8	3.91	0.45	Amphibole		MgSiCaFe		Image14	X	Acti	Cle
2	9	5.98	0.18	Amphibole	B	MgSiCaFe			X	Acti	Asb
2	10	2.64	0.25	Amphibole		MgSiCaFe		Image15	X	Acti	Cle
2	11	1.15	0.12	Amphibole		MgSiCaFe			X	Acti	Cle
3	1	3.33	0.25	Non-Asbestos		AlSiFe 15645C		Image16	X		
3	2	4.37	0.15	Amphibole	B	MgSiCaFe			X	Acti	Asb
3	3	12.2	0.12	Amphibole	F	MgSiCaFe			X	Acti	Asb
3	4	2.4	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
3	5	1.5	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
3	6	13.6	0.1	Amphibole	M	MgSiCaFe			X	Acti	Asb
3	7	2.3	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
3	8	15.2	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
3	9	2.3	0.18	Amphibole		MgSiCaFe			X	Acti	Cle
3	10	8.51	0.15	Amphibole	F	MgSiCaFe			X	Acti	Asb
4	1	2.5	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
4	2	2.05	0.35	Amphibole		MgSiCaFe15646C		Image17	Diff3	Acti	Cle
4	3	2.1	0.25	Amphibole		MgSiCaFe			X	Acti	Cle
4	4	2.99	0.25	Amphibole		MgSiCaFe			X	Acti	Cle
4	5	2.7	0.12	Amphibole	B	MgSiCaFe			X	Acti	Asb
4	6	3.91	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
4	7	1.84	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
4	8	7.45	0.2	Amphibole	F	MgSiCaFe			X	Acti	Asb
4	9	2.76	0.3	Non-Asbestos		MgAlSiCaFe15647C		Image18	X		
4	10	8.05	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
4	11	1.61	0.2	Amphibole		MgSiCaFe			X	Acti	Cle

RJL: LLH901997-14	3158159.HTA1	Microscope tem1200_2	Grid Openings	10
13	K & L Gates	Magnification 21 KX	Asbestos	36.0
Wt: 0.0007 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	15.0
Dil: 1.0	Filter Size: 47 mm	Operator: Ashleigh Sload	Nonasbestos	54.0
HQ44614		Cv = 3.44	Nonasbestos >= 5µm	2.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
5	1	3.22	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
5	2	1.9	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
5	3	1.15	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
5	4	12.88	2.3	Amphibole		MgAlSiCaFe	15648C	Image19	Diff5	Horn	Cle
5	5	1.84	0.2	Amphibole		MgAlSiCaFe			X	Horn	Cle
5	6	0.8	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
5	7	1.15	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
6	1	1.84	0.15	Non-Asbestos		AlSiFe			X		
6	2	1.61	0.2	Amphibole		MgSiCaFe		Image20	X	Acti	Cle
6	3	2.88	0.5	Non-Asbestos		AlSiFe			X		
6	4	3.22	0.08	Amphibole	F	MgSiCaFe		Image21	X	Acti	Asb
6	5	6.65	0.12	Amphibole	F	MgSiCaFeAl	15661C	Image22	Diff6	Acti	Asb
6	6	1.7	0.15	Non-Asbestos		AlSiFe			X		
6	7	2.1	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
6	8	2.3	0.1	Amphibole	F	MgSiCaFe			X	Acti	Asb
6	9	5.1	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
6	10	3.45	0.12	Amphibole	B	MgSiCaFe			X	Acti	Asb
6	11	1.45	0.25	Amphibole		MgSiCaFe			X	Acti	Cle
6	12	4.83	0.6	Amphibole		MgAlSiCaFe			X	Horn	Cle
7	1	1.15	0.1	Non-Asbestos		AlSiFe			X		
7	2	1.61	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
7	3	2.64	0.35	Non-Asbestos		AlSiFeMg			X		
7	4	5.98	0.4	Amphibole	B	MgSiCaFe			X	Acti	Asb
7	5	7.82	0.2	Amphibole	F	MgSiCaFe			X	Acti	Asb
8	1	2.64	0.15	Amphibole	F	MgSiCaFe	15662C	Image23	Diff7	Acti	Asb
8	2	2.53	0.05	Amphibole	F	MgSiCaFe				Acti	Asb
8	3	2.99	0.35	Non-Asbestos		AlSiFe			X		
8	4	2.99	0.5	Amphibole		MgAlSiCaFe			X	Horn	Cle
8	5	1.4	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
8	6	0.9	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
8	7	2.3	0.1	Amphibole	F	MgSiCaFe			X	Acti	Asb
8	8	3.45	0.6	Amphibole		MgSiCaFeAl	15663C	Image24	Diff8	Acti	Cle
8	9	3.22	0.05	Amphibole	F	MgSiCaFeAl			X	Acti	Asb
8	10	1.5	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
9	1	0.9	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
9	2	8.7	0.35	Amphibole	B	MgSiCaFe			X	Acti	Asb
9	3	2.76	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
9	4	2.02	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
9	5	1.84	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
9	6	1.35	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
10	1	3.91	0.2	Amphibole	F	MgSiCaFe			X	Acti	Asb
10	2	1.84	0.05	Amphibole	F	MgSiCaFe			X	Acti	Asb
10	3	2.5	0.35	Non-Asbestos		AlSiFe			X		
10	4	4.7	0.08	Amphibole	F	MgSiCaFe			X	Acti	Asb

**RJ Lee Group, Inc.**  
**TEM Count Sheet**

RJL: LLH901997-14	3158159.HTA1	Microscope tem1200_2	Grid Openings	10
13	K & L Gates	Magnification 21 KX	Asbestos	36.0
Wt: 0.0007 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	15.0
Dil: 1.0	Filter Size: 47 mm	Operator: Ashleigh Sload	Nonasbestos	54.0
HQ44614		Cv = 3.44	Nonasbestos >= 5µm	2.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
10	5	1.2	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
10	6	1.85	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
10	7	9.66	1.4	Amphibole		MgAlSiCaFe			X	Horn	Cle
10	8	0.9	0.15	Amphibole		MgSiCaFe			X	Acti	Cle

12% Particulate

**Analyst's Comments: Sample Analyzed on TEM-2000i**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/6/2019 2:40:26 PM approve by Ashleigh Sload

Final Review: 9/10/2019 9:40:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158159.HTA1	Microscope tem2000fx1	Grid Openings	25
13	K & L Gates	Magnification 10 KX	Asbestos	12.0
Wt: 0.0007 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	4.0
Dil: 1.0	Filter Size: 47 mm	Operator: Ashleigh Sload	% Wt of largest asbestos structure	%
HQ44614		Cv = 0.41		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	8.2	1.6	Non-Asbestos		MgAlSiFe	15637C	Image1	Diff1		
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7	1	8.9	0.1	Amphibole	F	MgSiCaFe	15639C	Image2	Diff3 Diff4	Acti	Asb
8	1	12.6	0.1	Amphibole	B	MgSiCaFe		Image3 Image4 Image5	X	Acti	Asb
8	2	7.4	0.22	Amphibole	F	MgSiCaFe	15640C	Image6	Diff5	Acti	Asb
9				NSD							
10	1	6.3	0.36	Amphibole	B	MgSiCaFe		Image7	X	Acti	Asb
10	2	7.7	0.1	Amphibole	F	MgSiCaFe		Image8	X	Acti	Asb
11				NSD							
12	1	8.8	0.15	Amphibole	F	MgSiCaFe		Image9	X	Acti	Asb
12	2	5.4	0.54	Non-Asbestos		MgAlSiFe			X		
13	1	7.2	0.2	Amphibole	F	MgSiCaFe		Image10	X	Acti	Asb
14	1	7.7	0.27	Amphibole	F	MgSiCaFe	15641C	Image11	Diff6 Diff7	Acti	Asb
15	1	9.9	0.9	Non-Asbestos		MgAlSiFe			X		
16	1	10.8	0.1	Amphibole	F	MgSiCaFe		Image12	X	Acti	Asb
17				NSD							
18				NSD							
19				NSD							
20	1	8.1	0.4	Non-Asbestos		MgAlSiFe			X		
21	1	18.2	0.45	Amphibole	B	MgSiCaFe		Image14 Image15	X	Acti	Asb
22	1	7.7	0.4	Amphibole	B	MgSiCaFe		Image16	X	Acti	Asb
23				NSD							
24				NSD							
25	1	17.3	0.45	Amphibole	F	MgSiCaFe		Image17	X	Acti	Asb

12% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/6/2019 10:37:59 AM approve by Ashleigh Sload

Final Review: 9/10/2019 9:40:00 AM approve by Monica Mcgrath



RJL: LLH901997-14	3158161.HTA2	Microscope tem1200_2	Grid Openings	10
15	K & L Gates	Magnification 20 KX	Asbestos	5.0
Wt: 0.0002 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	2.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	6.0
HQ44614		Cv = 0.45	Nonasbestos >= 5µm	1.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	2.1	0.06	Amphibole	F	MgSiCaFe19424B		Image1	Diff1	Acti	Asb
2	1	1.12	0.18	Amphibole		MgSiCaFe		Image2	X	Acti	Cle
3	1	6.5	0.66	Amphibole		MgSiCaFe19425B		Image3	Diff2	Acti	Cle
4	1	1.35	0.12	Amphibole		MgSiCaFe		Image4	X	Acti	Cle
5				NSD							
6				NSD							
7	1	5.1	0.4	Amphibole	B	MgSiCaFe19426B		Image5 Image6	Diff3	Acti	Asb
7	2	1.8	0.18	Amphibole	B	MgSiCaFe		Image7 Image8	X	Acti	Asb
8	1	4.7	0.4	Amphibole		MgSiCaFe		Image9	X	Acti	Cle
9	1	3.95	0.35	Amphibole	B	MgSiCaFe		Image10	X	Acti	Asb
9	2	2.5	0.33	Amphibole		MgSiCaFe		Image11	X	Acti	Cle
10	1	2.8	0.18	Amphibole		MgSiCaFe		Image12	X	Acti	Cle
10	2	11.1	0.08	Amphibole	F	MgSiCaFe19427B		Image13	Diff4	Acti	Asb

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 12:54:52 PM approve by Jon Swope  
 Final Review: 9/10/2019 9:41:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158161.HTA2	Microscope tem1200_2	Grid Openings	25
15	K & L Gates	Magnification 10 KX	Asbestos	2.0
Wt: 0.0002 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	% Wt of largest asbestos structure	%
HQ44614		Cv = 0.074		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10	1	5.2	0.12	Amphibole	F	MgSiCaFe19428B		Image1	Diff1	Acti	Asb
11	1	7.4	0.08	Amphibole	F	MgSiCaFe		Image2	X	Acti	Asb
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 2:27:48 PM approve by Jon Swope

Final Review: 9/10/2019 9:41:00 AM approve by Monica McGrath

RJL: LLH901997-14	3158165.HTA1	Microscope tem2000fx1	Grid Openings	10
3	K & L Gates	Magnification 21 KX	Asbestos	0.0
Wt: 0.0004 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.0	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	3.0
HQ44614		Cv = 0	Nonasbestos >= 5µm	0.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3	1	1.15	0.1	Non-Asbestos		MgSiCaFe15657C		Image1	Diff1		CPX
4				NSD							
5	1	3.45	0.22	Amphibole		MgSiCaFeAl15658C		Image2	Diff2		Acti Cle
6				NSD							
7				NSD							
8				NSD							
9	1	3.5	0.2	Non-Asbestos		MgSiCaFe15659C		Image3	Diff3 Diff4		CPX
10				NSD							

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 4:16:22 PM approve by Jon Swope

Final Review: 9/10/2019 9:41:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158165.HTA1	Microscope tem2000fx1	Grid Openings	25
3	K & L Gates	Magnification 10 KX	Asbestos	0.0
Wt: 0.0004 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	0.0
Dil: 1.0	Filter Size: 47 mm	Operator: Jon Swope	% Wt of largest asbestos structure	%
HQ44614		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 4:18:43 PM approve by Jon Swope

Final Review: 9/10/2019 9:41:00 AM approve by Monica Mcgrath



RJL: LLH901997-14	3158167.HTA1	Microscope tem2000fx1	Grid Openings	10
5	K & L Gates	Magnification 21 KX	Asbestos	0.0
Wt: 0.0003 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.0	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	4.0
HQ44614		Cv = 0	Nonasbestos >= 5µm	0.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	1.8	0.2	Amphibole		MgSiCaFeAl	5660C	Image1	Diff1	Acti	Cle
2				NSD							
3	1	1.65	0.1	Amphibole		MgAlSiCaFe	5667C	Image2	Diff2	Horn	Cle
4	1	2.85	0.45	Non-Asbestos		MgAlSiCaFe	5668C	Image3	Diff3	CPX	
4	2	2.4	0.25	Amphibole		MgSiCaFe		Image4	X	Acti	Cle
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/8/2019 4:37:43 PM approve by Jon Swope

Final Review: 9/10/2019 9:41:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158167.HTA1	Microscope tem2000fx1	Grid Openings	25
5	K & L Gates	Magnification 10 KX	Asbestos	0.0
Wt: 0.0003 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	0.0
Dil: 1.0	Filter Size: 47 mm	Operator: Jon Swope	% Wt of largest asbestos structure	%
HQ44614		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

10% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/9/2019 12:07:41 PM approve by Jon Swope

Final Review: 9/10/2019 9:41:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158170.HTA2	Microscope tem2000fx1	Grid Openings	10
8	K & L Gates	Magnification 21 KX	Asbestos	0.0
Wt: 0.0002 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Ashleigh Sload	Nonasbestos	2.0
HQ44614		Cv = 0	Nonasbestos >= 5µm	1.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6	1	2.99	0.25	Amphibole		MgSiCaFeAl	15664C	Image1	Diff1	Acti	Cle
7				NSD							
8	1	5.98	0.7	Non-Asbestos		NaAlSiCa	15665C	Image2	Diff2		
9				NSD							
10				NSD							

7% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/9/2019 10:25:46 AM approve by Ashleigh Sload

Final Review: 9/10/2019 9:41:00 AM approve by Monica Mcgrath

RJL: LLH901997-14	3158170.HTA2	Microscope tem2000fx1	Grid Openings	25
8	K & L Gates	Magnification 10 KX	Asbestos	0.0
Wt: 0.0002 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Ashleigh Sload	% Wt of largest asbestos structure	%
HQ44614		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

7% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 9/9/2019 10:00:43 AM approve by Ashleigh Sload

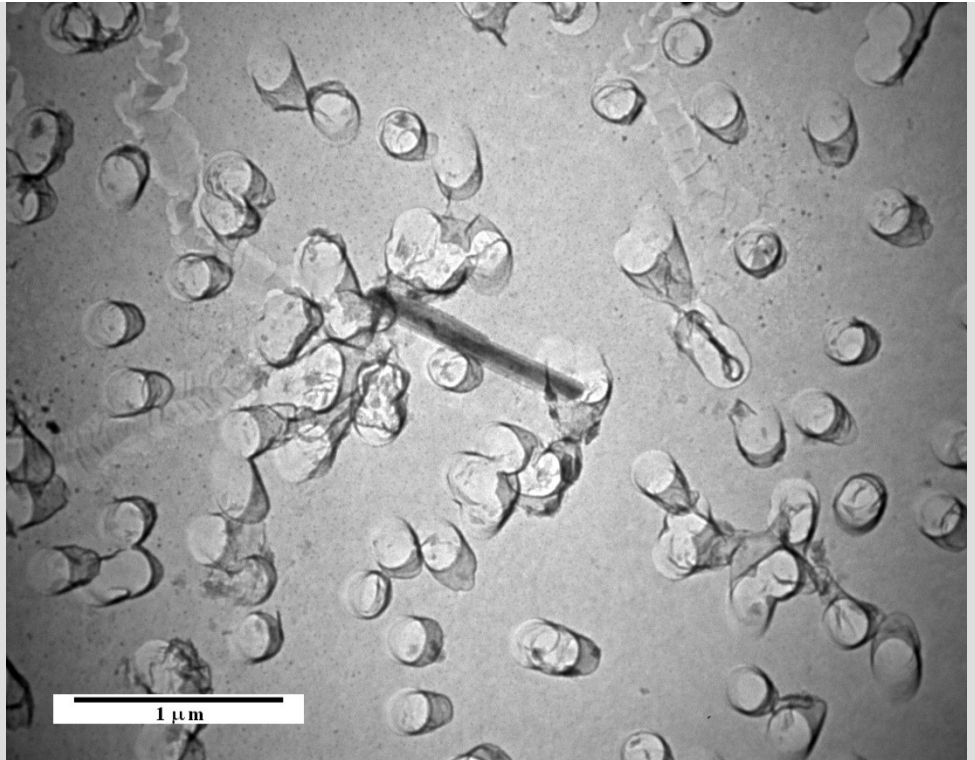
Final Review: 9/10/2019 9:41:00 AM approve by Monica McGrath

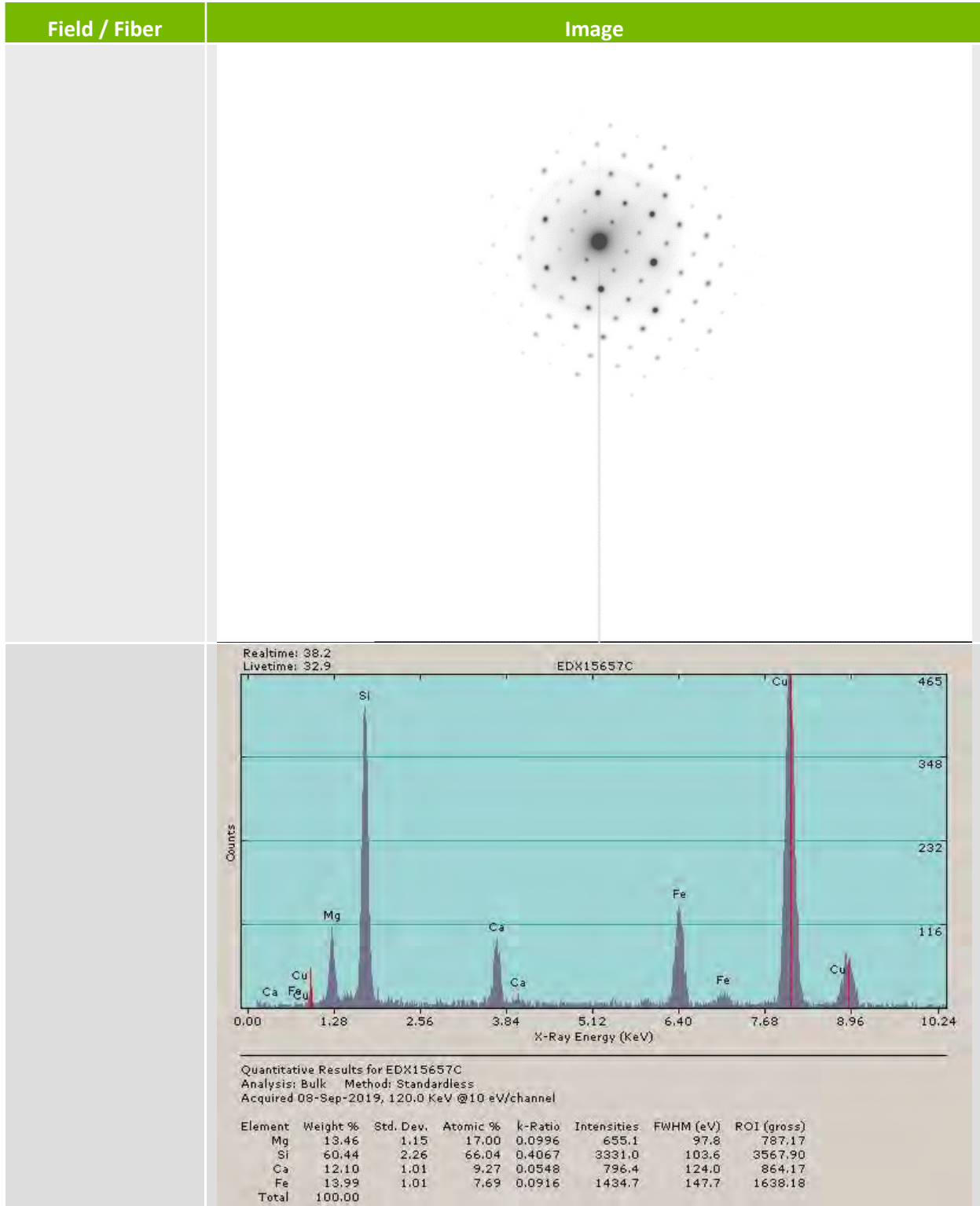


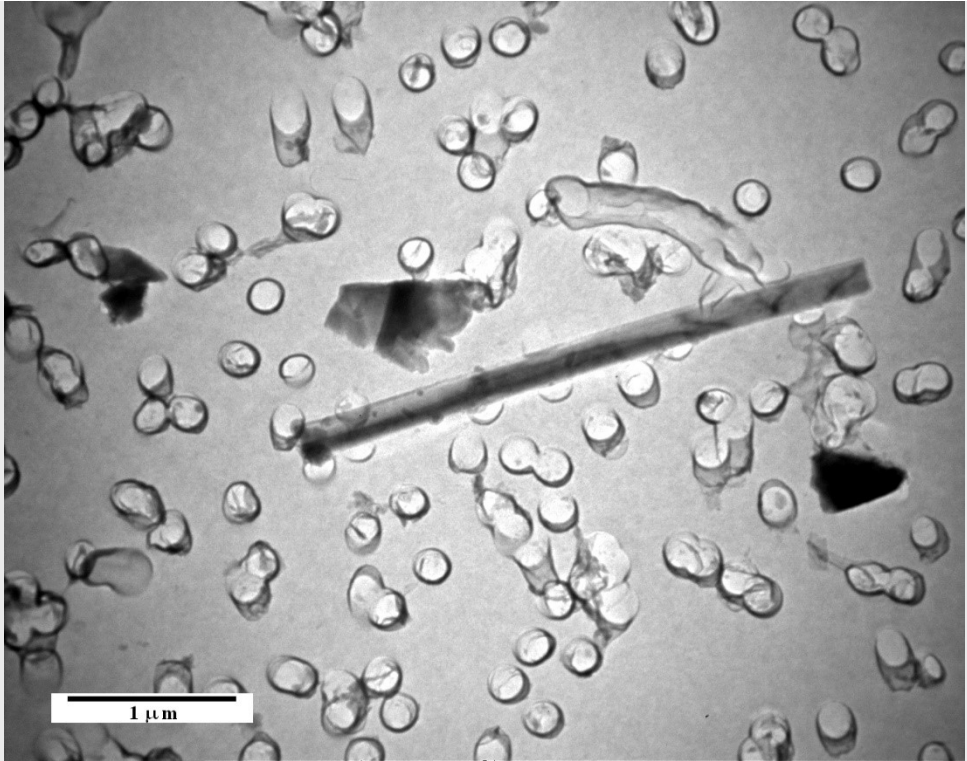
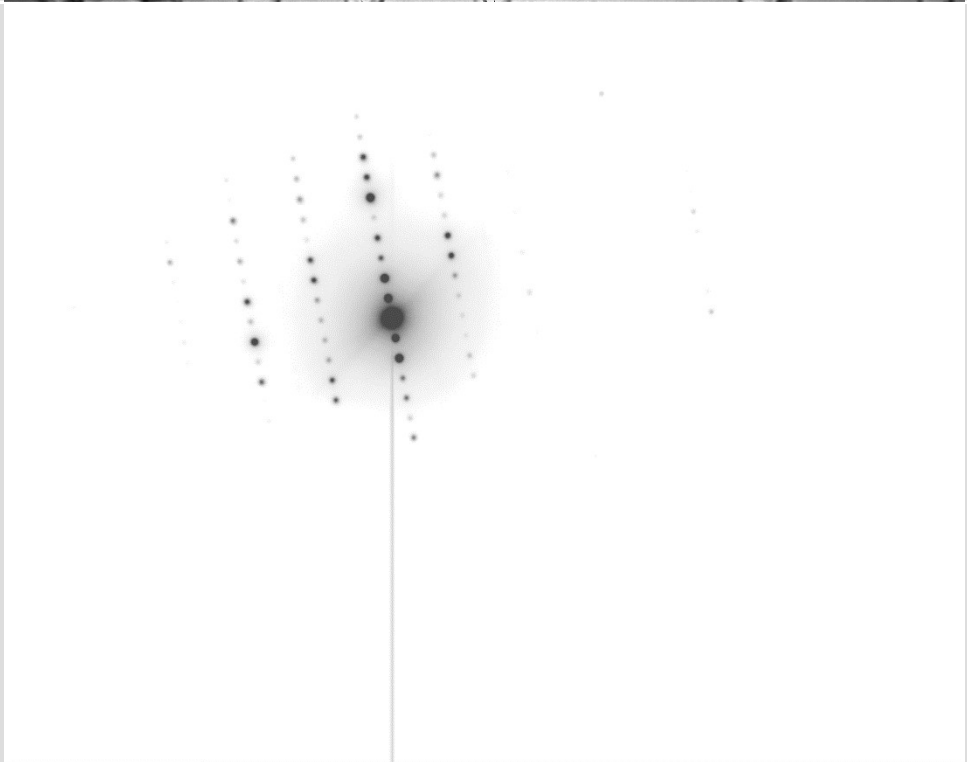
Transmission Electron Microscopy

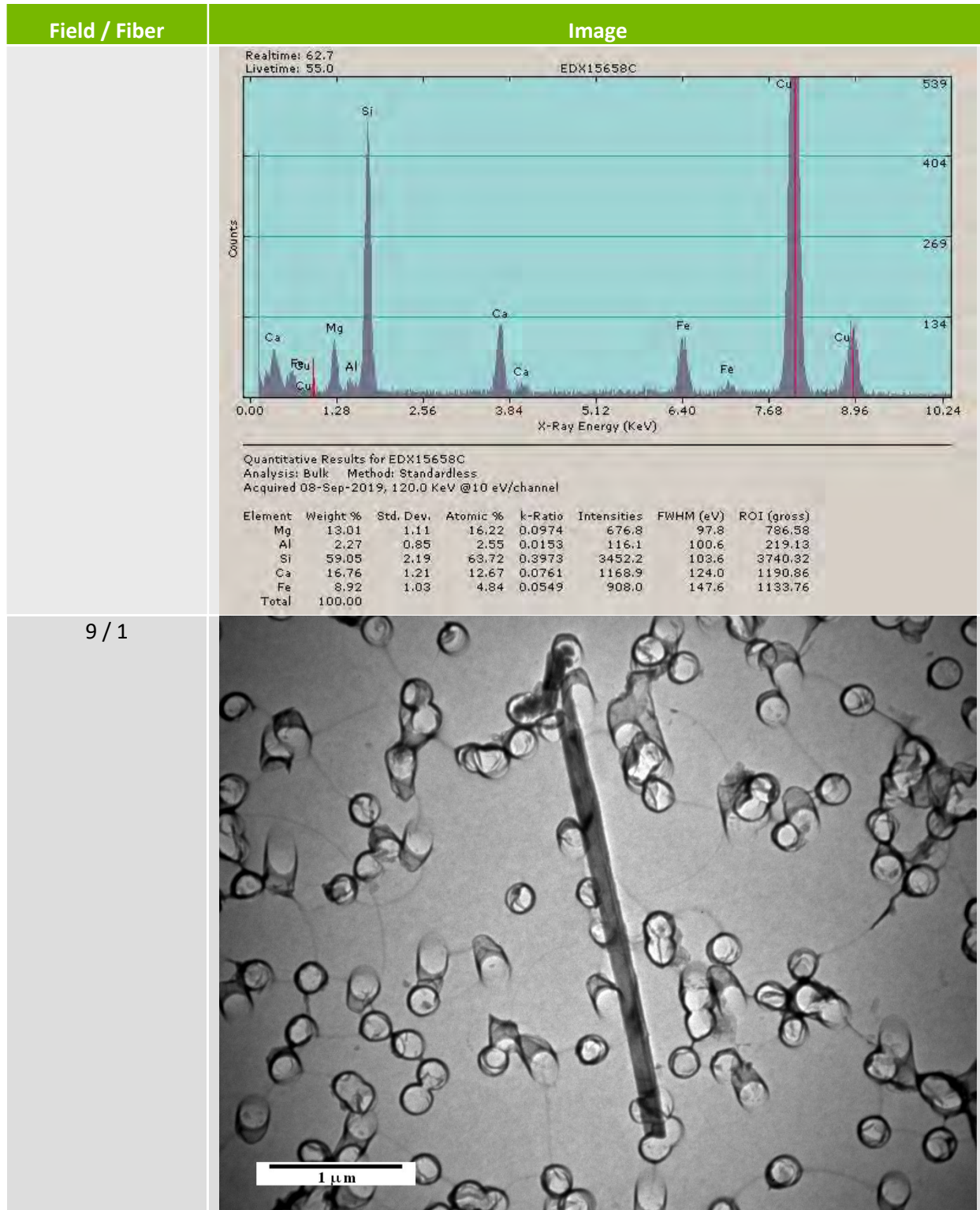
Report Dated September 26, 2019

Analysis of Samples 3, 5, 8, 11, 13, and 15

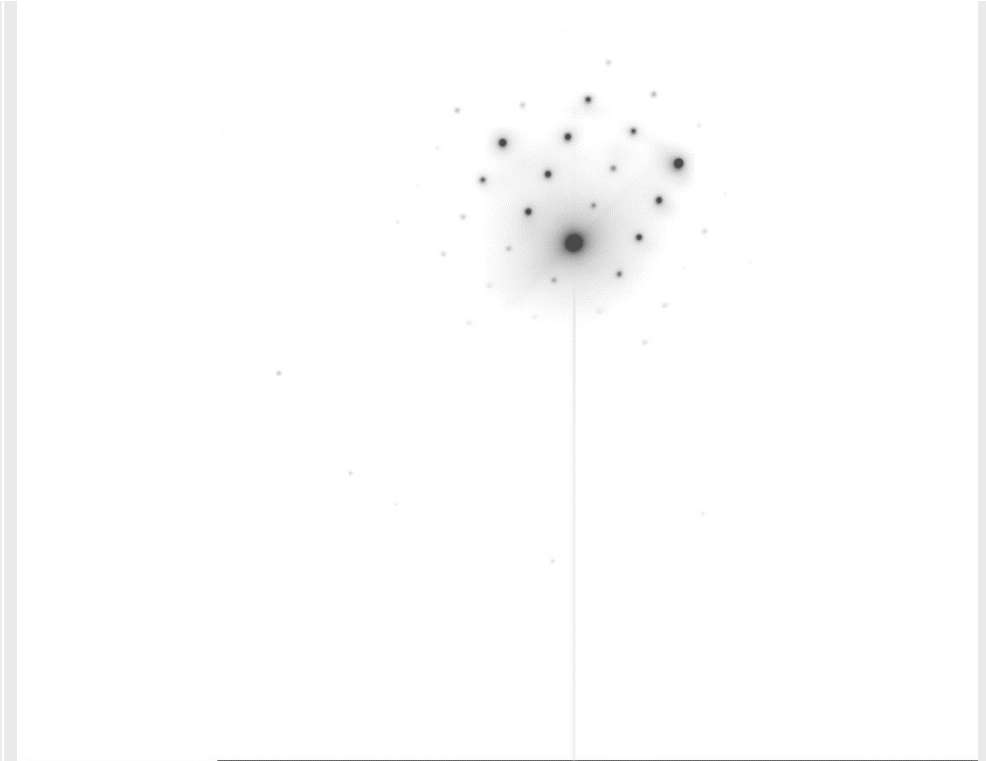
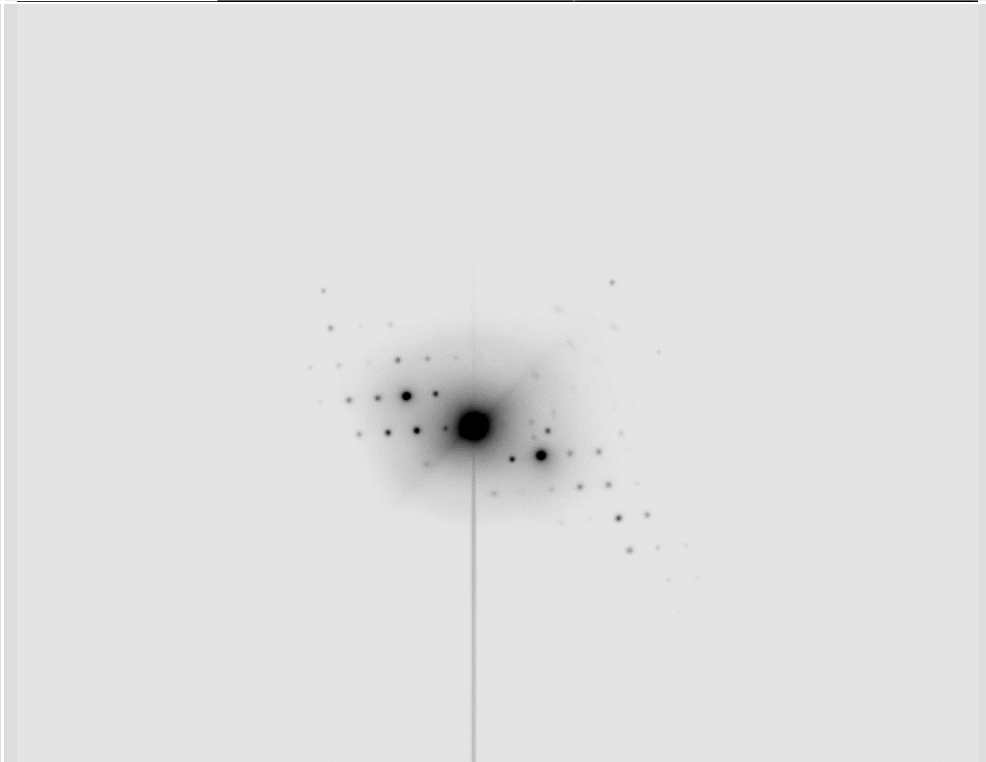
Field / Fiber	Image
LLH901997-14 Sample 3 Hi Mag 3 / 1	

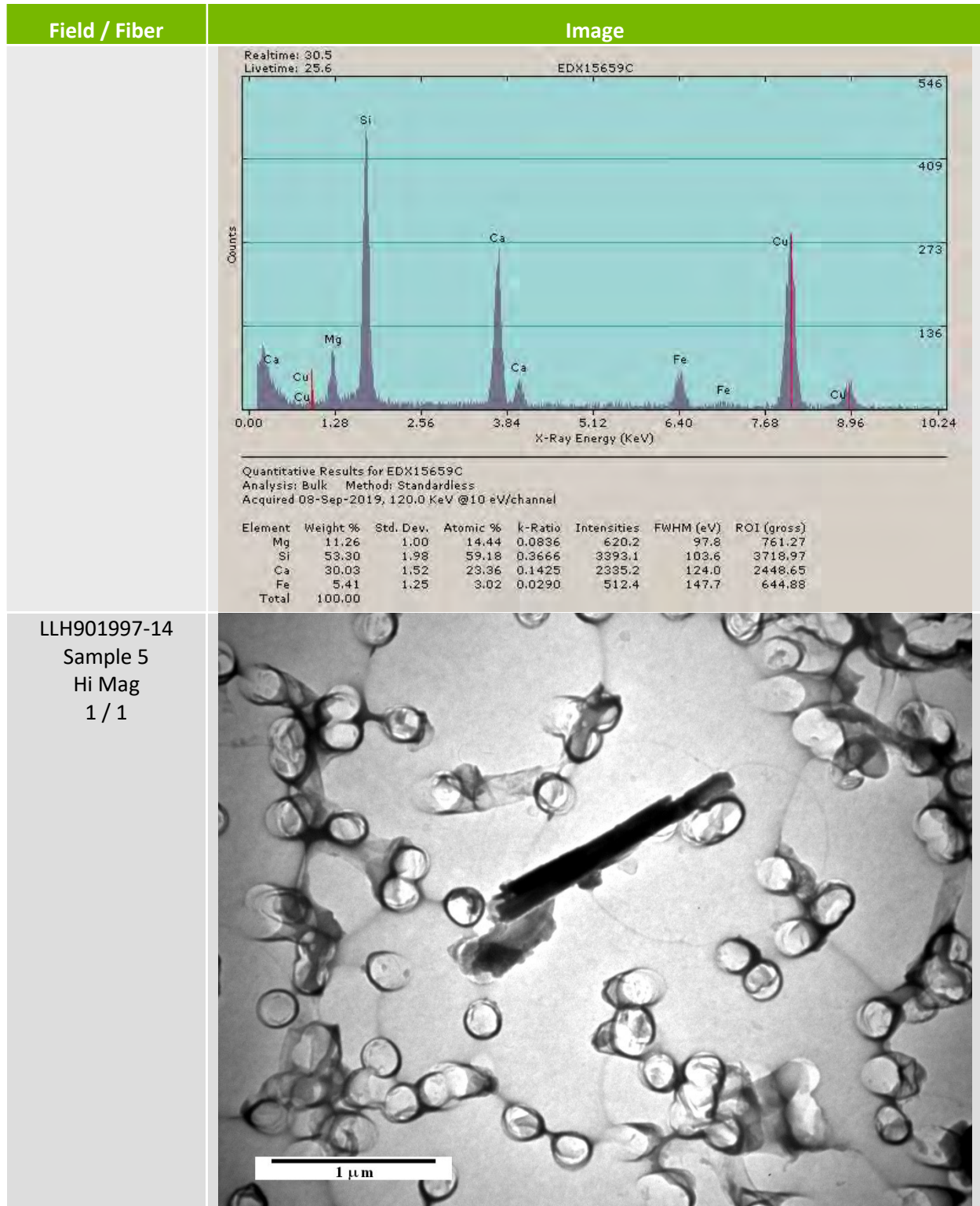


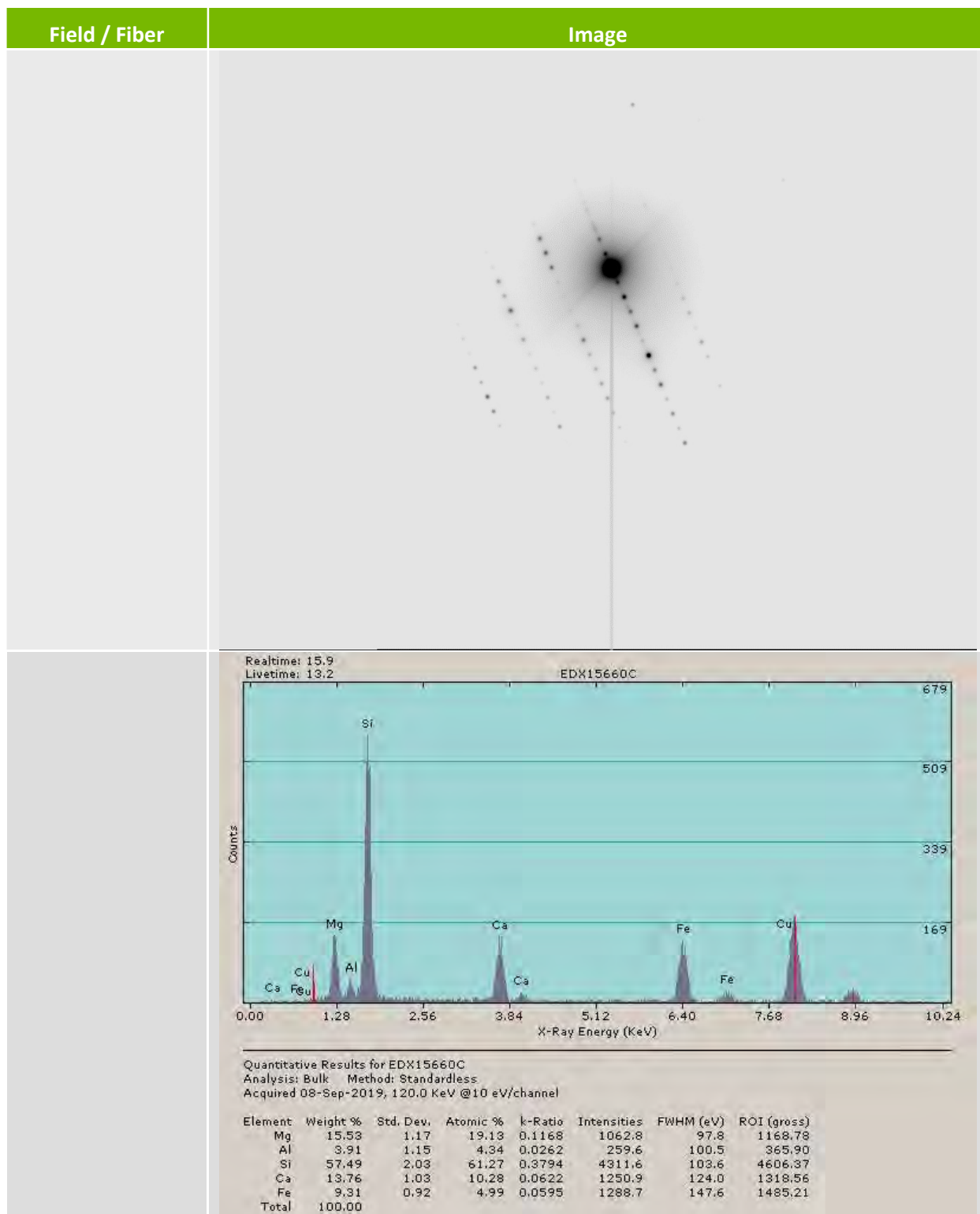
Field / Fiber	Image
5 / 1	 A grayscale micrograph showing a long, thin, cylindrical fiber oriented diagonally across the center. The fiber has a textured surface and is surrounded by numerous small, circular, ring-like structures. A white scale bar in the bottom-left corner of the image is labeled "1 μm".
	 A grayscale diffraction pattern showing a central dark spot with a series of smaller, faint spots arranged in a vertical line extending downwards from the center. The spots are more prominent on the left side of the vertical line.

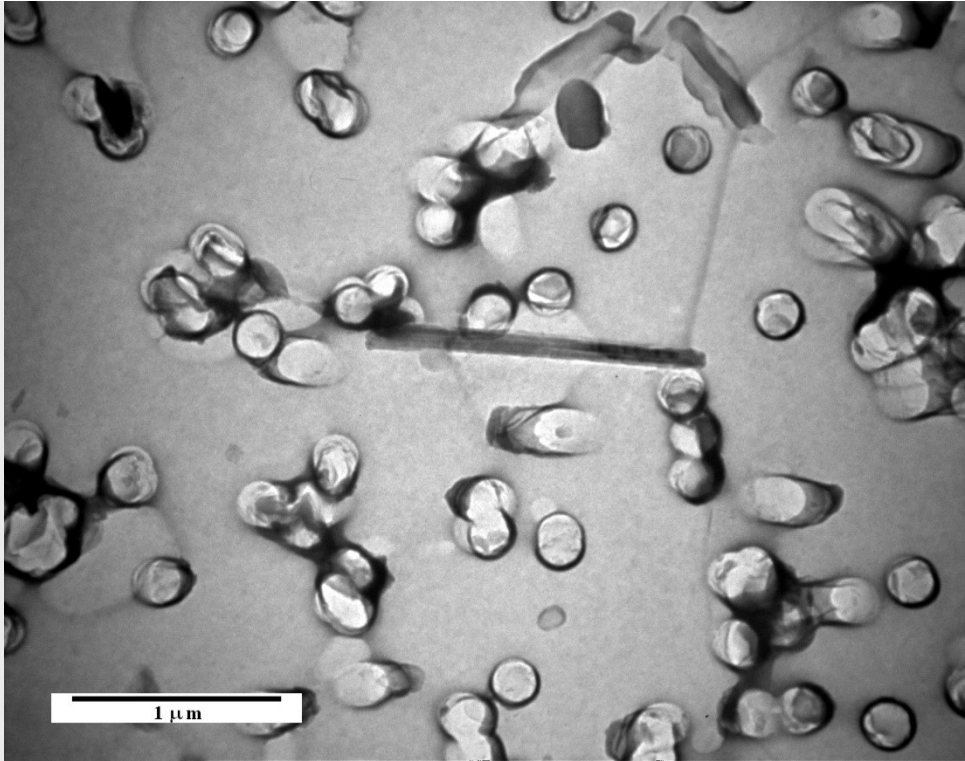
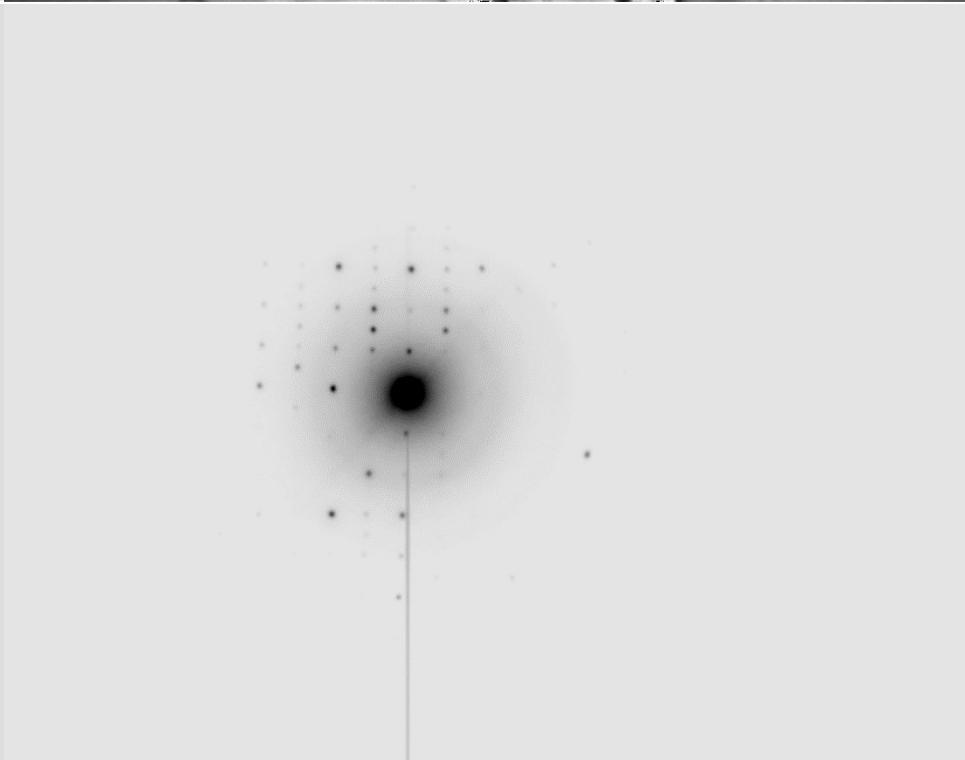




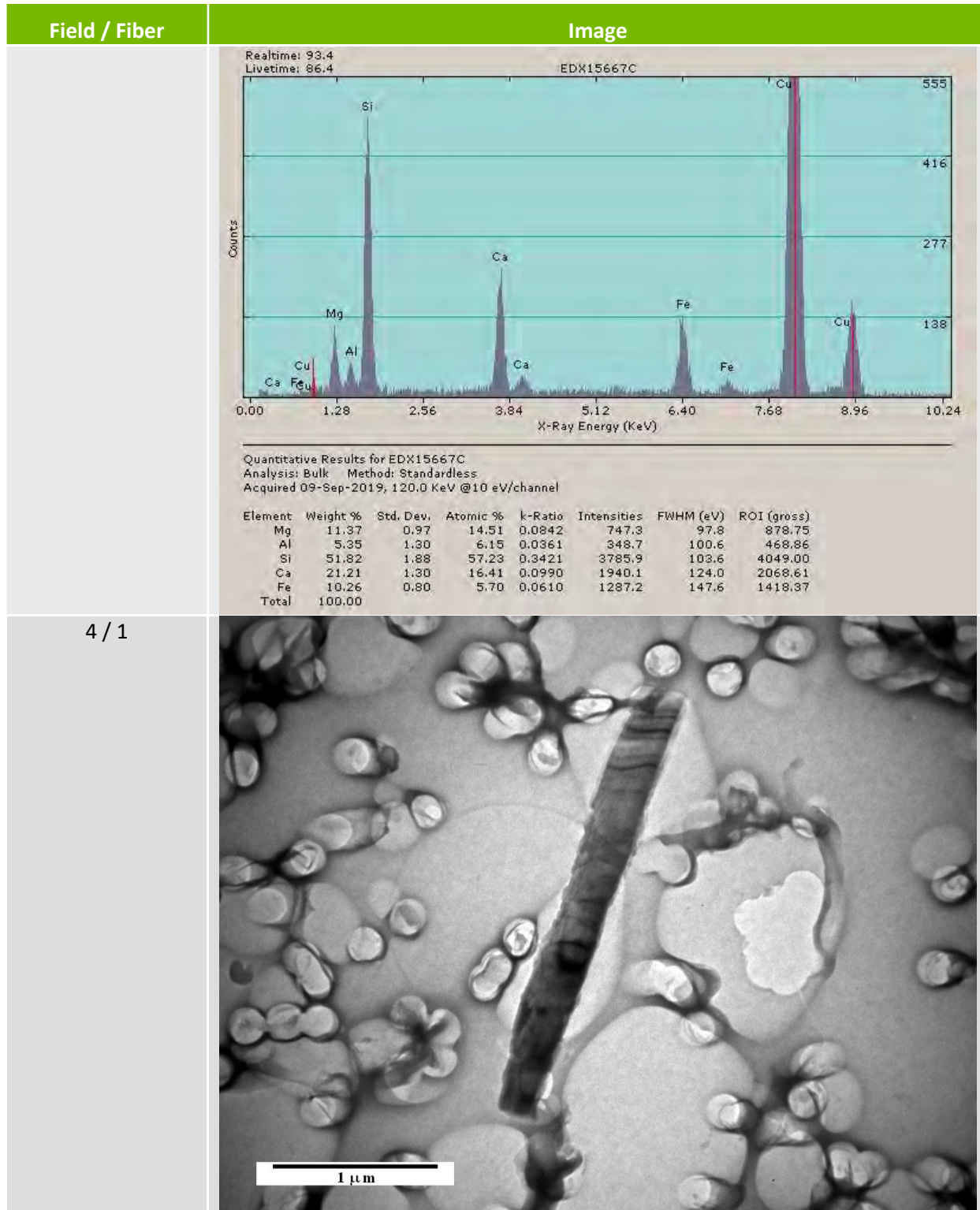
Field / Fiber	Image
	
	

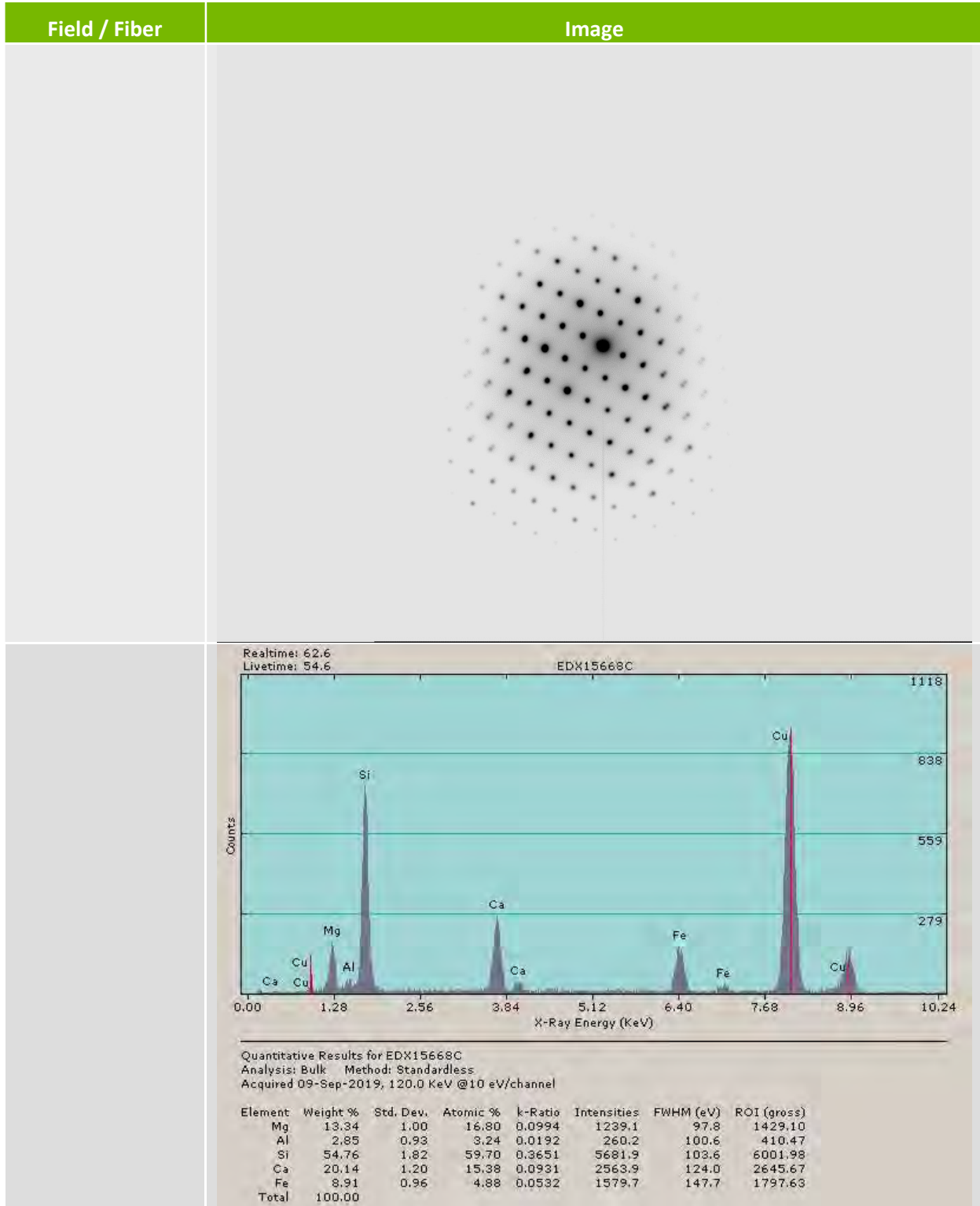


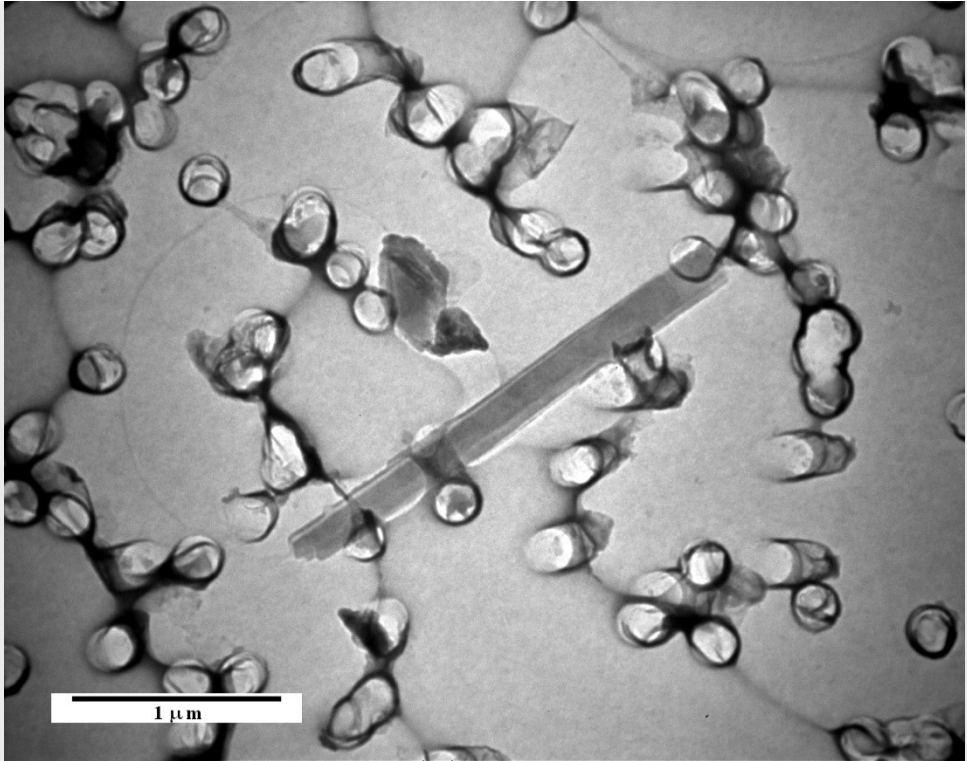
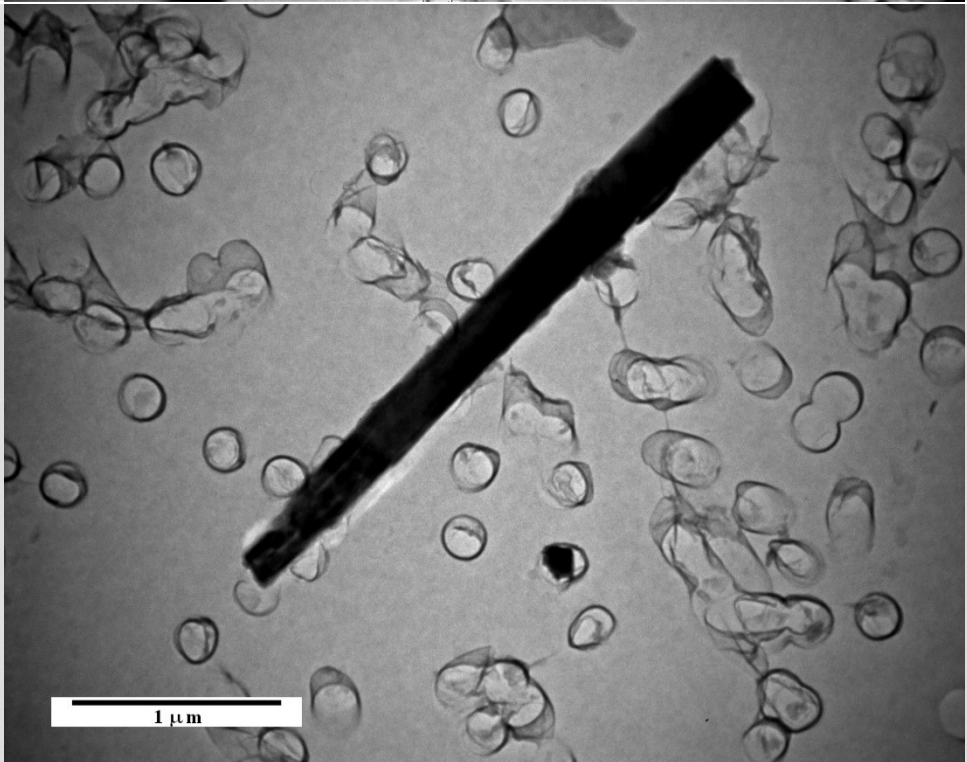


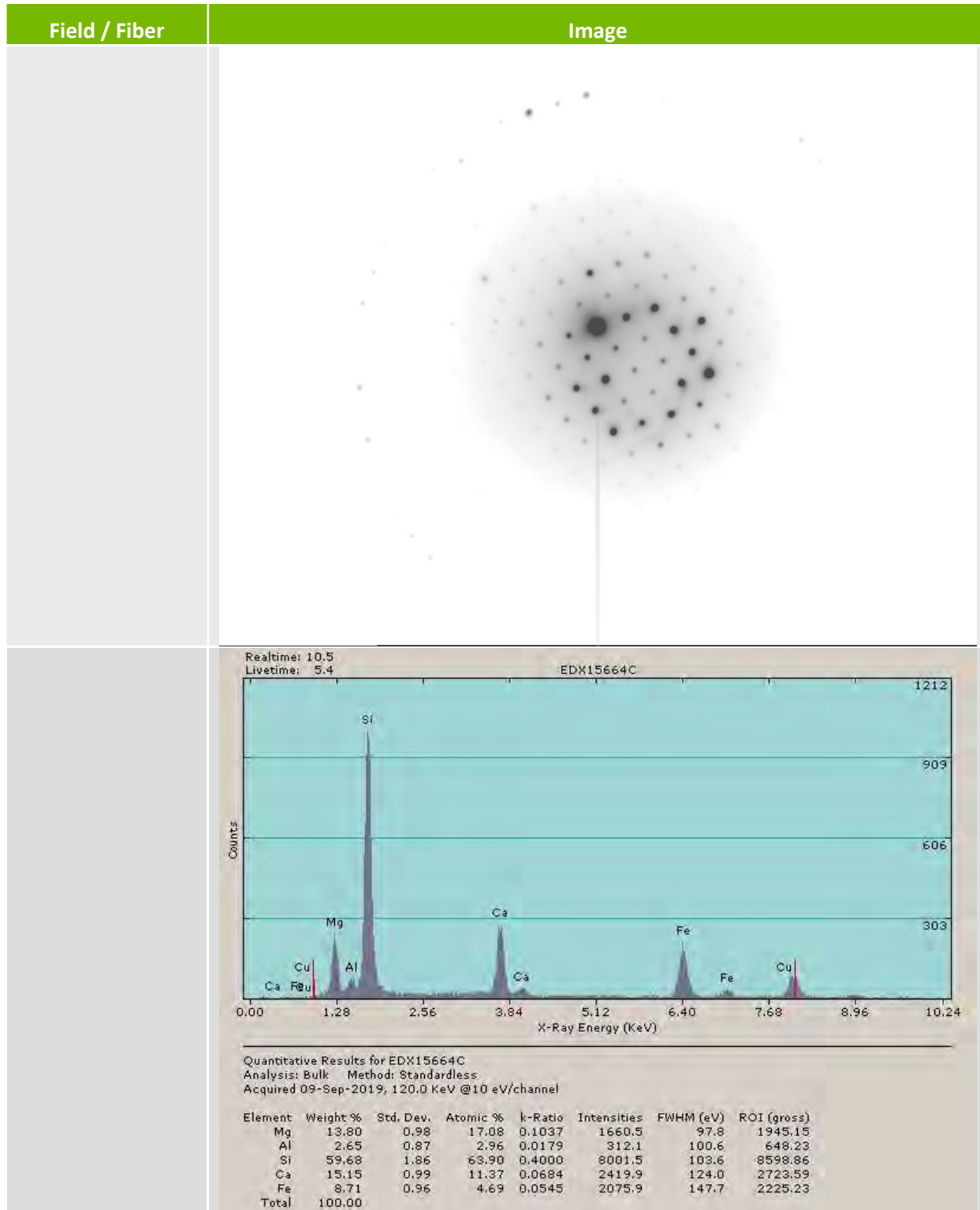
Field / Fiber	Image
3 / 1	 A grayscale micrograph showing a cross-section of a fiber. The central core is a dark, roughly circular region. The surrounding cladding is lighter and contains numerous small, dark, circular inclusions or defects. A scale bar in the bottom left corner indicates 1 μm.
	 A grayscale image showing the Fourier transform of the fiber cross-section. It features a central dark spot surrounded by a diffuse halo, with several discrete diffraction spots arranged in a pattern around the center.



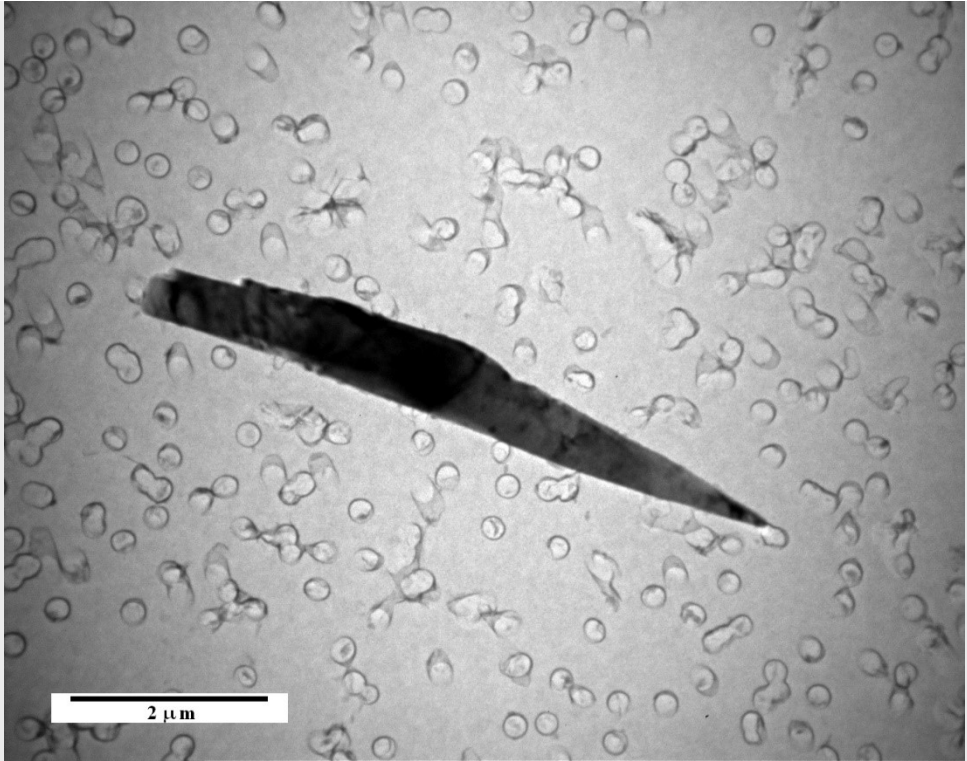
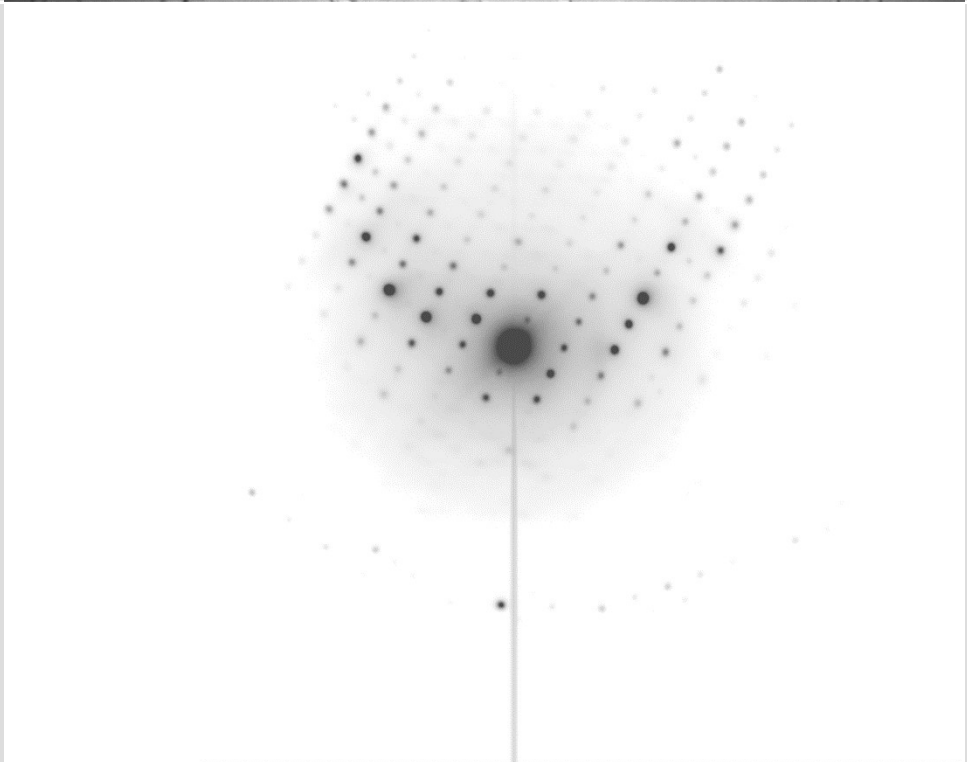


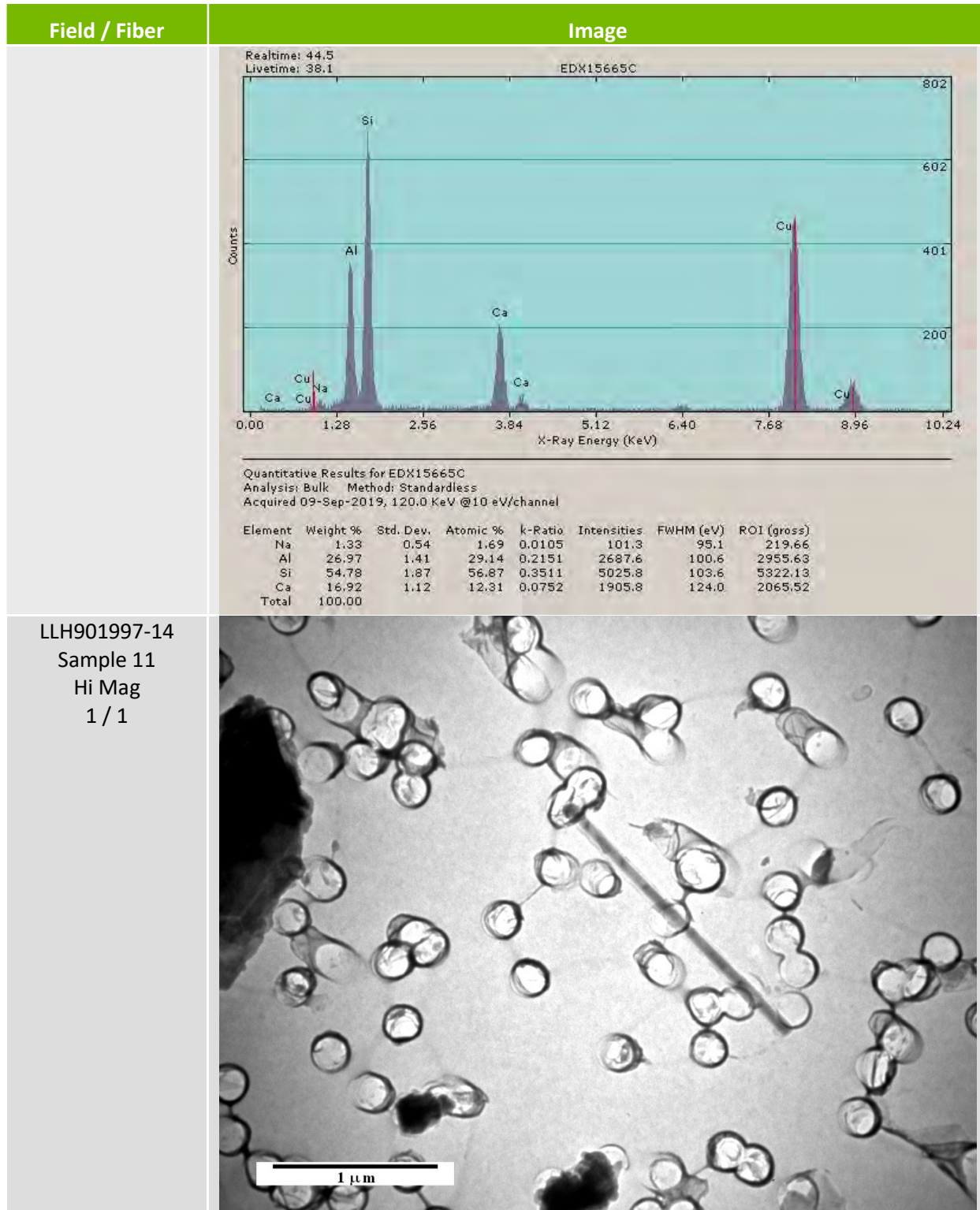


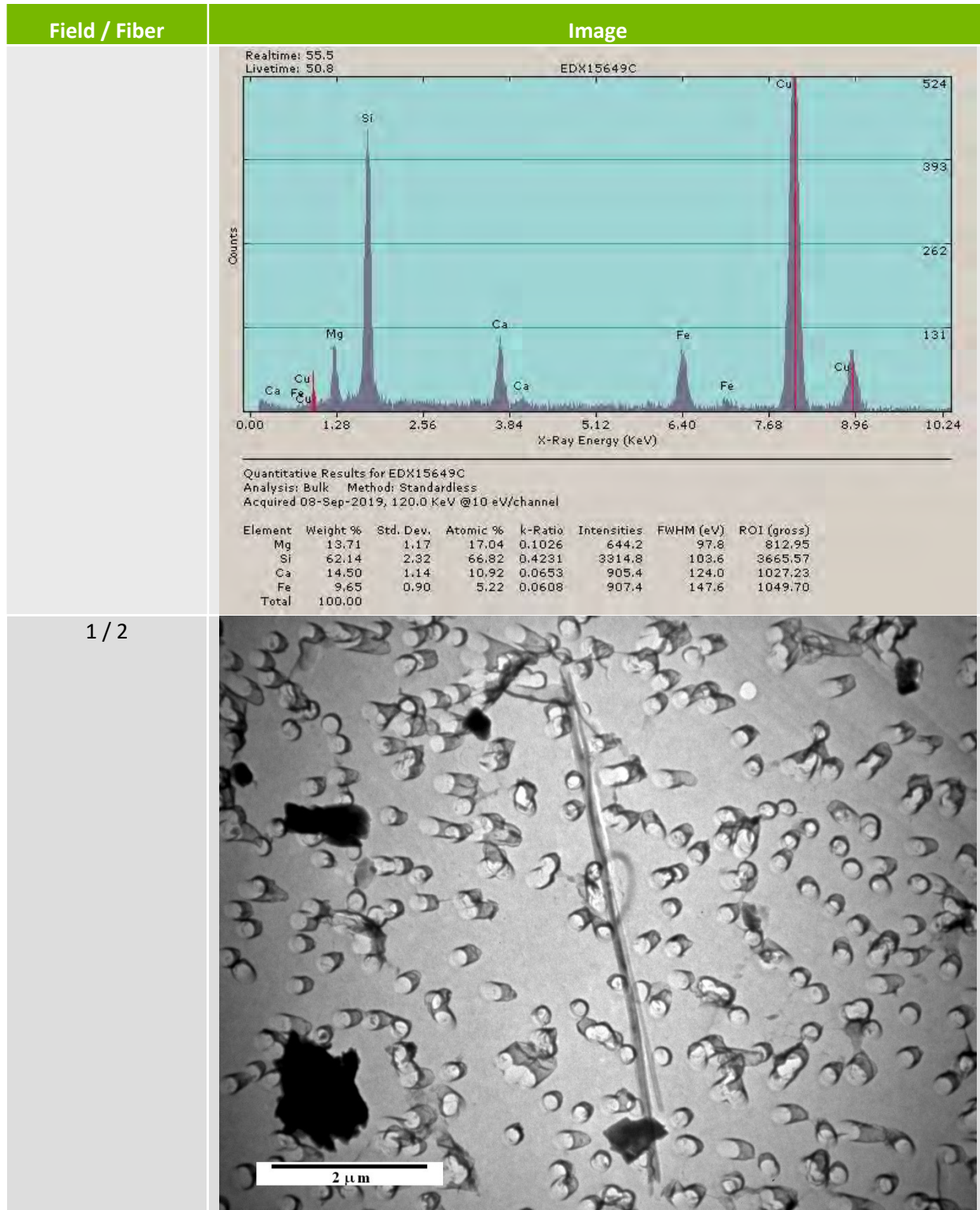
Field / Fiber	Image
4 / 2	 A transmission electron micrograph showing a fiber structure. The fiber is a thin, dark, elongated structure with a slightly irregular surface, oriented diagonally from the upper left to the lower right. It is surrounded by numerous small, circular, electron-transparent particles, some of which appear to be attached to the fiber. A white scale bar at the bottom left of the image is labeled "1 μm".
LLH901997-14 Sample 8 Hi Mag 6 / 1	 A transmission electron micrograph showing a fiber structure. The fiber is a thick, dark, elongated structure with a smooth surface, oriented diagonally from the upper left to the lower right. It is surrounded by numerous small, circular, electron-transparent particles, some of which appear to be attached to the fiber. A white scale bar at the bottom left of the image is labeled "1 μm".



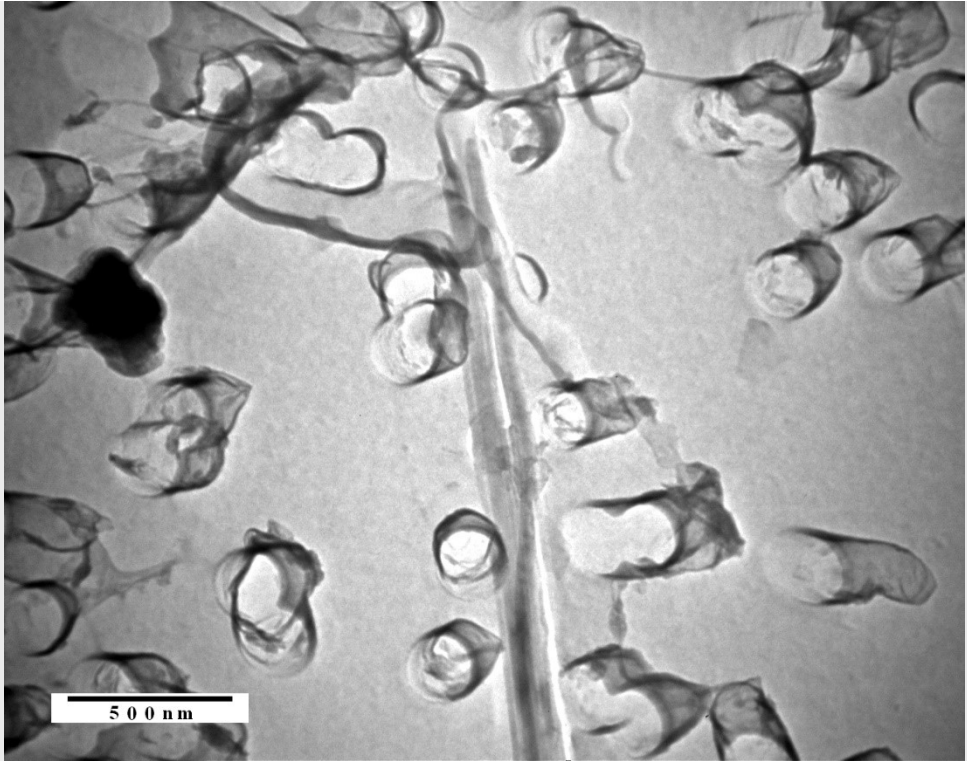
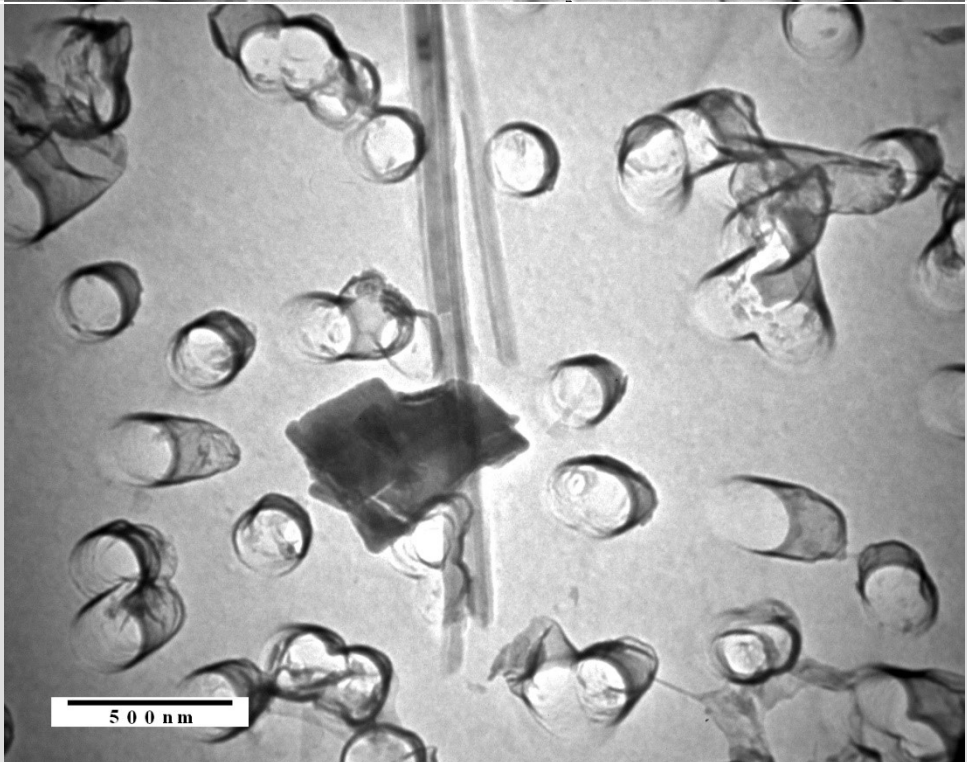


Field / Fiber	Image
8 / 1	 A grayscale micrograph showing a dark, elongated fiber structure against a background of numerous small, circular, ring-like structures. A scale bar in the bottom left corner indicates a length of 2 μm.
	 A grayscale diffraction pattern showing a central dark spot surrounded by a series of smaller, discrete spots arranged in a roughly circular pattern, indicating a periodic structure.

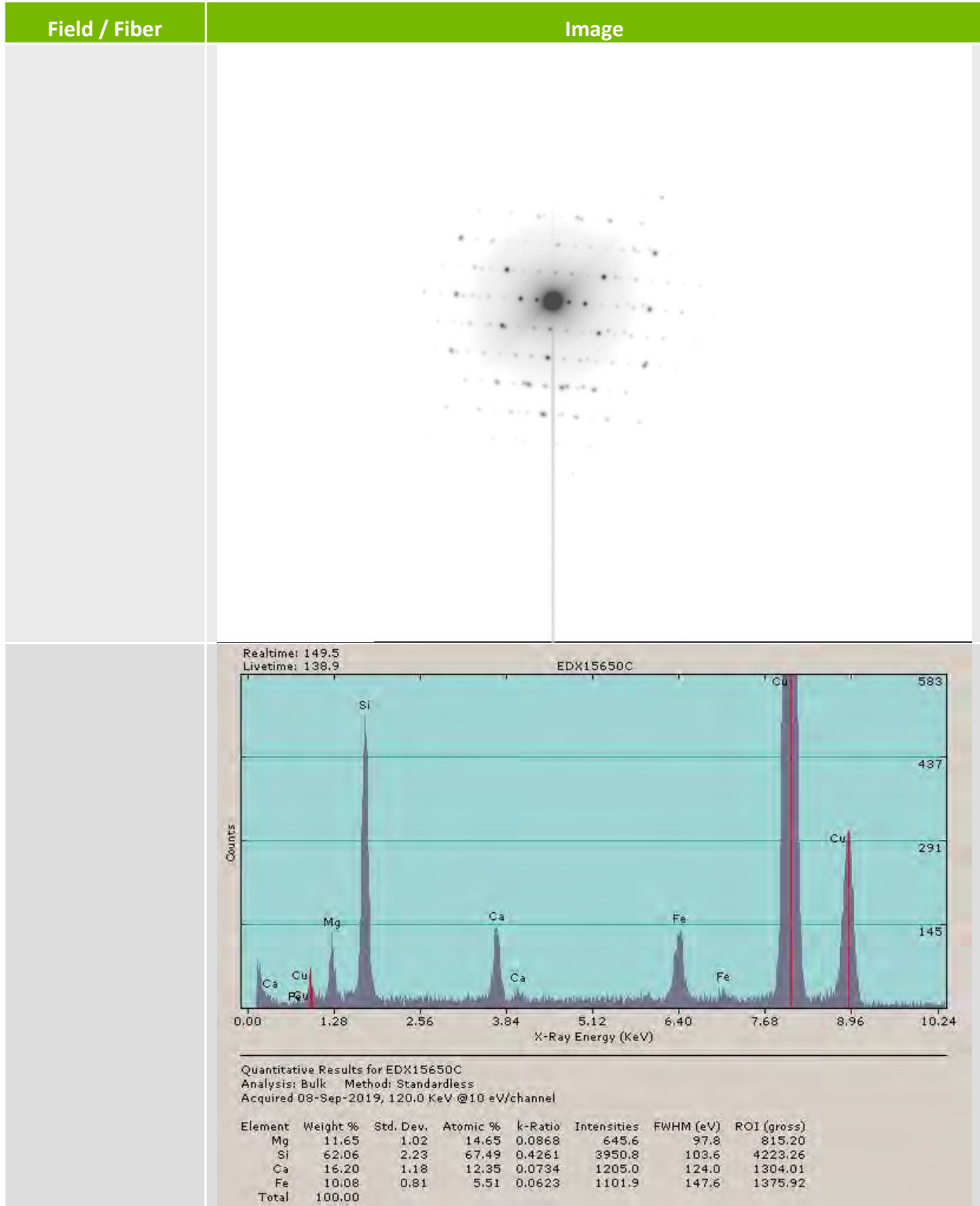


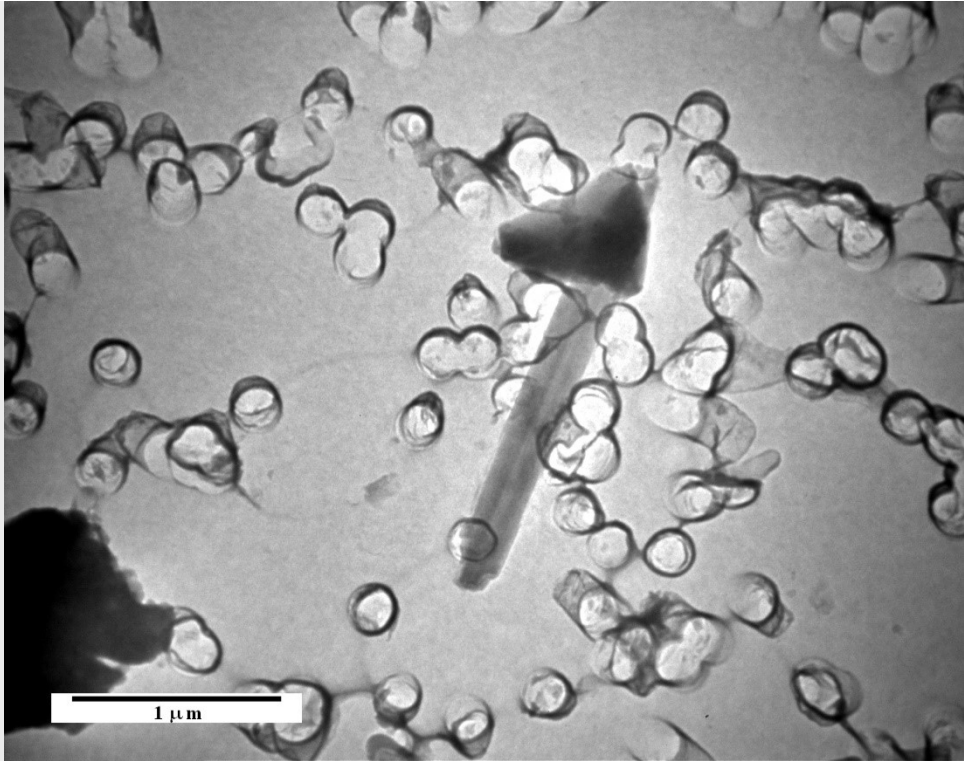
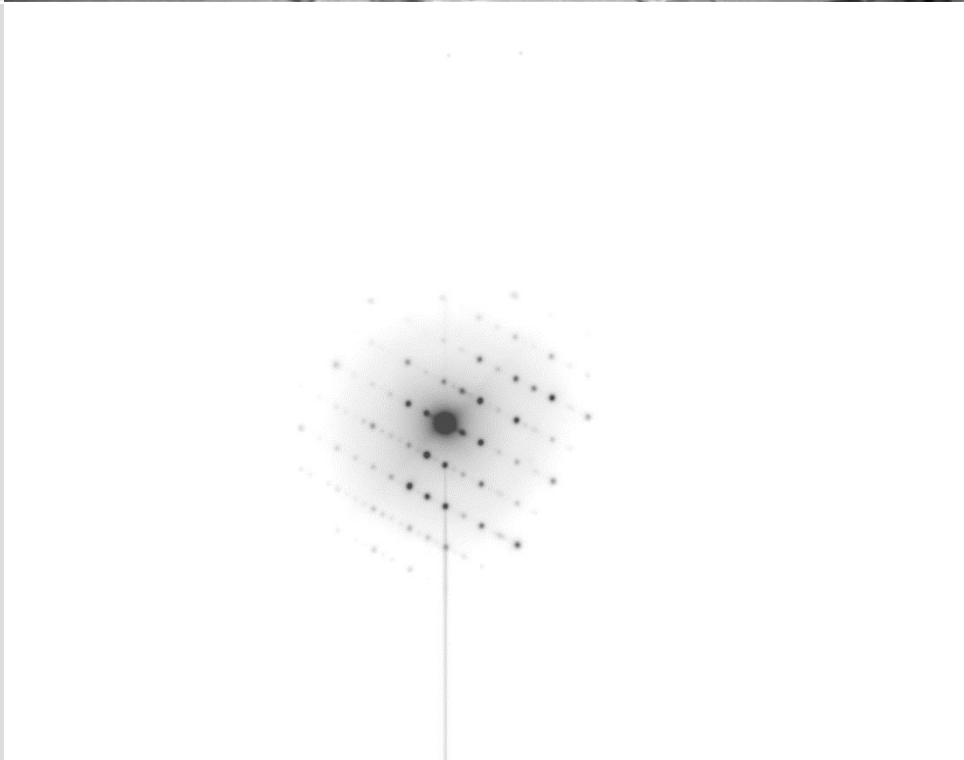


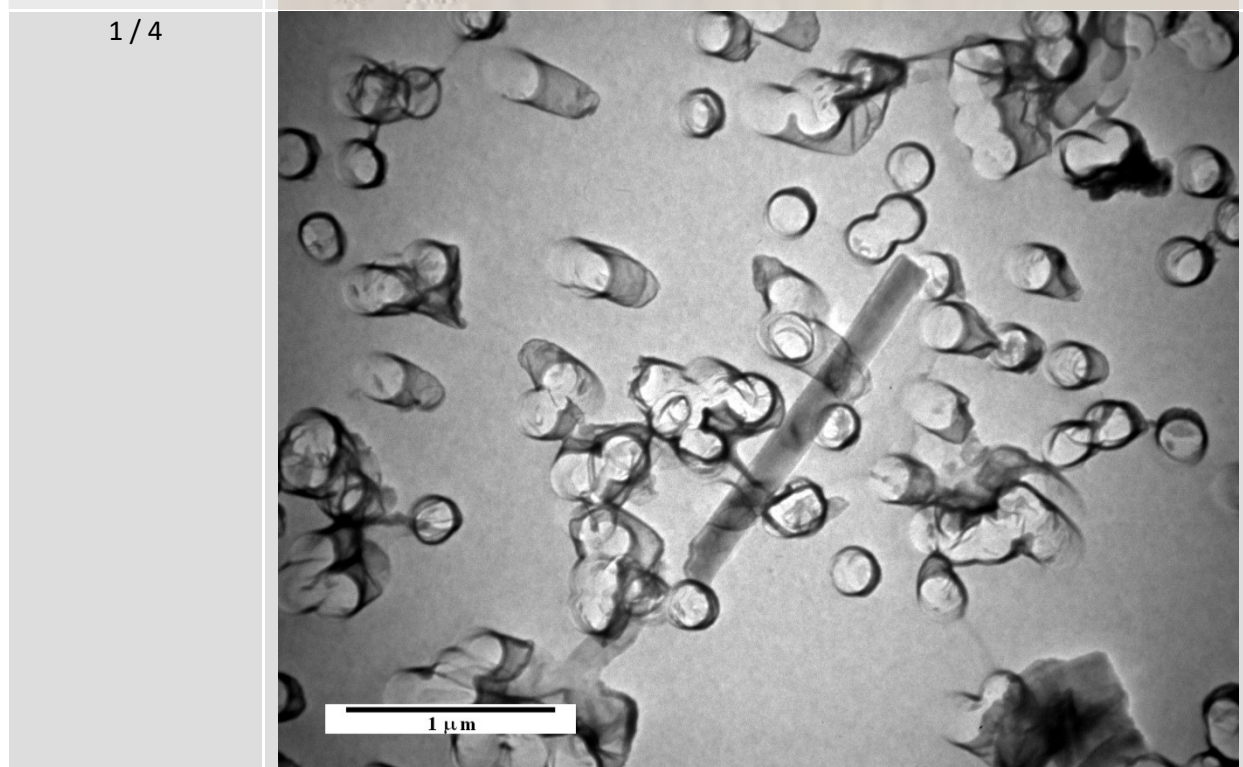
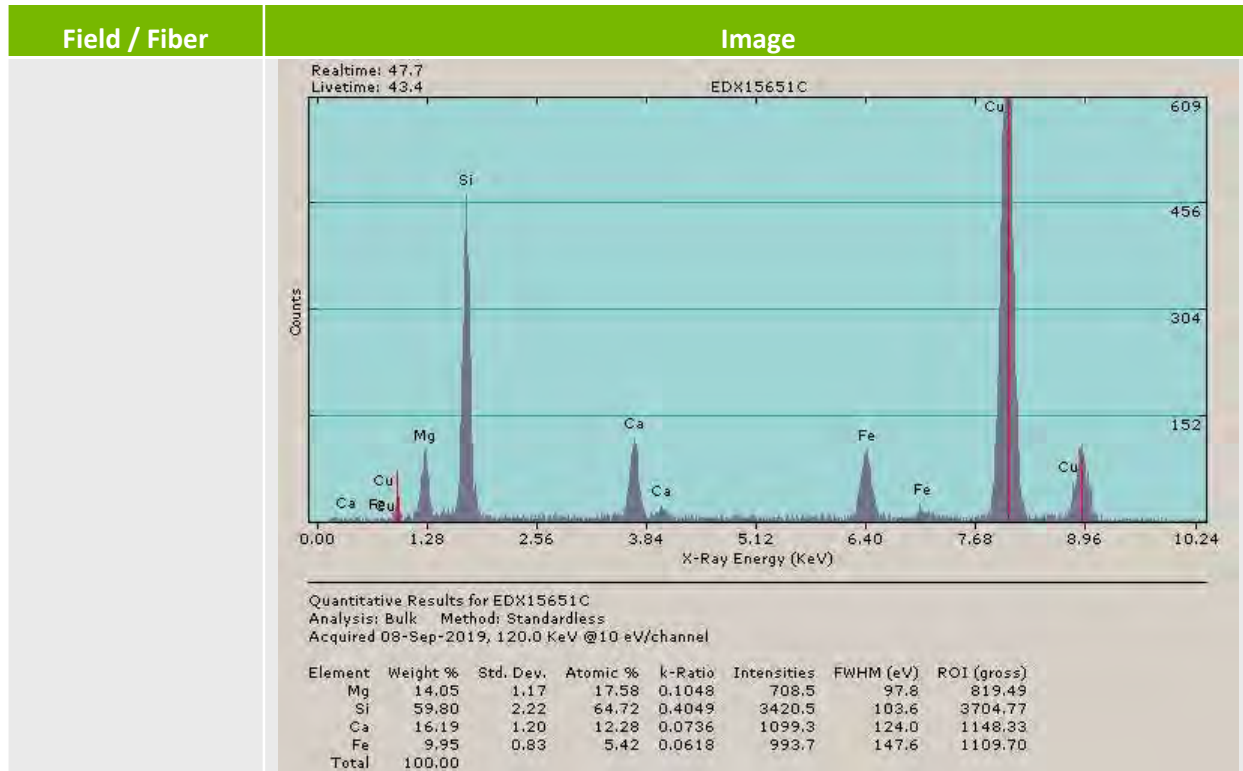


Field / Fiber	Image
	 <p>This micrograph displays a complex network of fibers and circular structures. A prominent, thick, vertical fiber runs through the center. The circular structures are distributed throughout the field, some appearing as thin, translucent rings and others as more solid, dark spots. A scale bar in the bottom left corner indicates 500 nm.</p>
	 <p>This micrograph shows a similar network of fibers and circular structures. A thick, vertical fiber is visible, and a dark, irregularly shaped object is present in the lower central region. The circular structures are scattered across the field. A scale bar in the bottom left corner indicates 500 nm.</p>

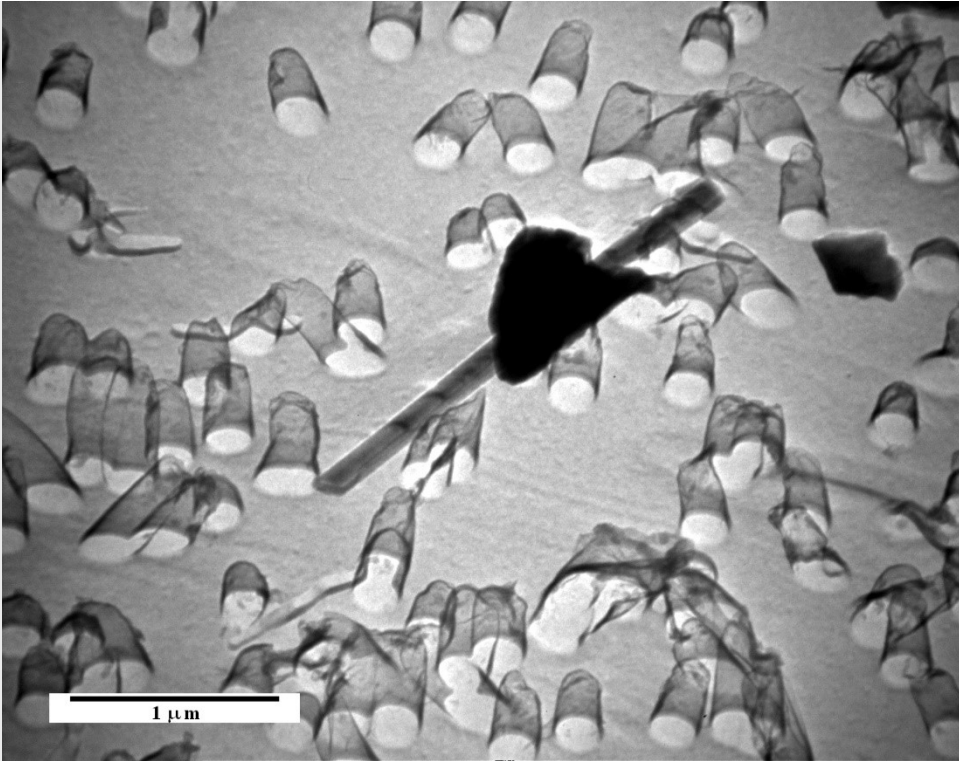
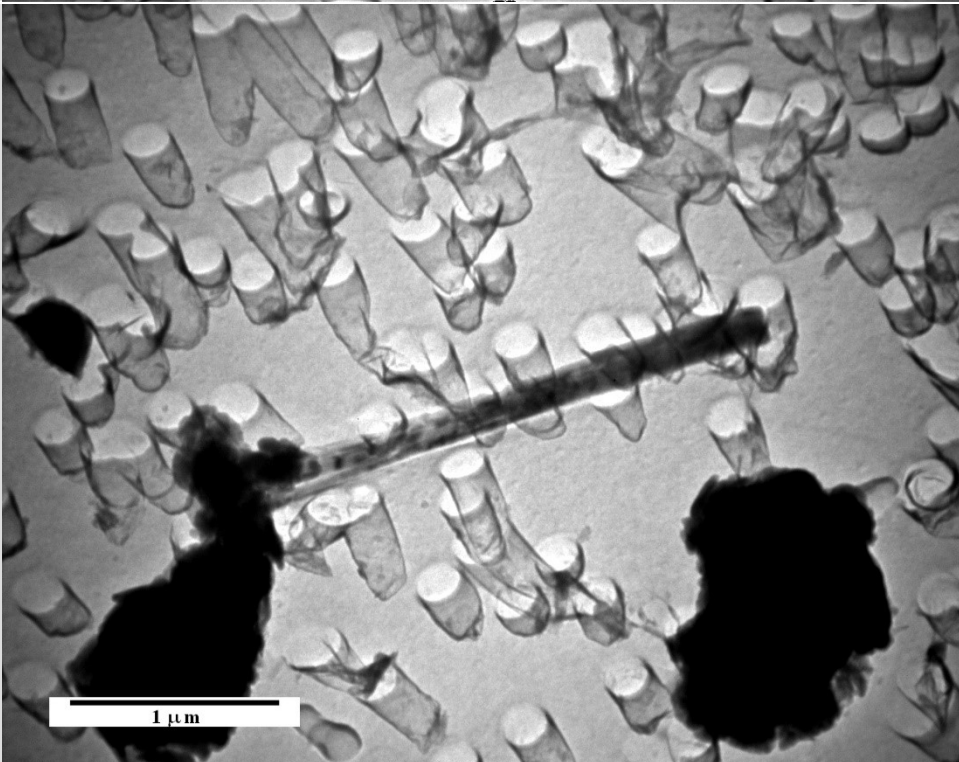




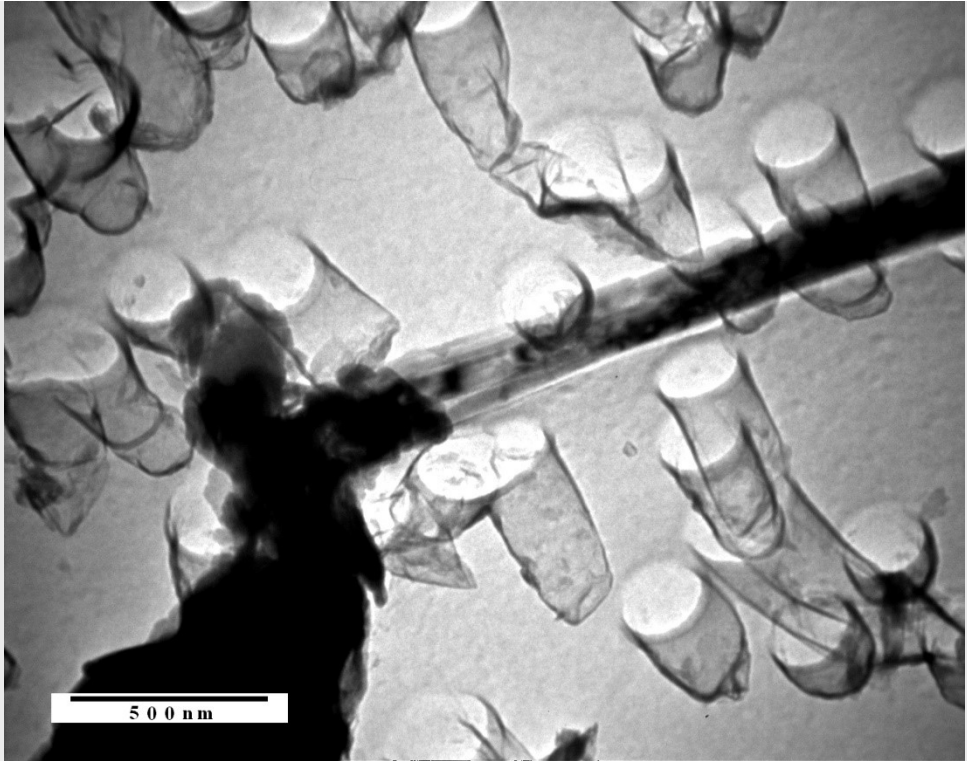
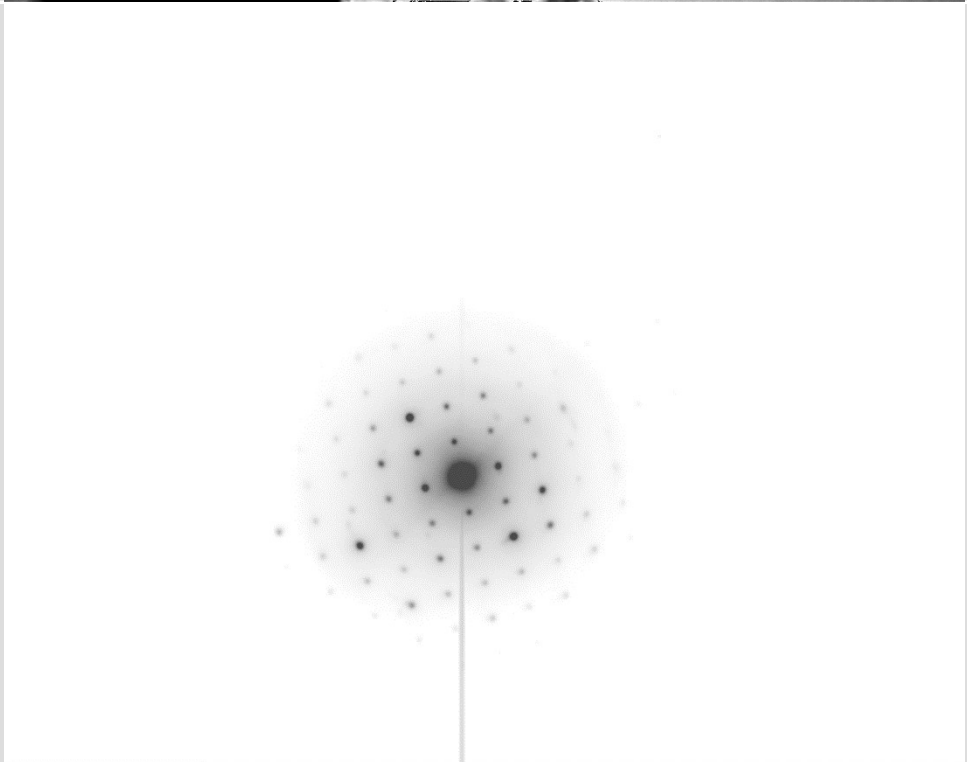
Field / Fiber	Image
1 / 3	 A grayscale micrograph showing a cross-section of a fiber. The fiber is a dark, elongated, roughly triangular shape in the center. It is surrounded by a dense field of smaller, circular or oval structures, likely representing the internal structure of the fiber or surrounding material. A white scale bar in the bottom left corner is labeled "1 μm".
	 A grayscale diffraction pattern corresponding to the micrograph above. It shows a central dark spot surrounded by a series of concentric, faint rings of dots, indicating a periodic or crystalline structure. A vertical line extends downwards from the center of the pattern.

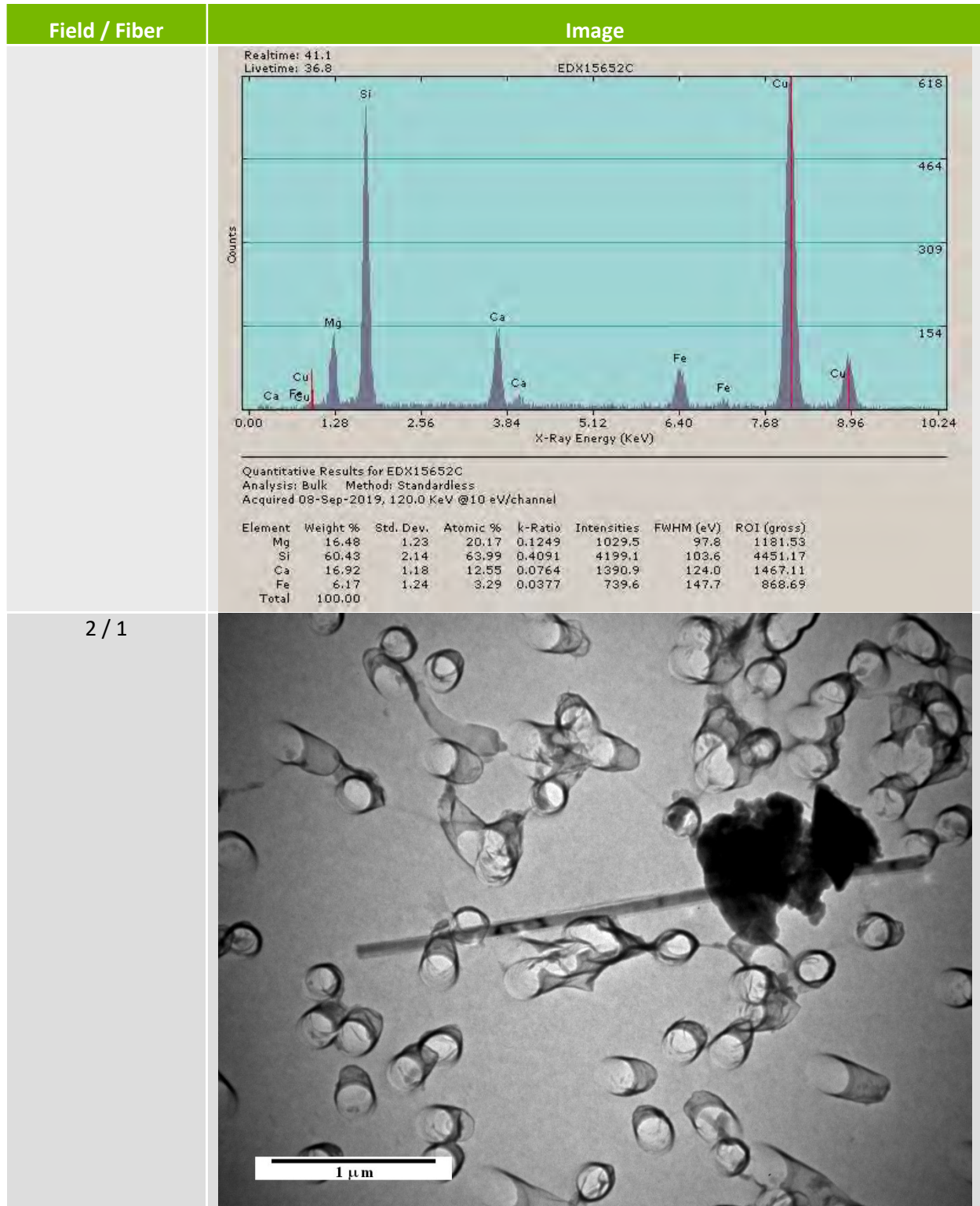


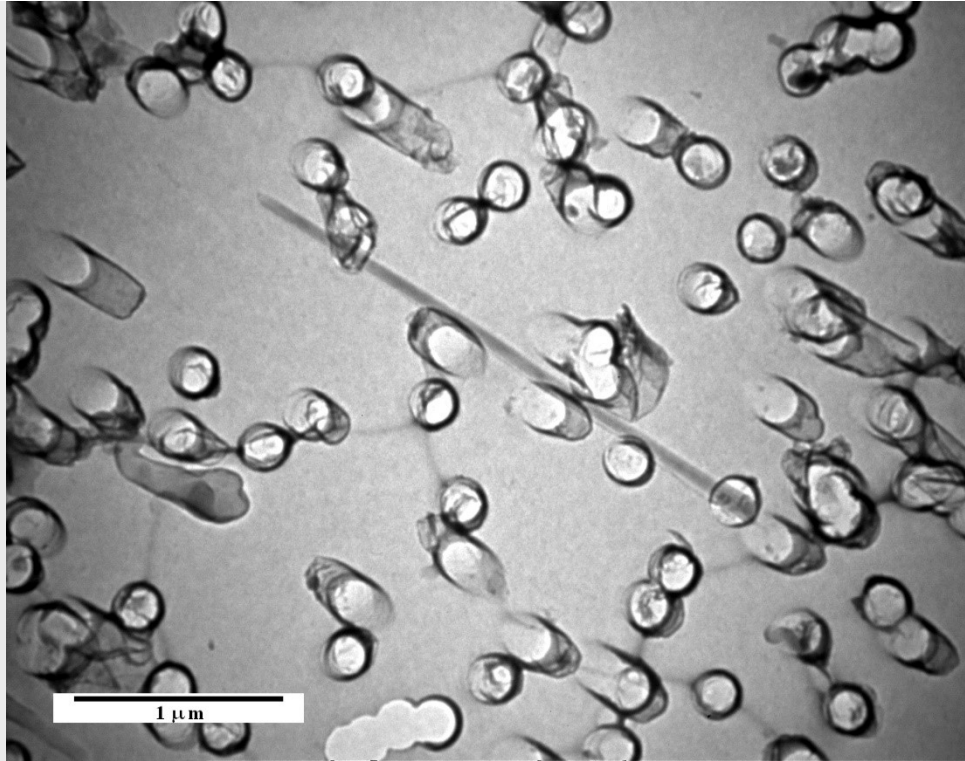
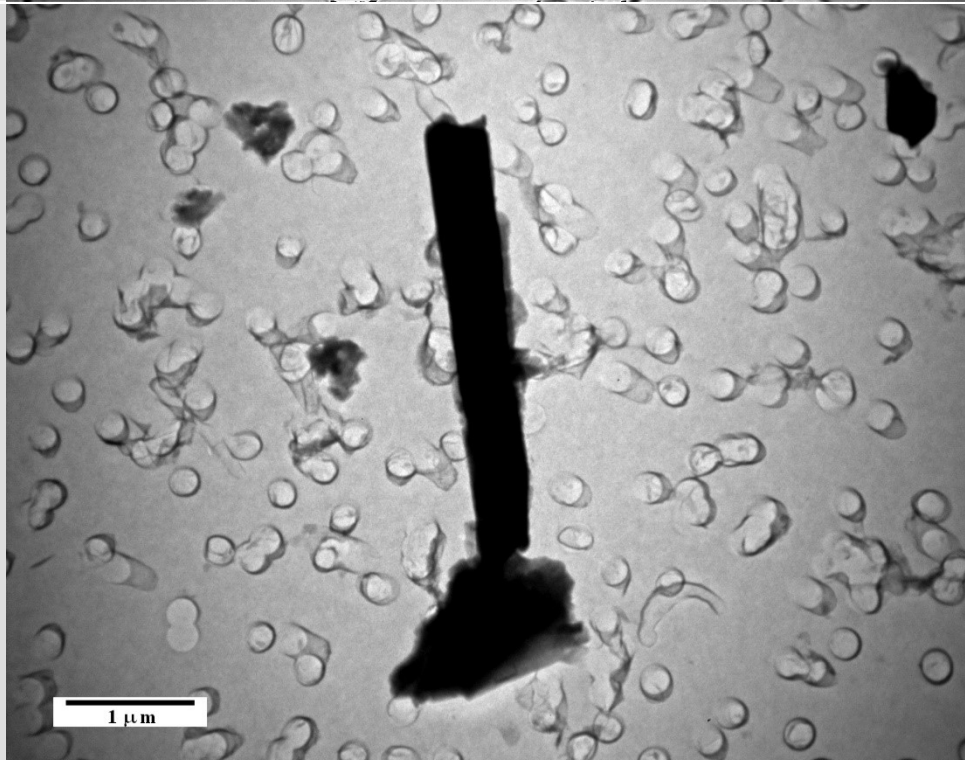


Field / Fiber	Image
1 / 5	 <p>A grayscale micrograph showing a dense field of cylindrical fibers. A single fiber is highlighted with a dark, irregular spot on its surface. A scale bar at the bottom left indicates 1 μm.</p>
1 / 6	 <p>A grayscale micrograph showing a dense field of cylindrical fibers. A single fiber is highlighted with two dark, irregular spots on its surface. A scale bar at the bottom left indicates 1 μm.</p>

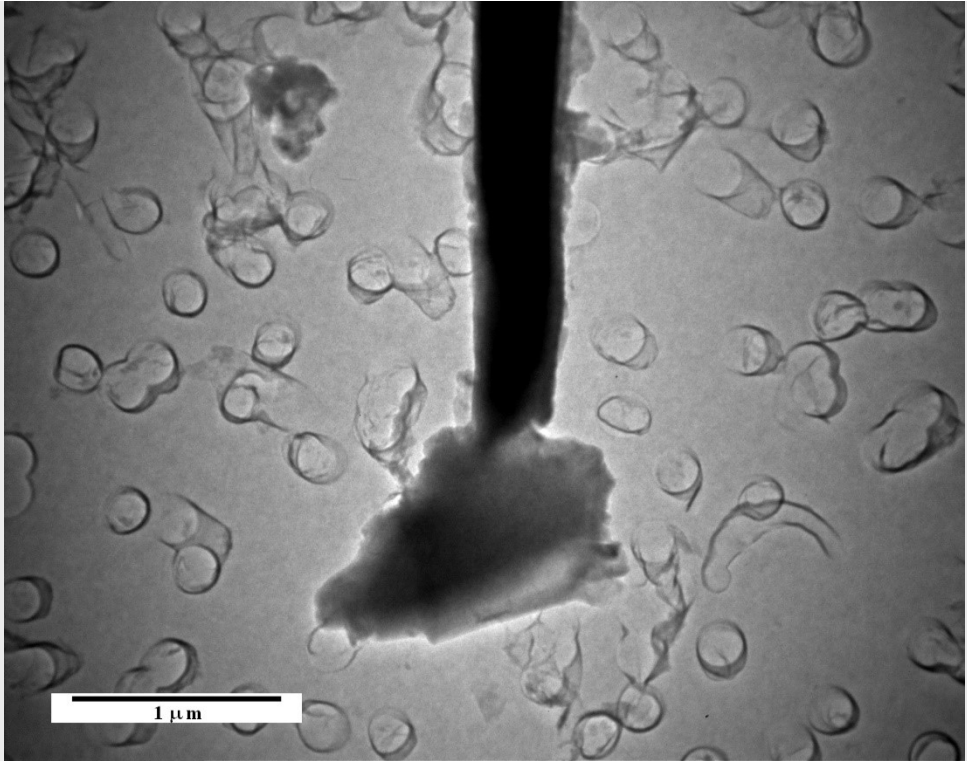
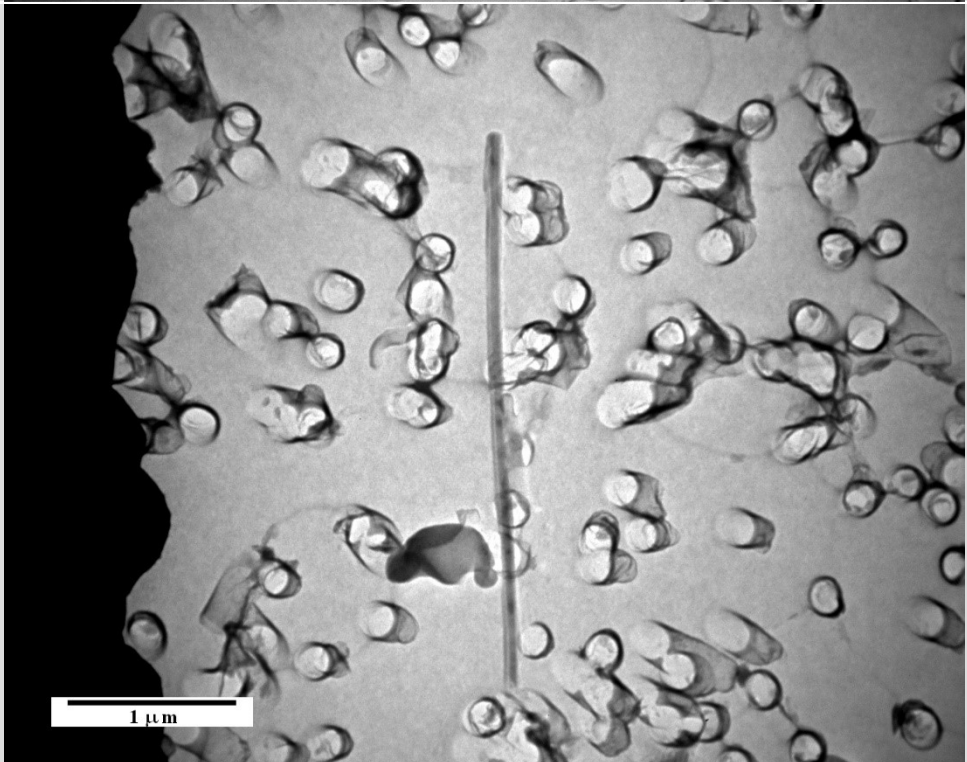


Field / Fiber	Image
	 A transmission electron micrograph (TEM) showing a dark, cylindrical fiber structure. The fiber is surrounded by numerous small, circular, electron-dense particles. A scale bar in the bottom left corner indicates a length of 500 nm.
	 A selected area electron diffraction (SAED) pattern showing a central spot and a regular array of surrounding spots, indicating a crystalline structure. The spots are arranged in a grid-like pattern, characteristic of a periodic lattice.

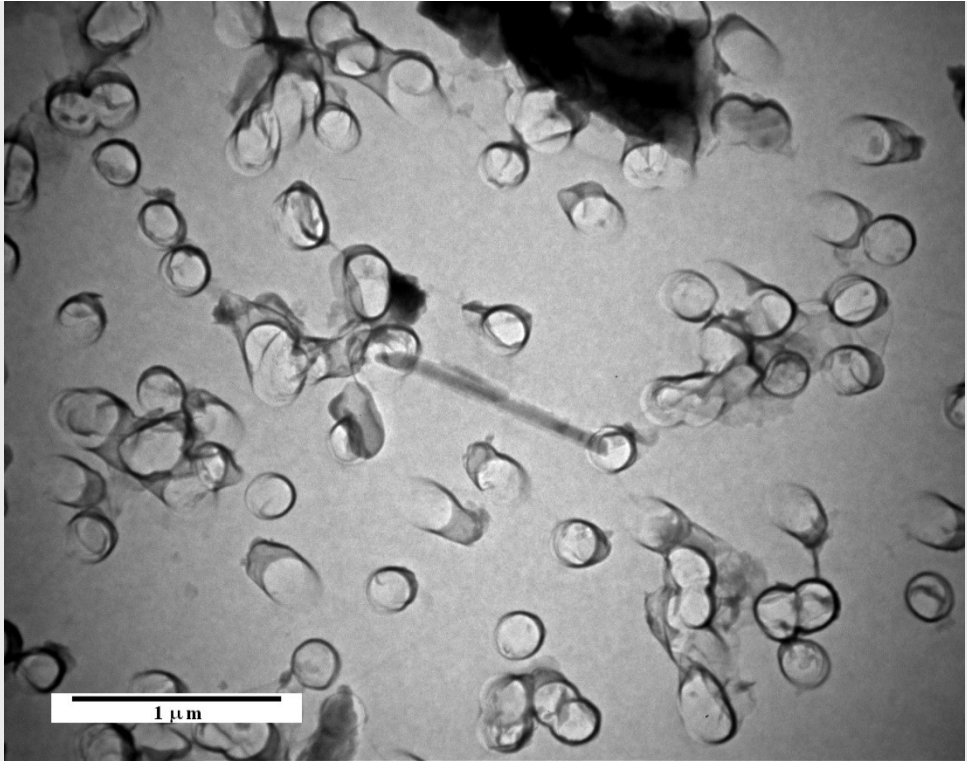
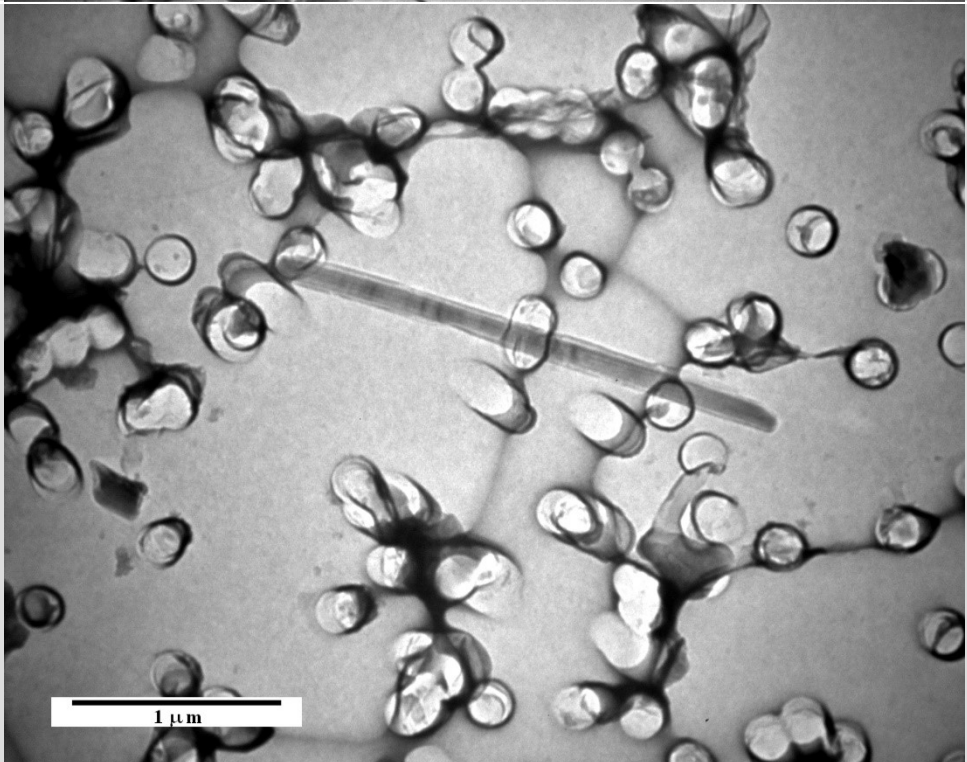


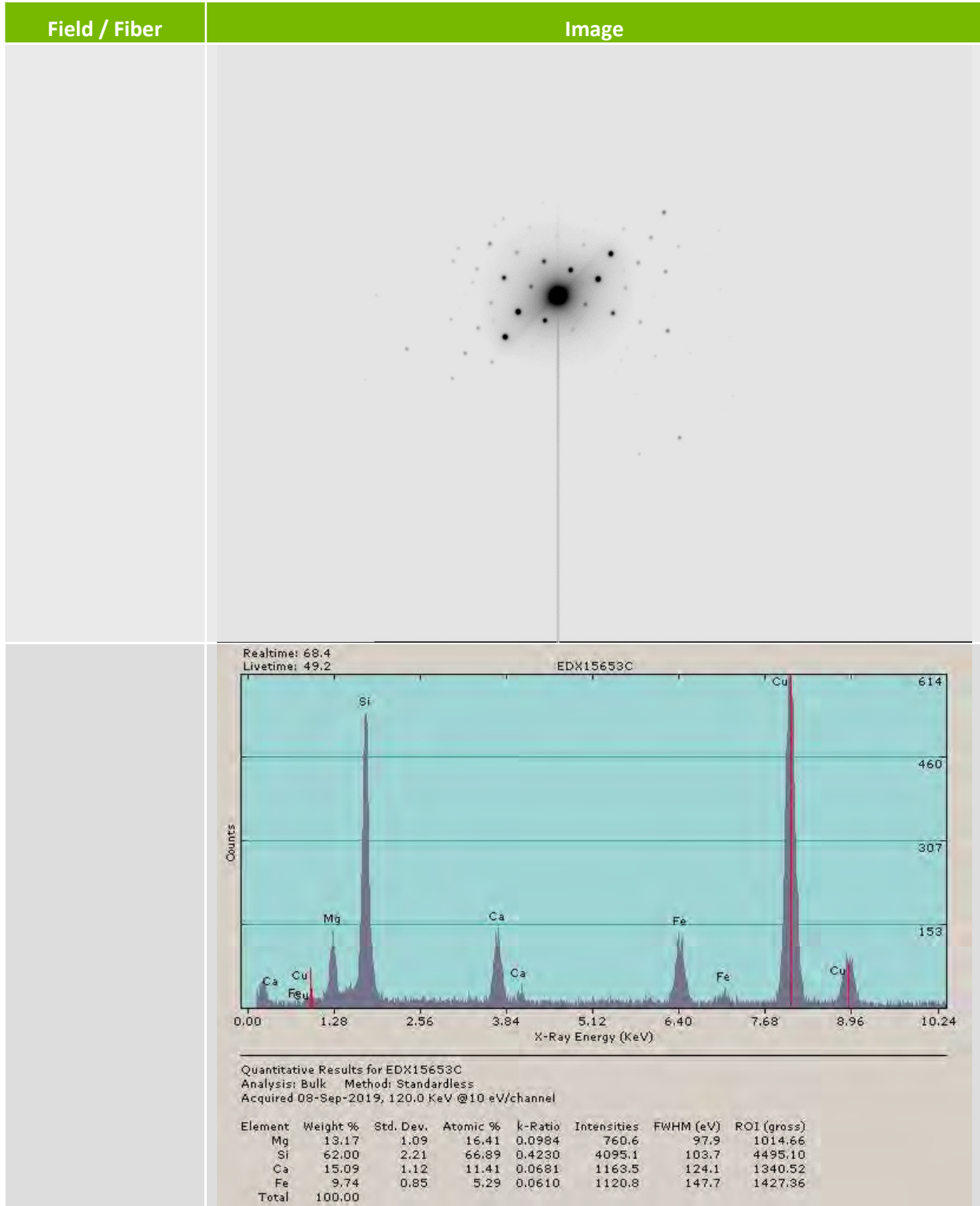
Field / Fiber	Image
3 / 1	 A grayscale micrograph showing a dense field of small, circular, ring-like structures. A thin, dark fiber runs diagonally across the center of the field. A white scale bar with the text "1 μm" is located in the lower-left corner of the image area.
4 / 1	 A grayscale micrograph showing a field of small, circular, ring-like structures. A large, thick, dark fiber is oriented vertically in the center of the field. A white scale bar with the text "1 μm" is located in the lower-left corner of the image area.

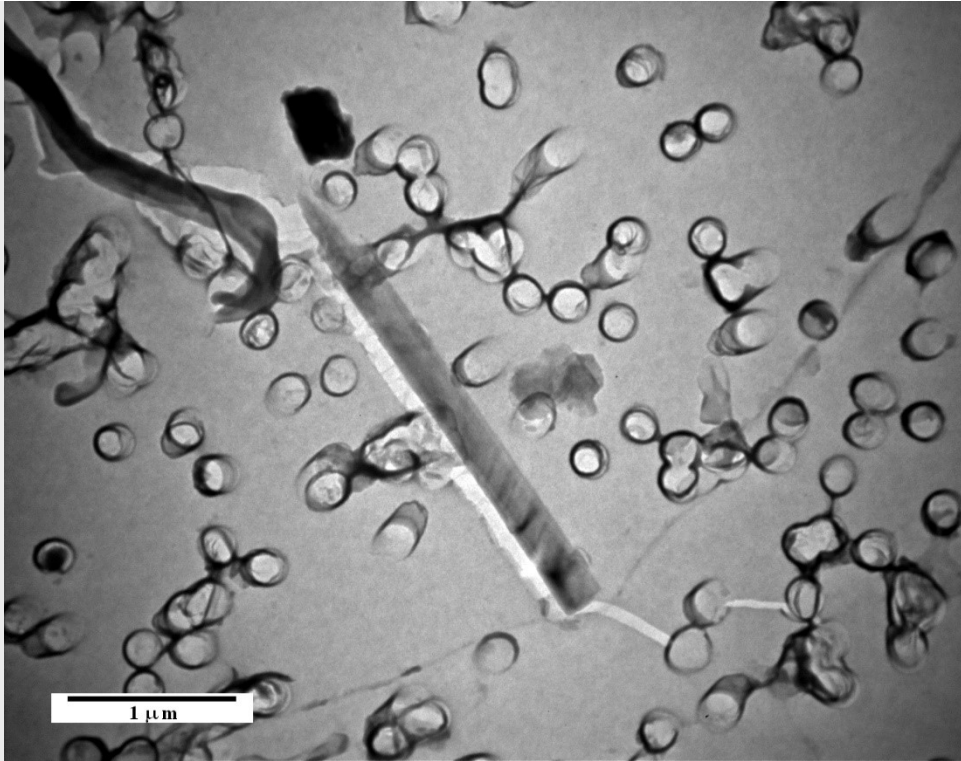
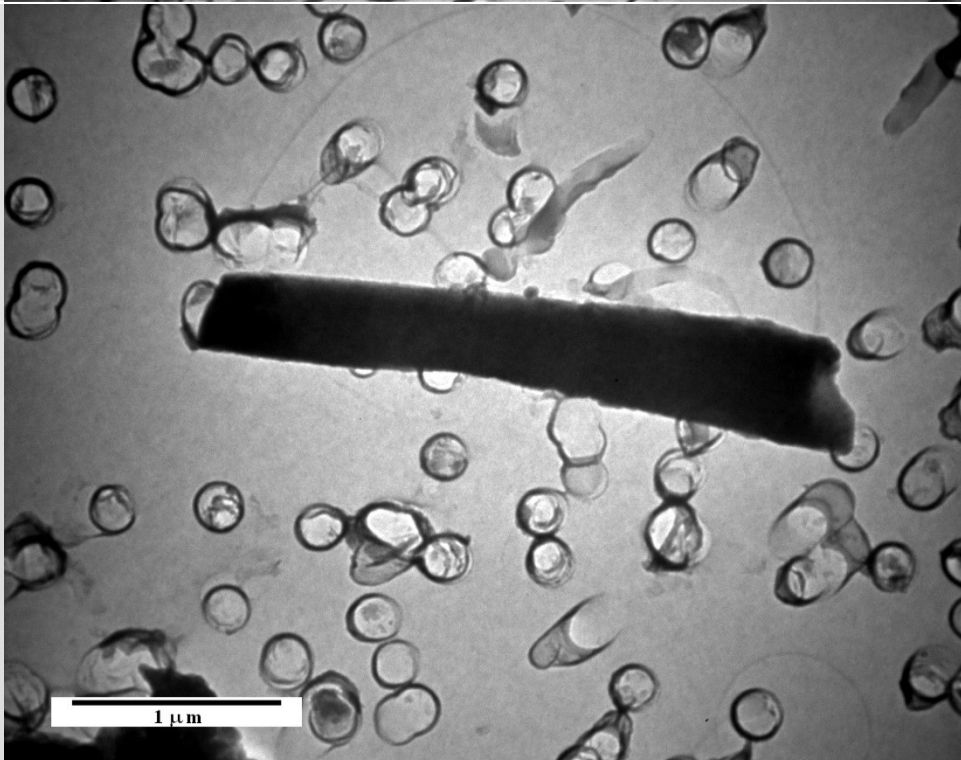


Field / Fiber	Image
	 <p>A grayscale micrograph showing a dense field of small, circular, ring-like structures. A dark, vertical fiber-like structure is positioned in the center, extending from the top edge. A white scale bar at the bottom left indicates 1 μm.</p>
4 / 2	 <p>A grayscale micrograph showing a dense field of small, circular, ring-like structures. A dark, vertical fiber-like structure is positioned in the center, extending from the top edge. A white scale bar at the bottom left indicates 1 μm.</p>

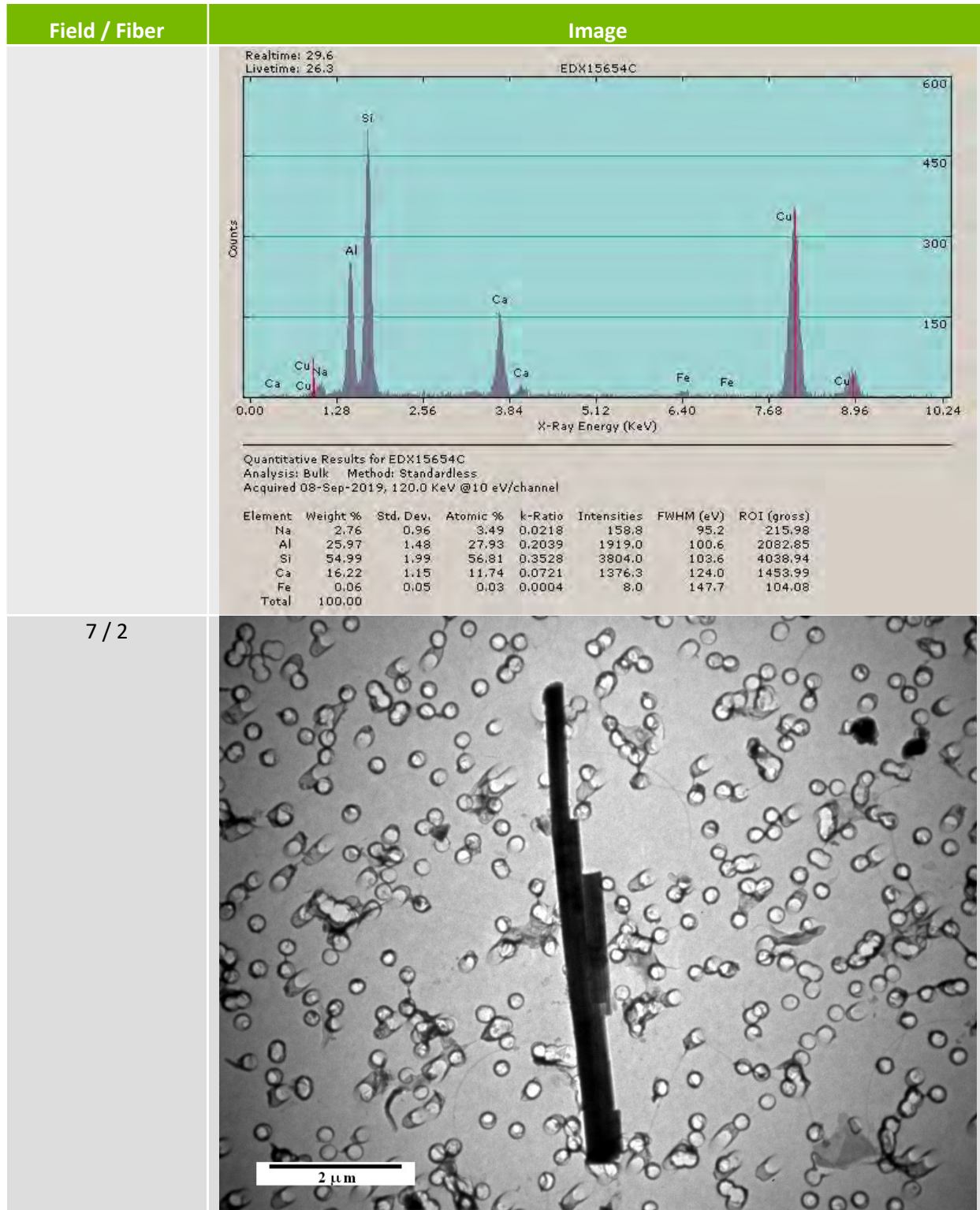


Field / Fiber	Image
5 / 1	
5 / 2	

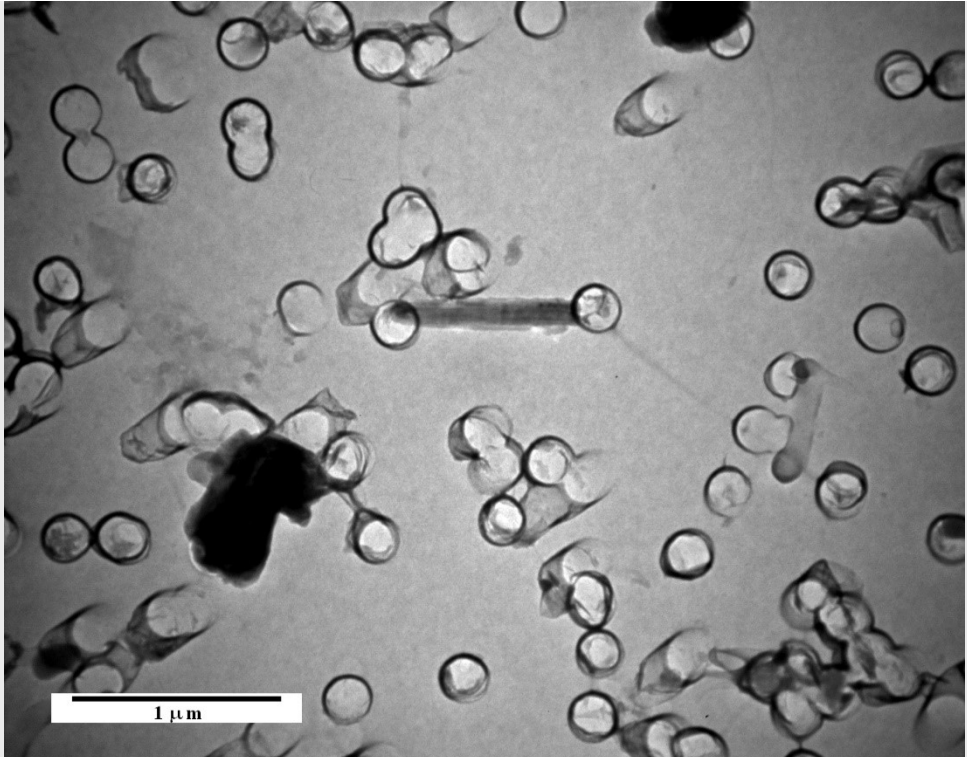
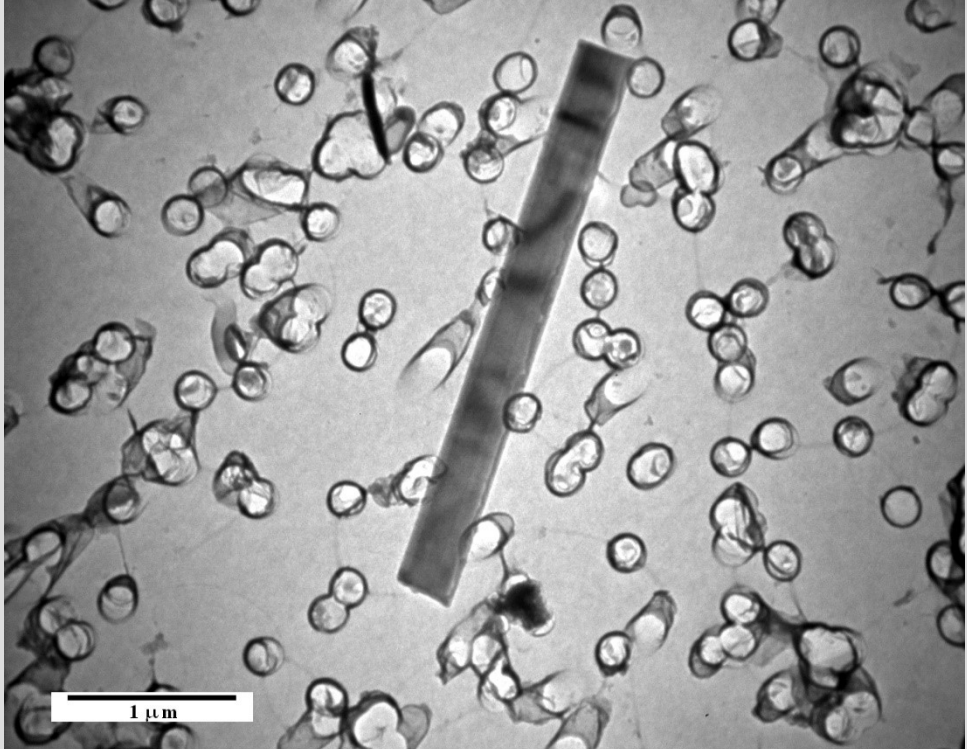


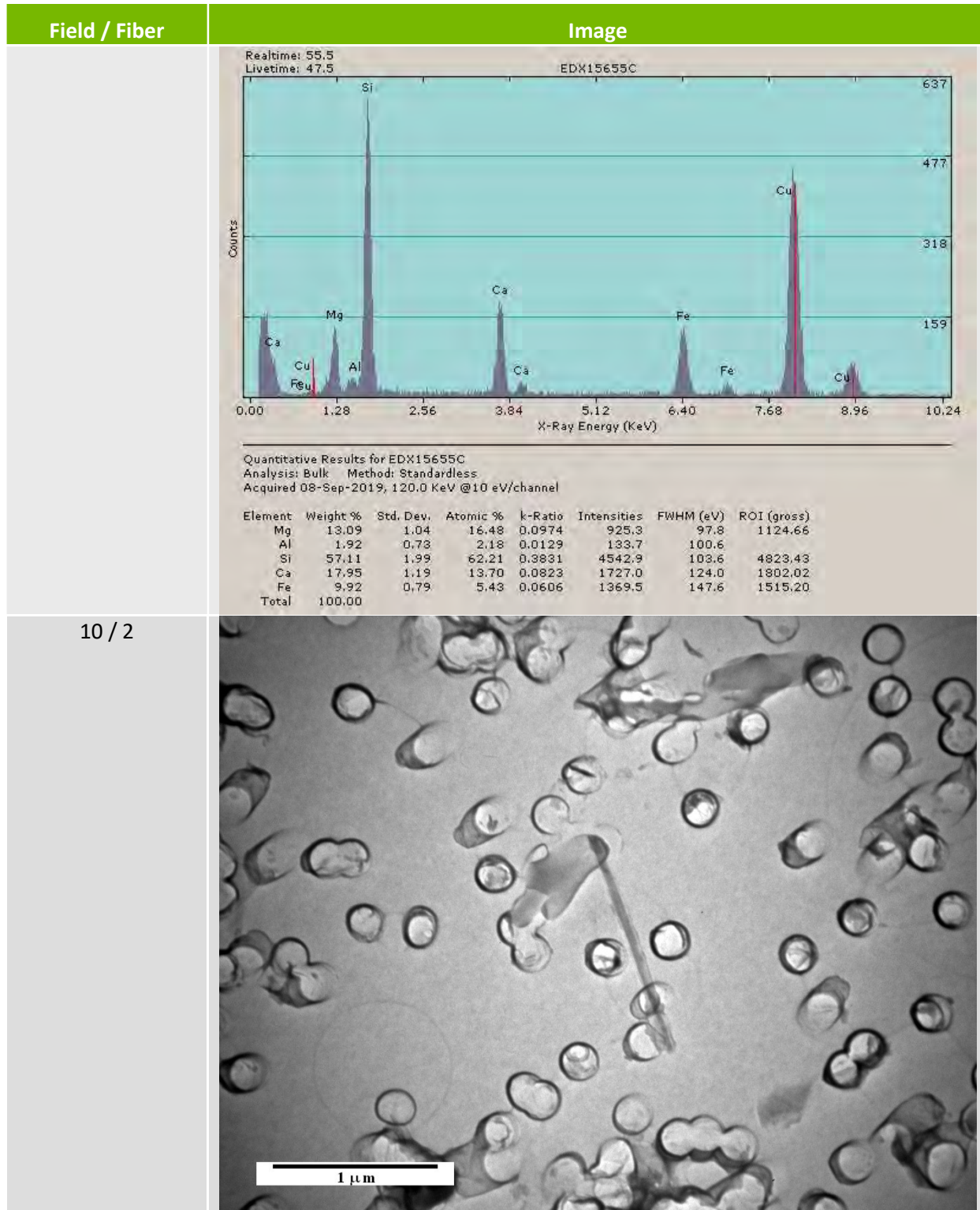
Field / Fiber	Image
6 / 1	 <p>A grayscale micrograph showing a single, elongated, cylindrical fiber oriented diagonally from the upper left towards the lower right. The fiber has a textured surface and a dark, irregularly shaped end. It is surrounded by a dense field of small, circular particles, many of which appear to have a central core and a surrounding shell. A white scale bar with the text "1 μm" is located in the lower-left corner of the image area.</p>
7 / 1	 <p>A grayscale micrograph showing a single, elongated, cylindrical fiber oriented horizontally across the center of the frame. The fiber is dark and appears to have a textured surface. It is surrounded by a dense field of small, circular particles, many of which appear to have a central core and a surrounding shell. A white scale bar with the text "1 μm" is located in the lower-left corner of the image area.</p>



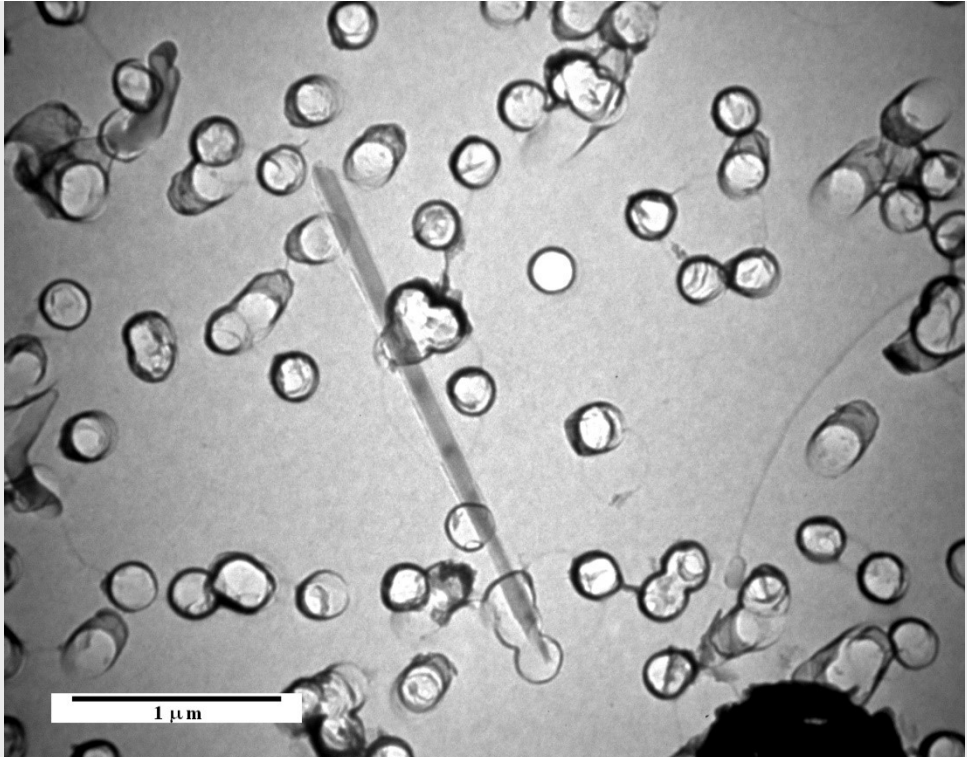
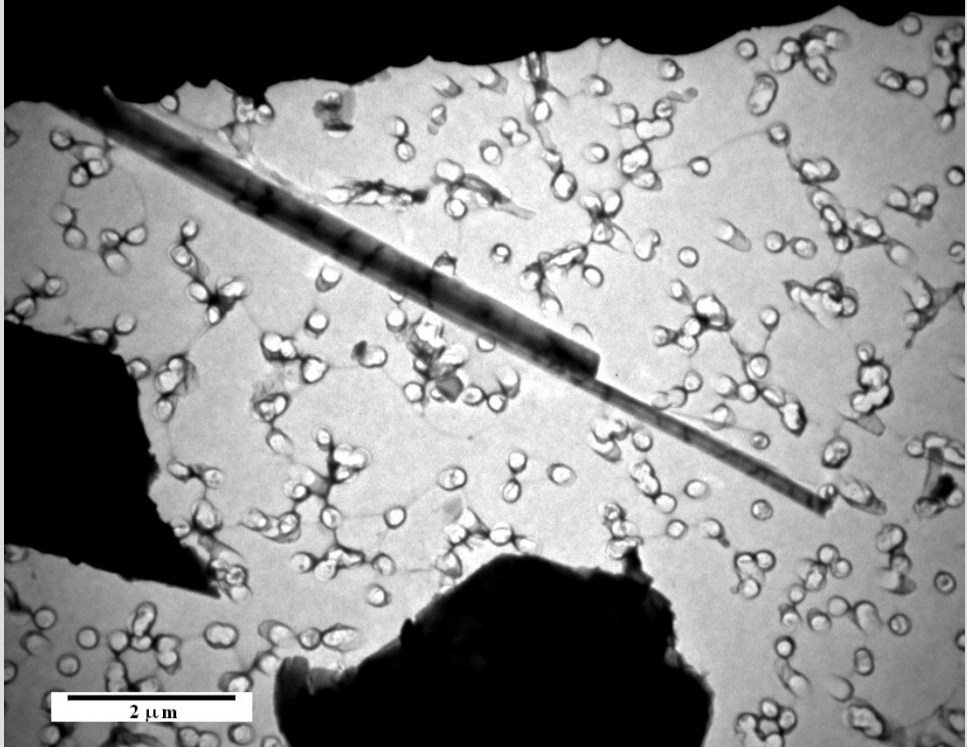


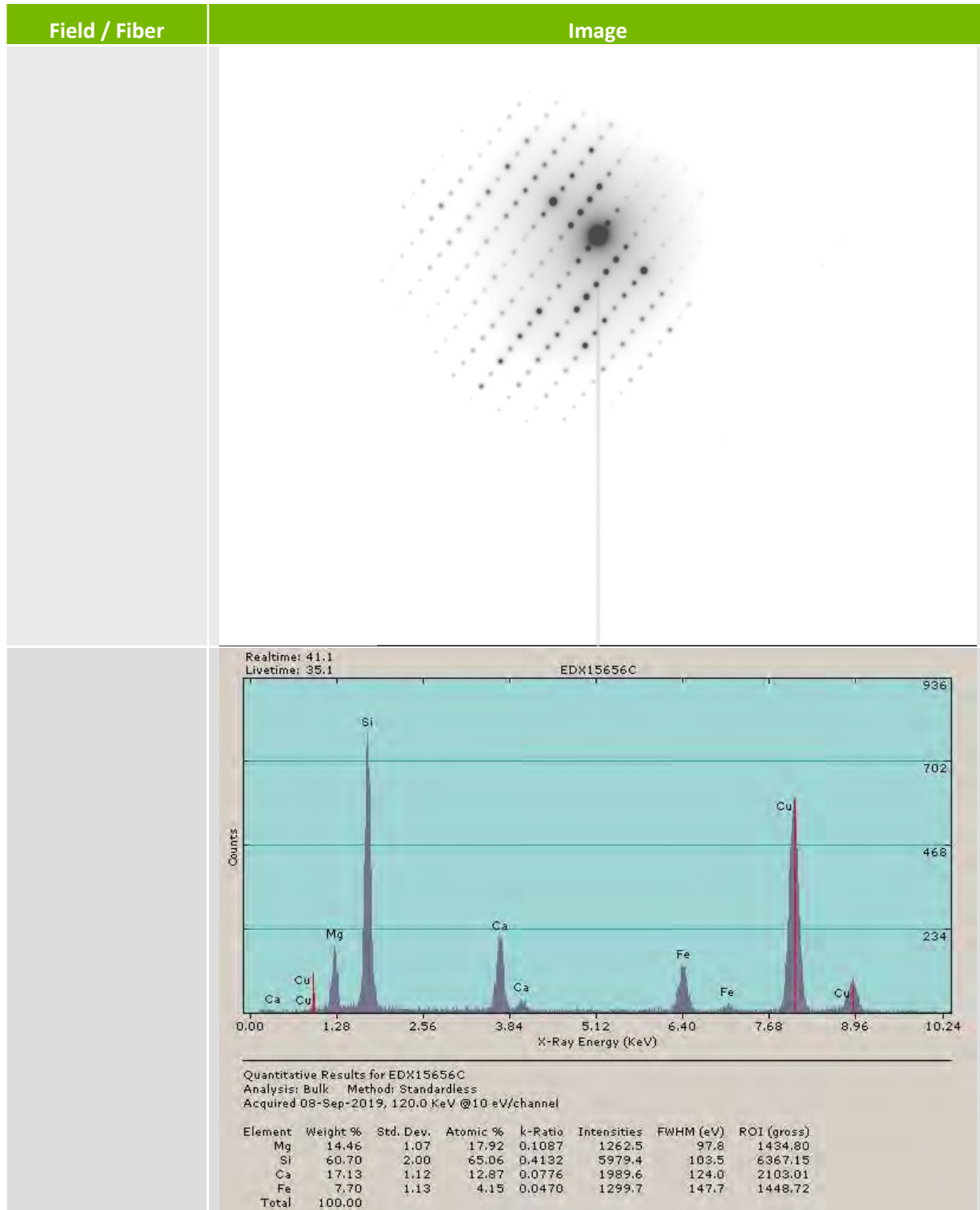


Field / Fiber	Image
8 / 1	 <p>This micrograph shows a field of circular fibers, some appearing as doublets. A prominent dark, irregular shape is visible in the lower-left quadrant. A horizontal scale bar labeled "1 μm" is located at the bottom left of the image.</p>
10 / 1	 <p>This micrograph shows a field of circular fibers. A long, thin, dark fiber is oriented vertically in the center-right area. A horizontal scale bar labeled "1 μm" is located at the bottom left of the image.</p>

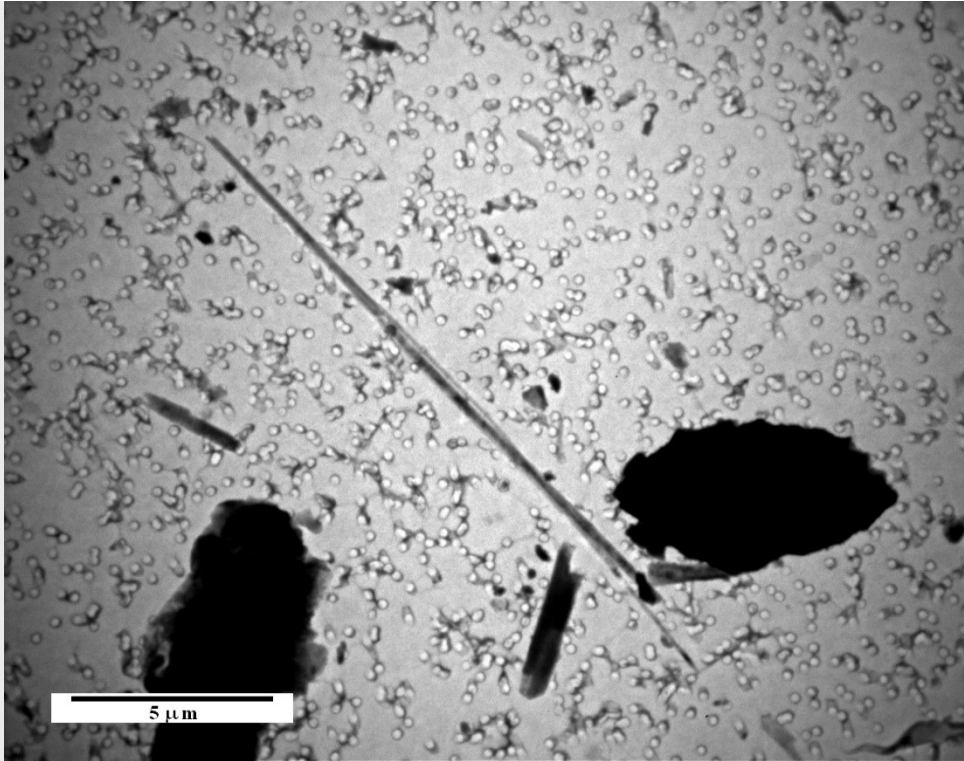
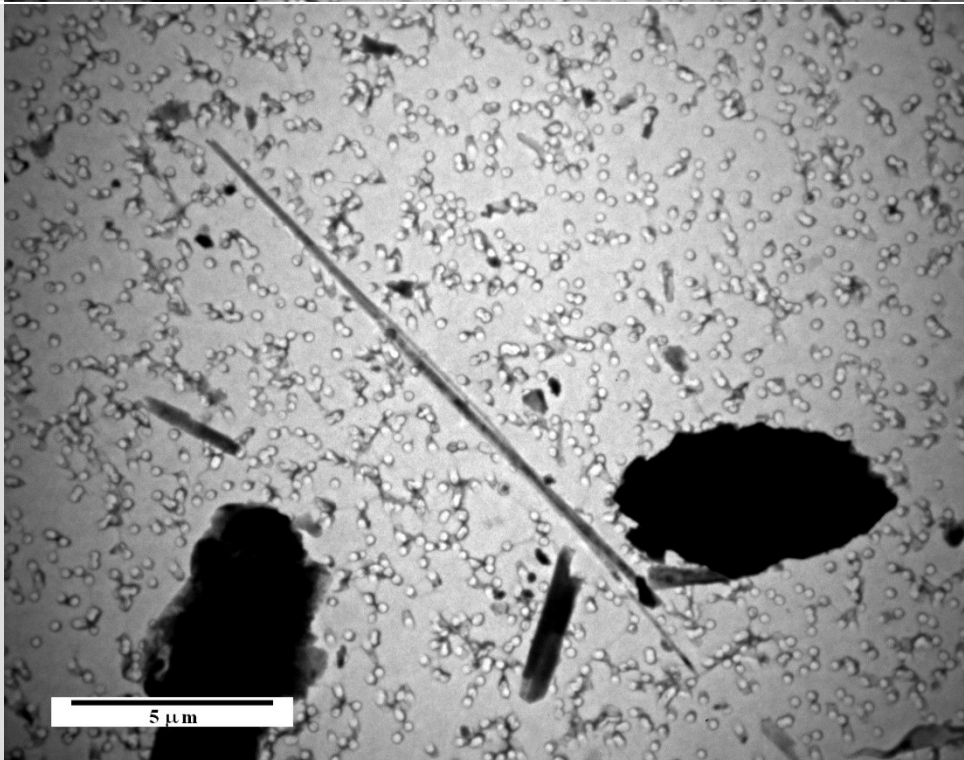


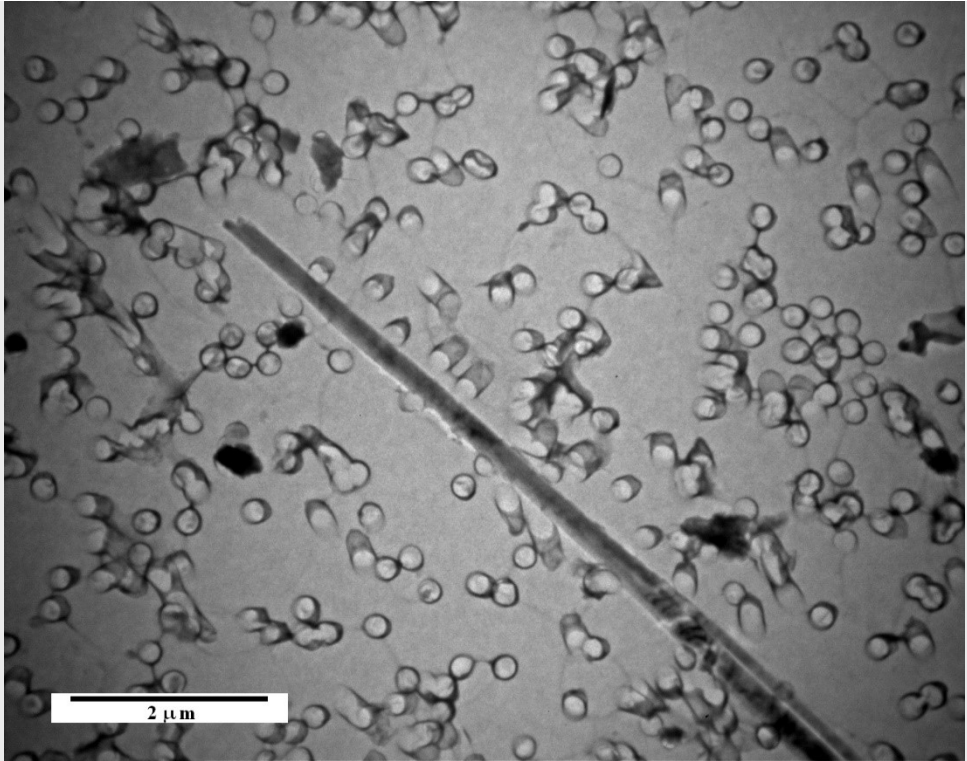
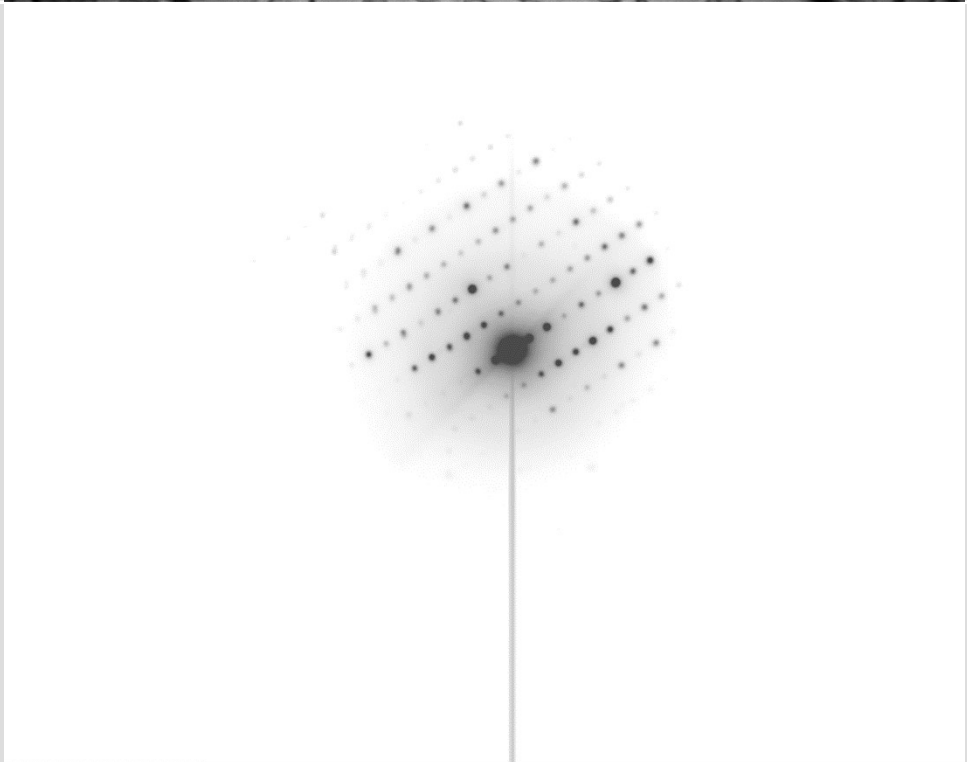


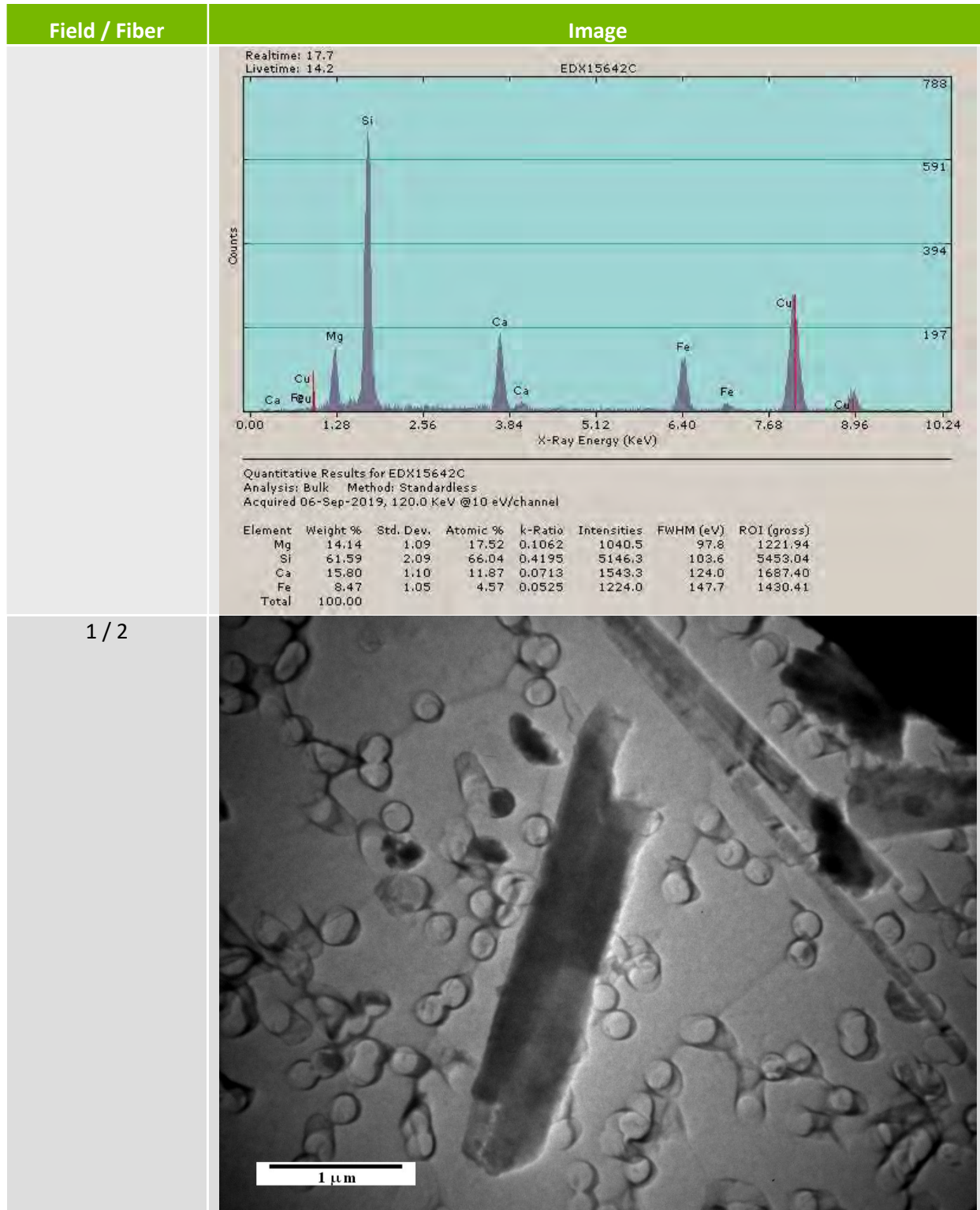
Field / Fiber	Image
10 / 3	 <p>A transmission electron micrograph showing a single, elongated, cylindrical fiber oriented vertically in the center. The fiber has a textured surface and is surrounded by a dense field of small, circular particles, many of which appear to be cross-sections of similar fibers. A white scale bar at the bottom left indicates a length of 1 μm.</p>
LLH901997-14 Sample 11 Lo Mag 11 / 1	 <p>A transmission electron micrograph showing a single, elongated, cylindrical fiber oriented diagonally from the upper left to the lower right. The fiber is surrounded by a field of small, circular particles. The image is taken at a lower magnification than the one above. A white scale bar at the bottom left indicates a length of 2 μm.</p>



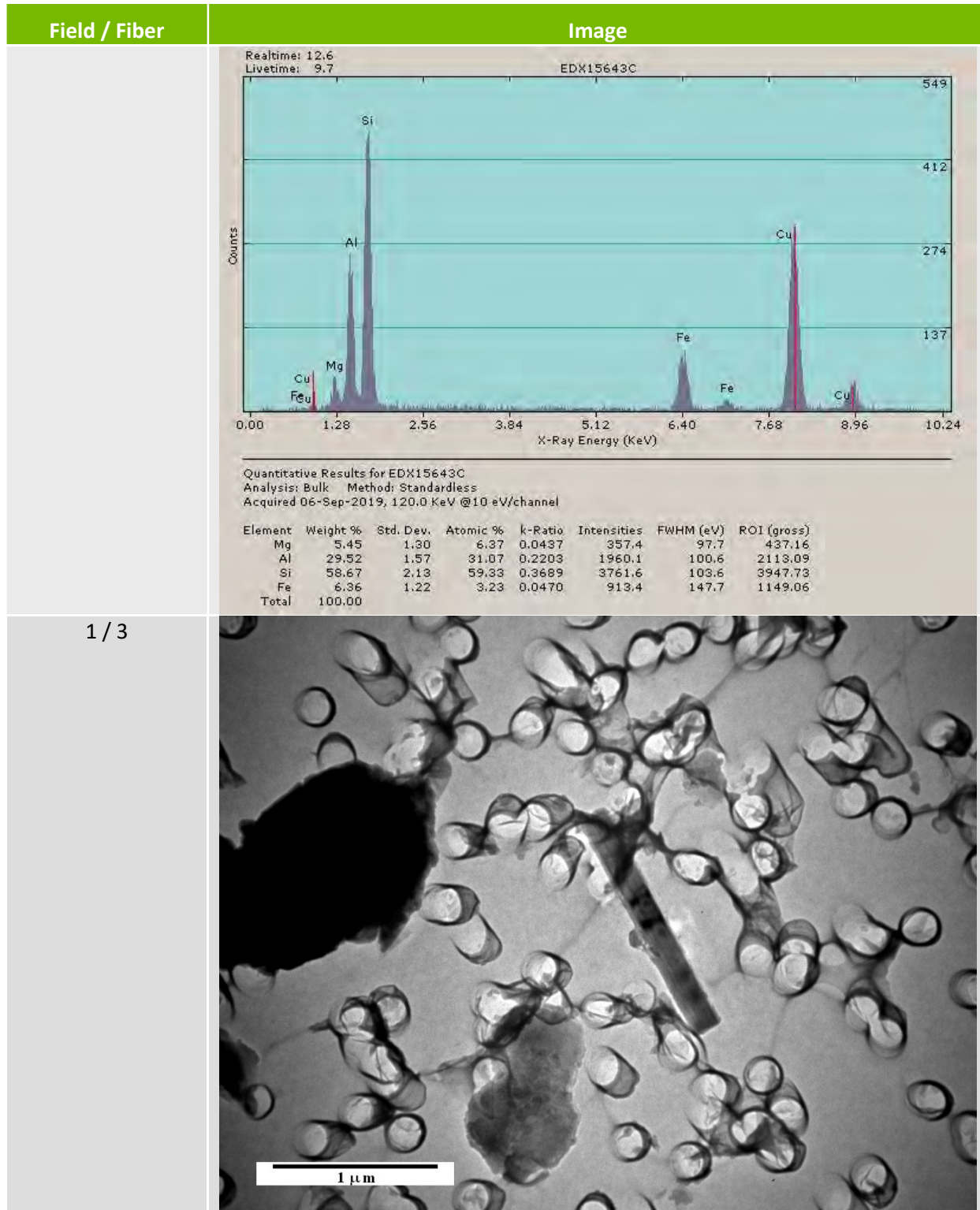


Field / Fiber	Image
LLH901997-14 Sample 13 Hi Mag 1 / 1	 A high-magnification micrograph showing a dense field of small, circular, light-colored particles. Several elongated, dark fibers are visible, including a prominent one running diagonally from the upper left to the lower right. Two large, dark, irregular shapes are present, one in the lower left and one in the middle right. A white scale bar in the lower left corner is labeled "5 μm".
	 A high-magnification micrograph showing a dense field of small, circular, light-colored particles. Several elongated, dark fibers are visible, including a prominent one running diagonally from the upper left to the lower right. Two large, dark, irregular shapes are present, one in the lower left and one in the middle right. A white scale bar in the lower left corner is labeled "5 μm".

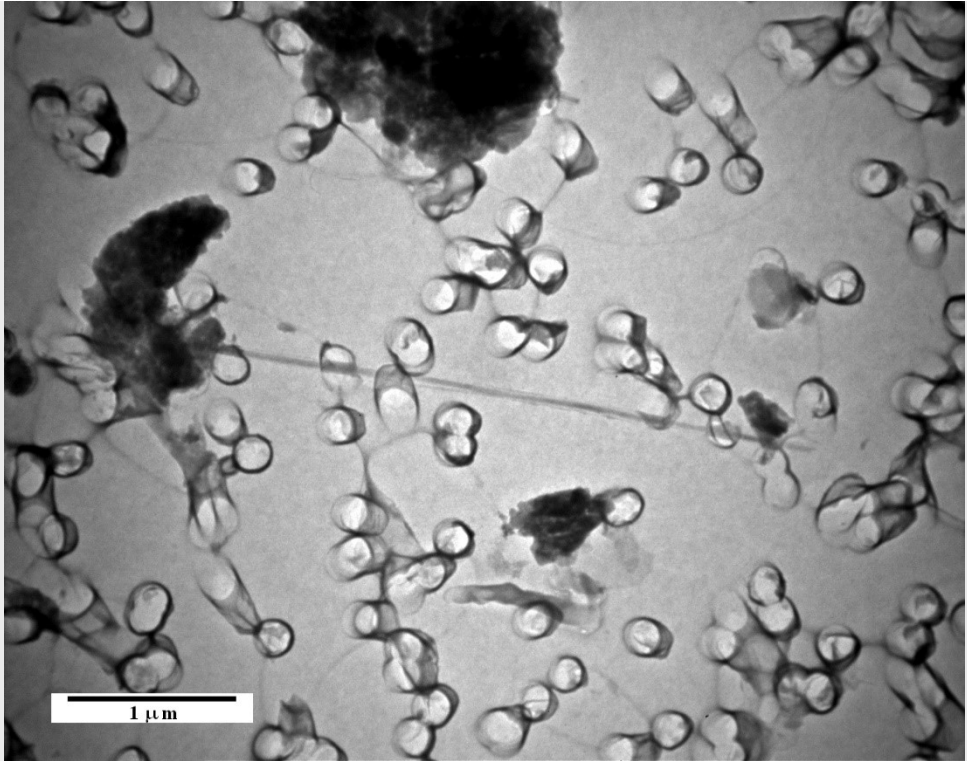
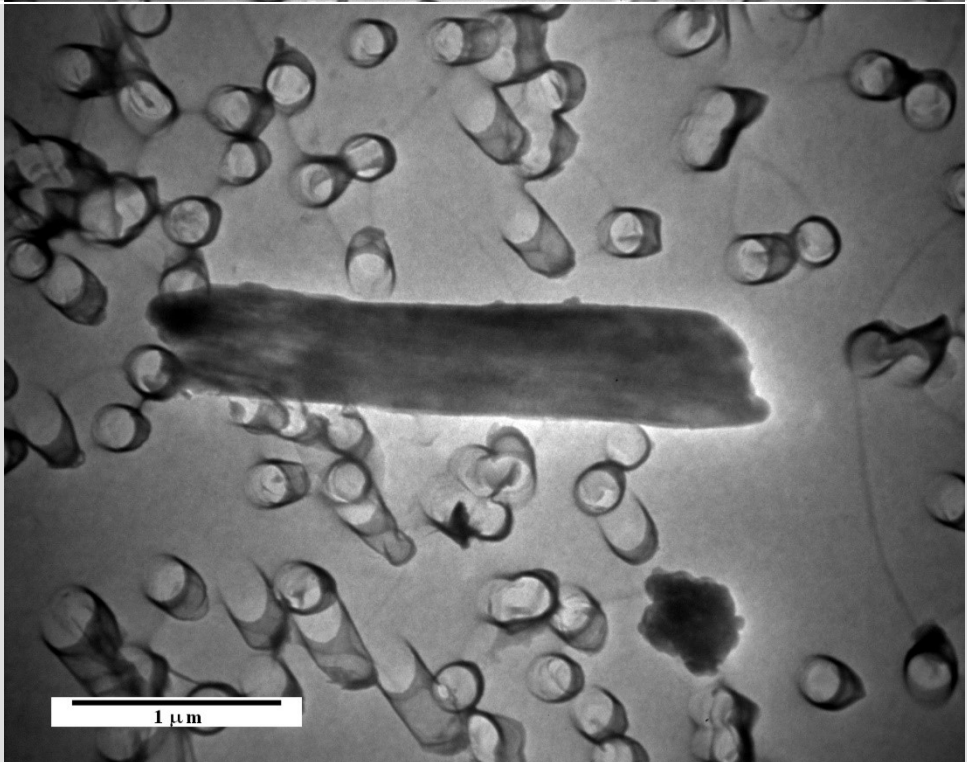
Field / Fiber	Image
	 A grayscale micrograph showing a dense field of small, circular, ring-like structures. A single, elongated, cylindrical fiber runs diagonally across the center of the field. A white scale bar in the bottom-left corner of the image is labeled "2 μm".
	 A grayscale diffraction pattern showing a central dark spot surrounded by a series of smaller, discrete spots arranged in a roughly circular, grid-like pattern. A vertical line extends downwards from the center of the pattern.

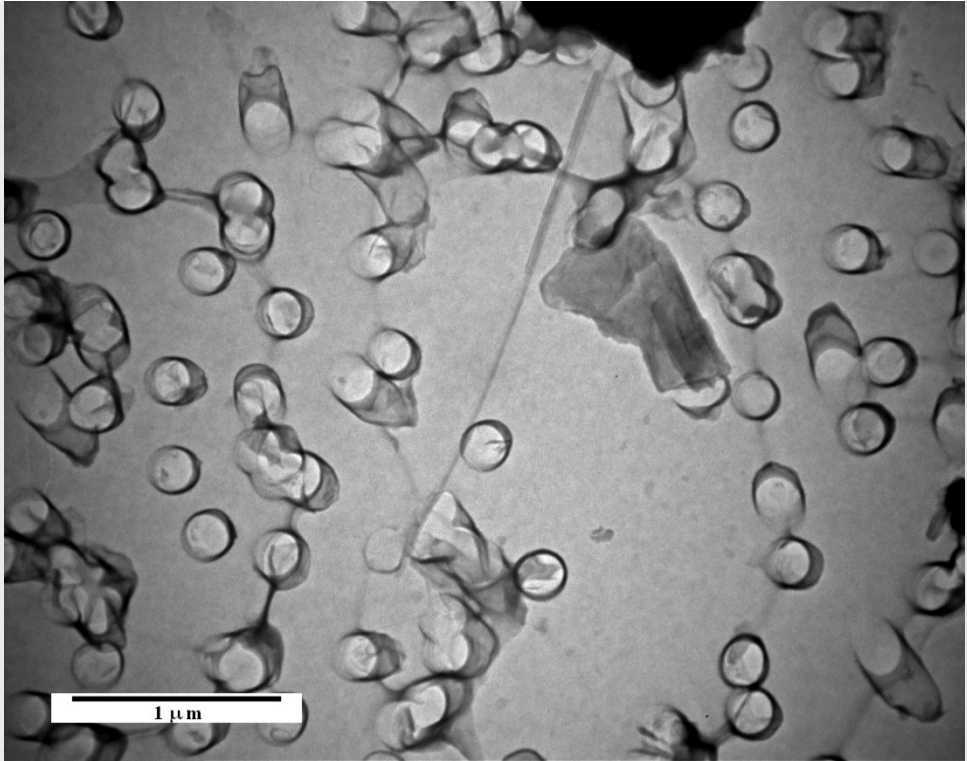
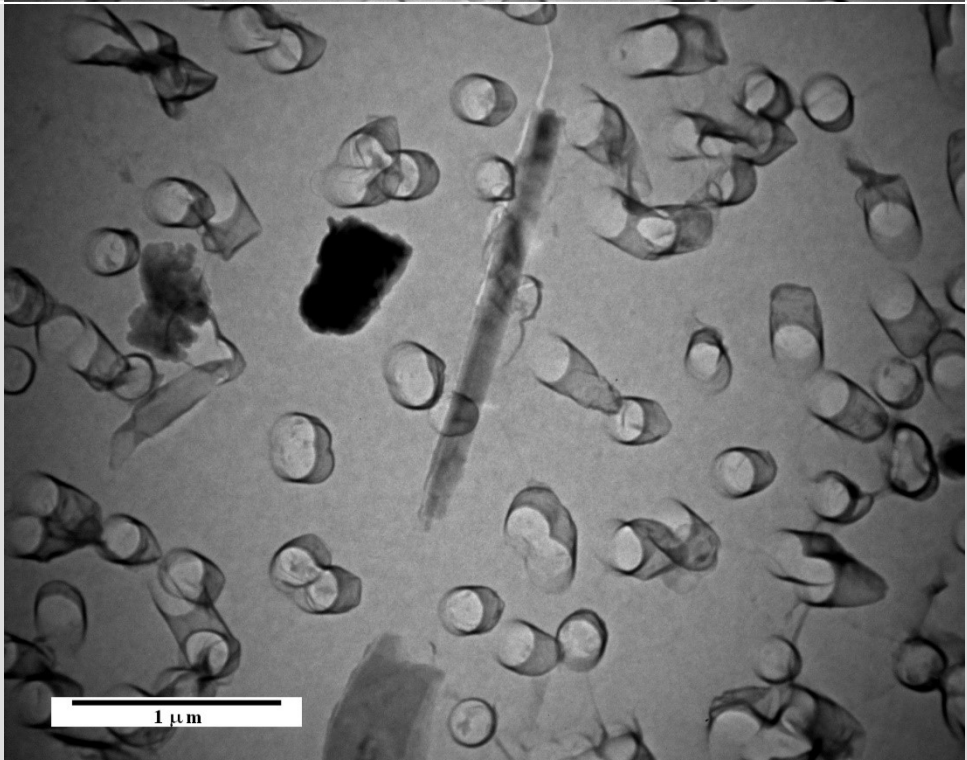




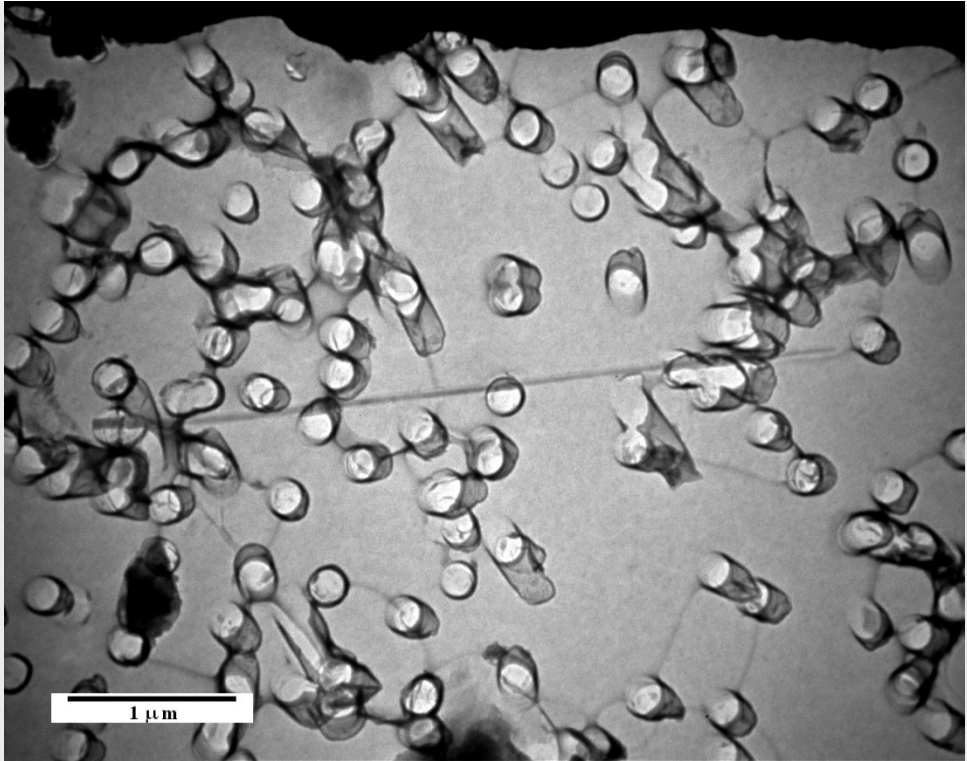
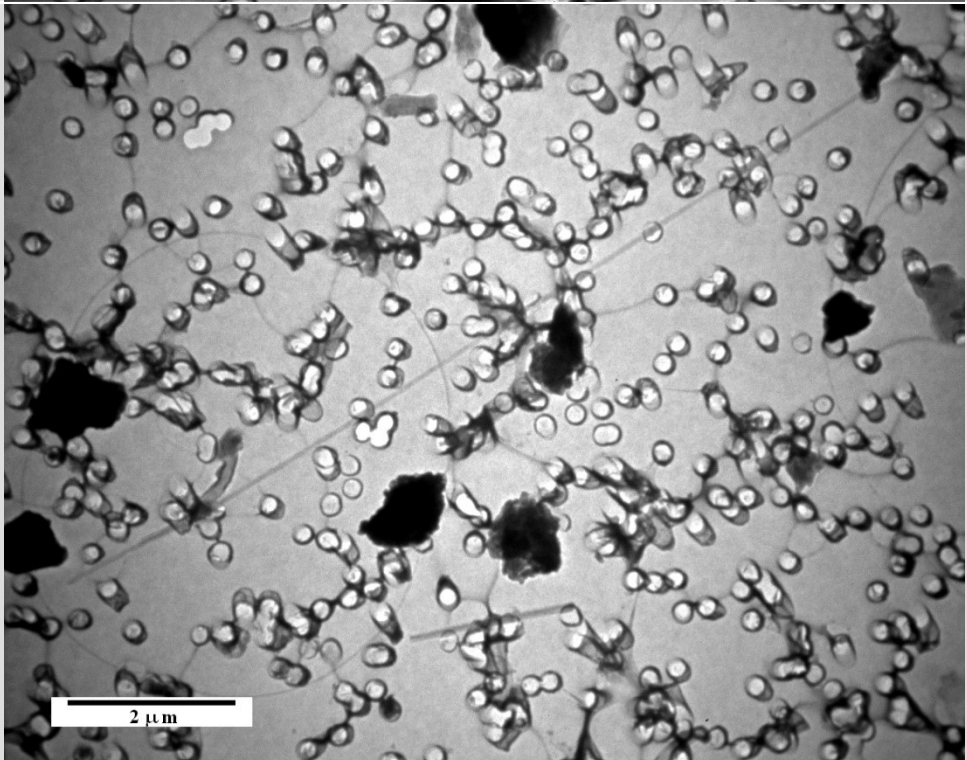


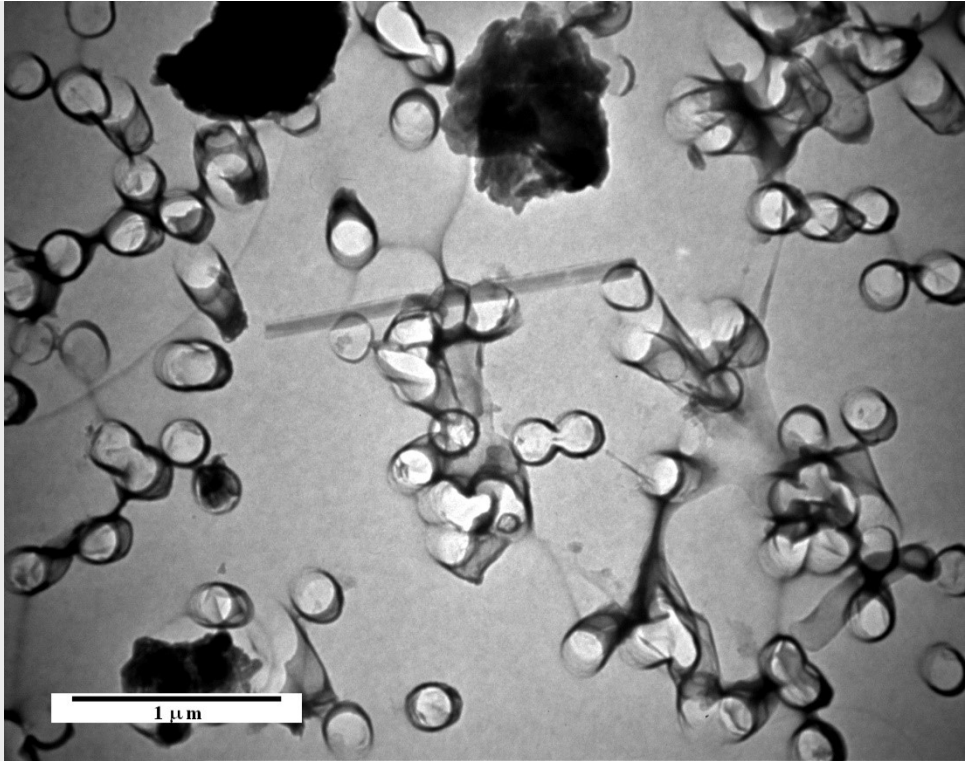
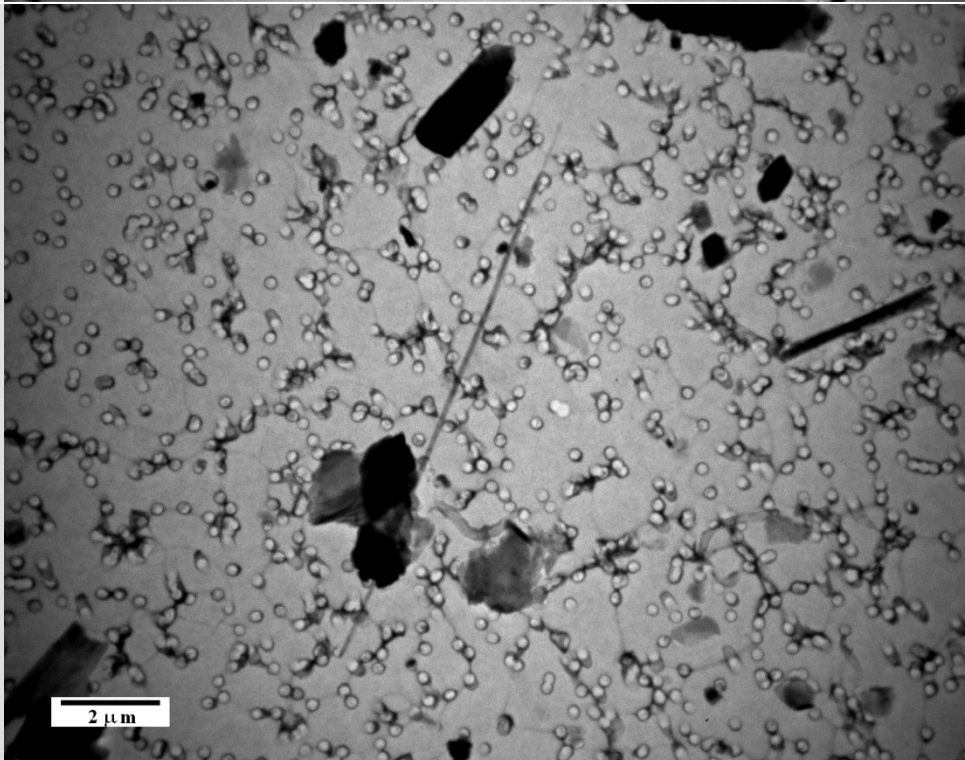


Field / Fiber	Image
1 / 6	 A grayscale micrograph showing a dense field of small, circular, ring-like structures. A large, dark, irregularly shaped mass is located in the upper left quadrant. A white scale bar with the text "1 μm" is positioned in the lower left corner of the image area.
1 / 7	 A grayscale micrograph showing a dense field of small, circular, ring-like structures. A prominent, long, dark, horizontal fiber-like structure is visible in the center. A white scale bar with the text "1 μm" is positioned in the lower left corner of the image area.

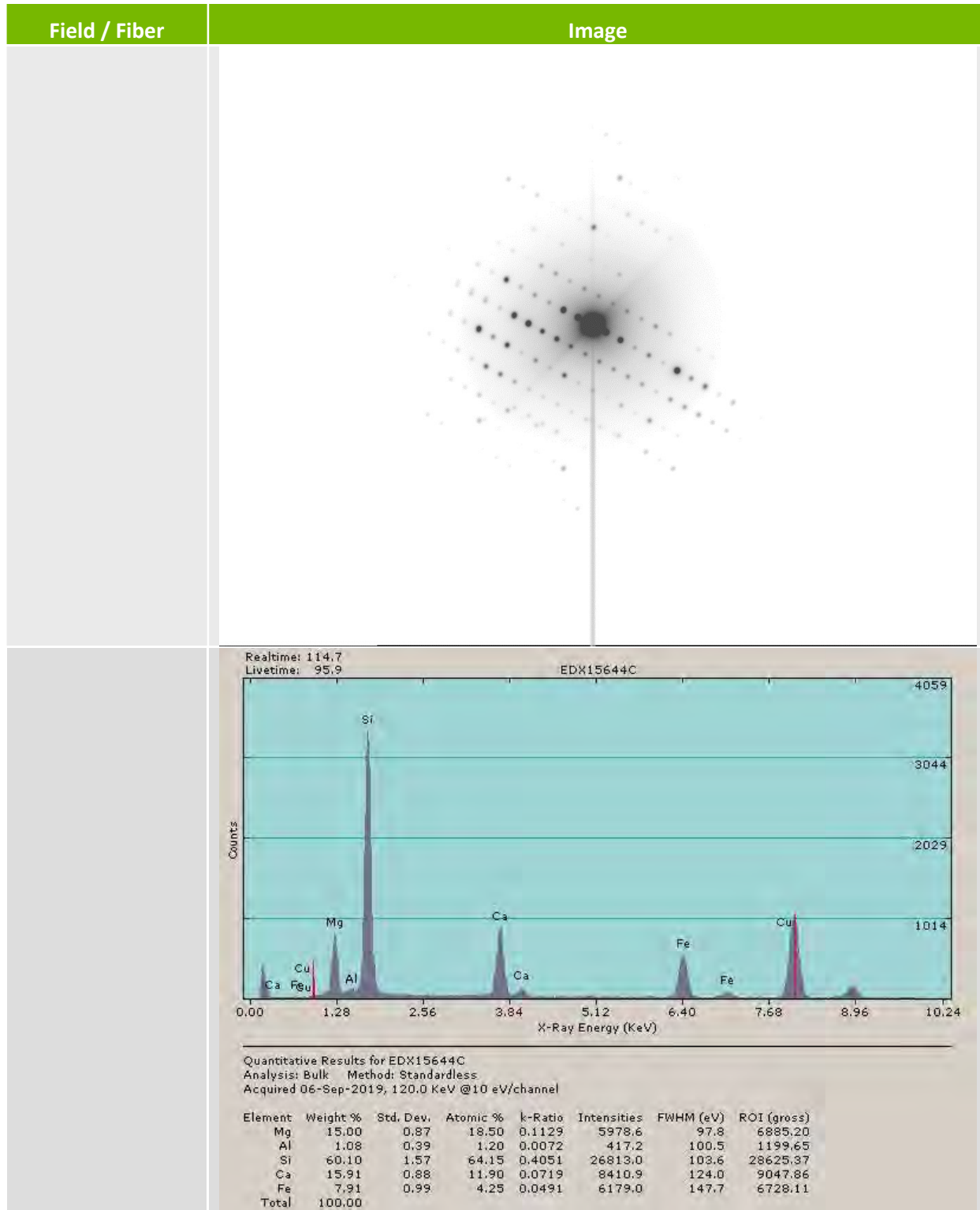
Field / Fiber	Image
1 / 8	 Micrograph showing a dense field of circular fibers. A scale bar in the bottom left corner indicates 1 μm.
1 / 9	 Micrograph showing a dense field of circular fibers, similar to Field 1/8. A scale bar in the bottom left corner indicates 1 μm.

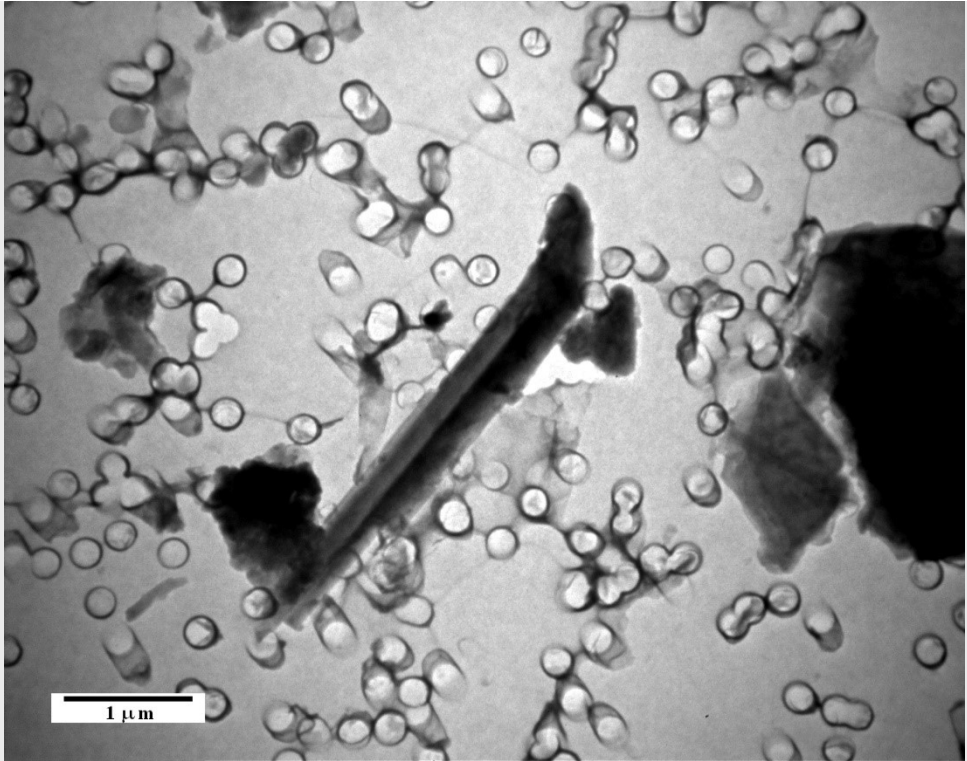
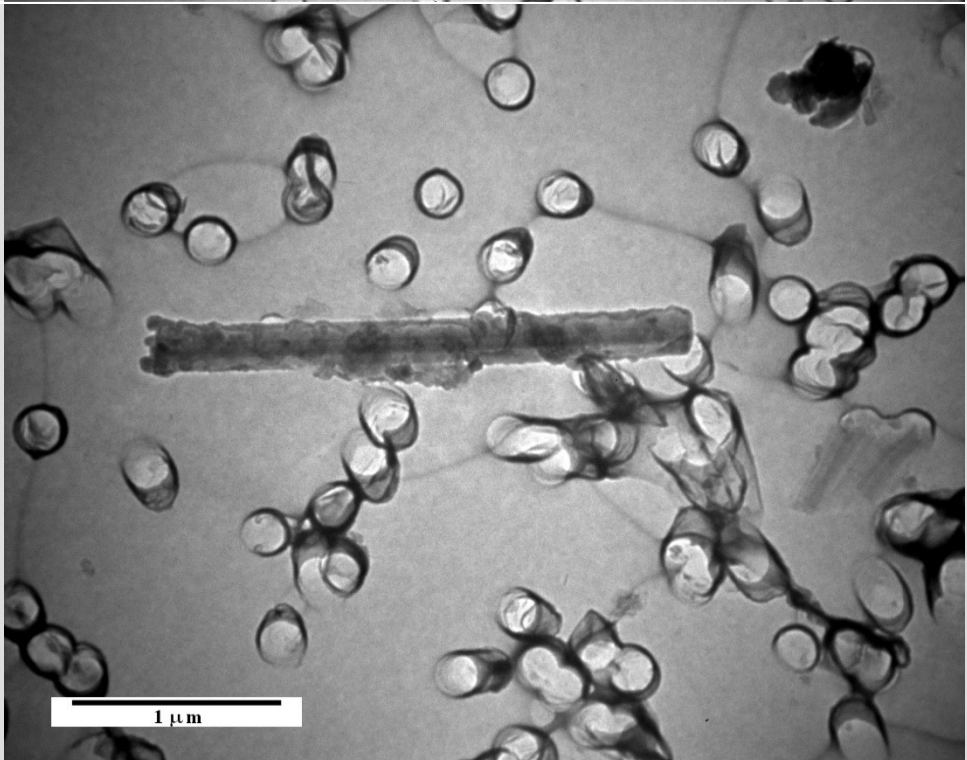


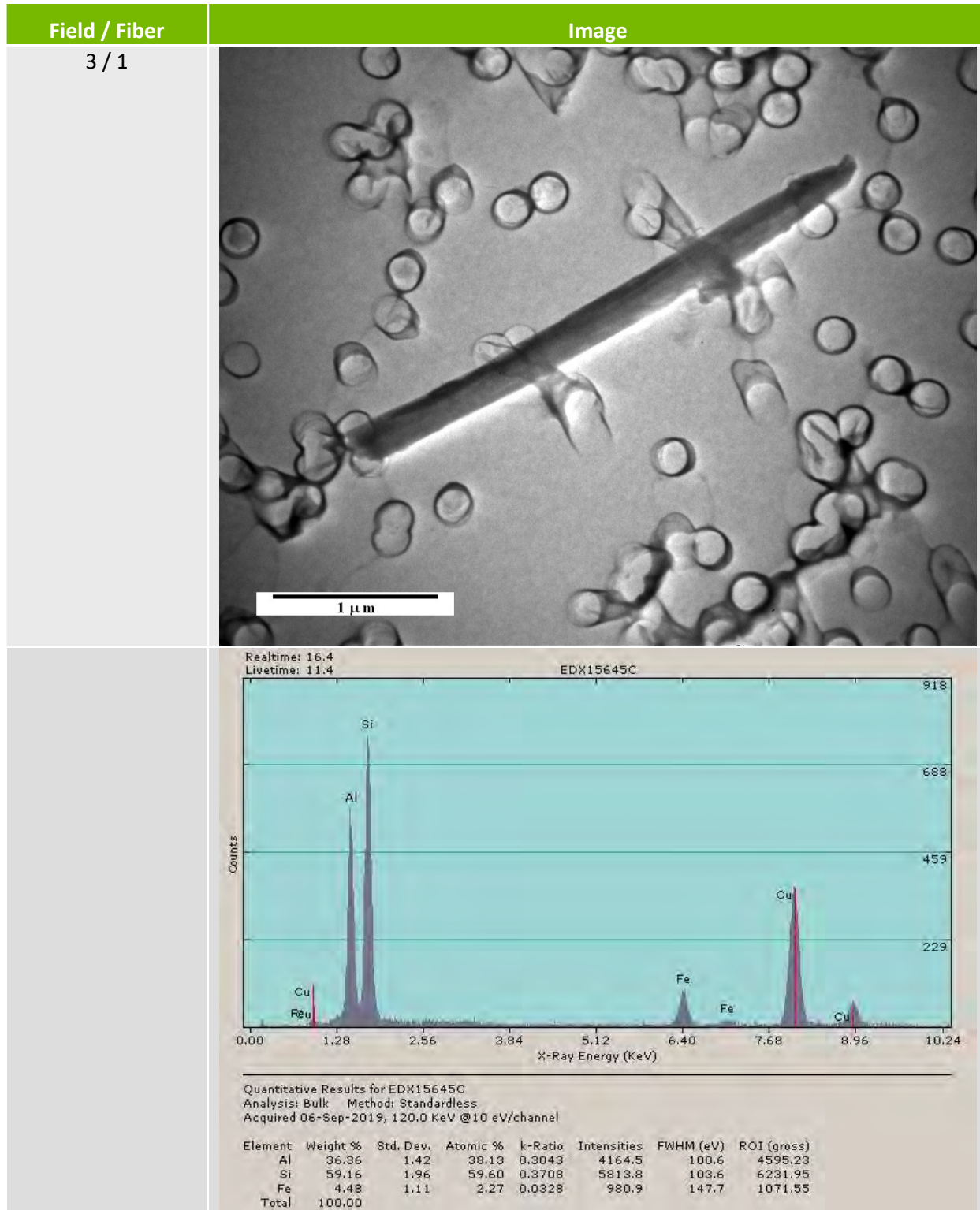
Field / Fiber	Image
2 / 2	
2 / 3	

Field / Fiber	Image
2 / 4	 A transmission electron micrograph showing a network of interconnected fibers. The fibers are composed of numerous small, roughly spherical particles. There are several large, dark, irregular clusters of material. A scale bar at the bottom left indicates 1 μm.
2 / 6	 A transmission electron micrograph showing a dense network of interconnected fibers. The fibers are composed of many small, roughly spherical particles. There are several large, dark, irregular clusters of material. A scale bar at the bottom left indicates 2 μm.

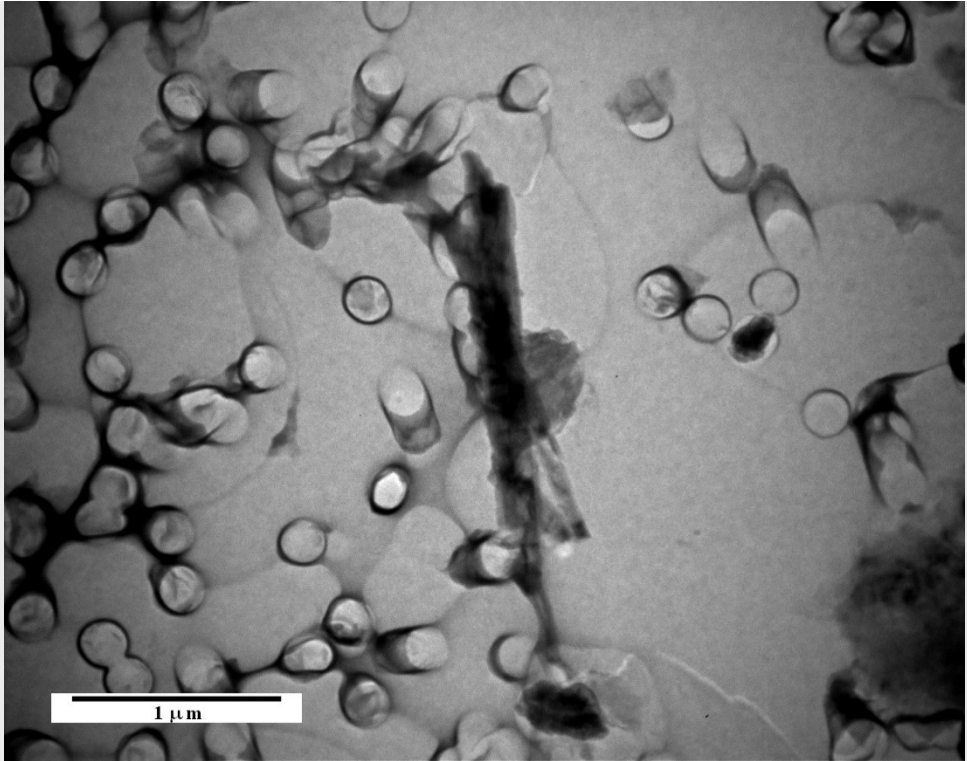
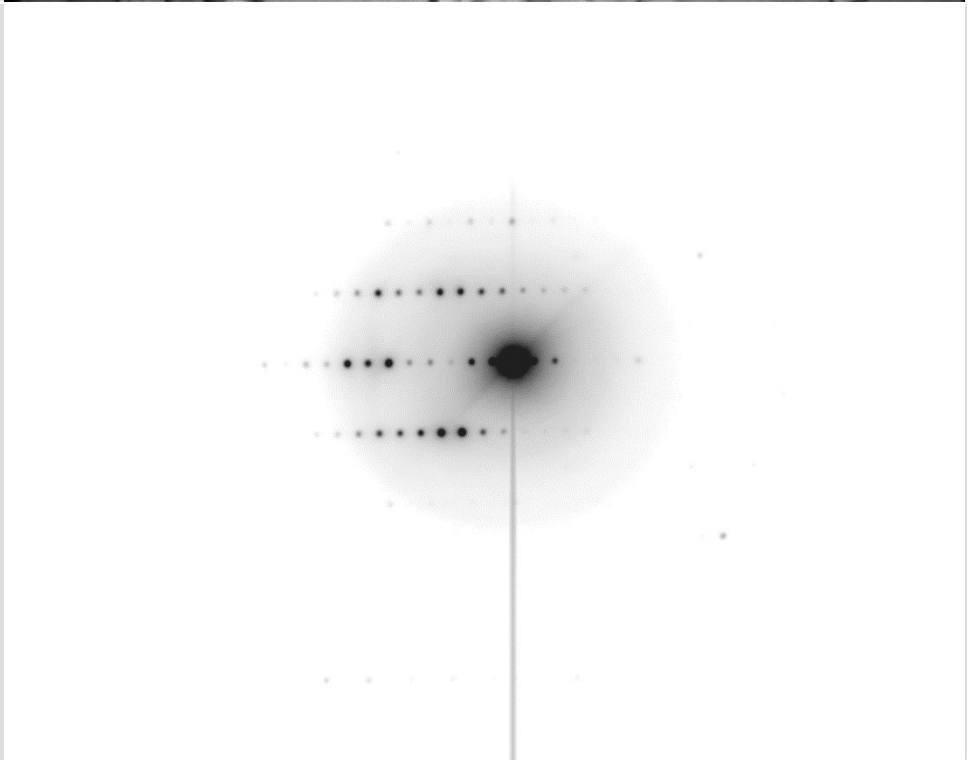




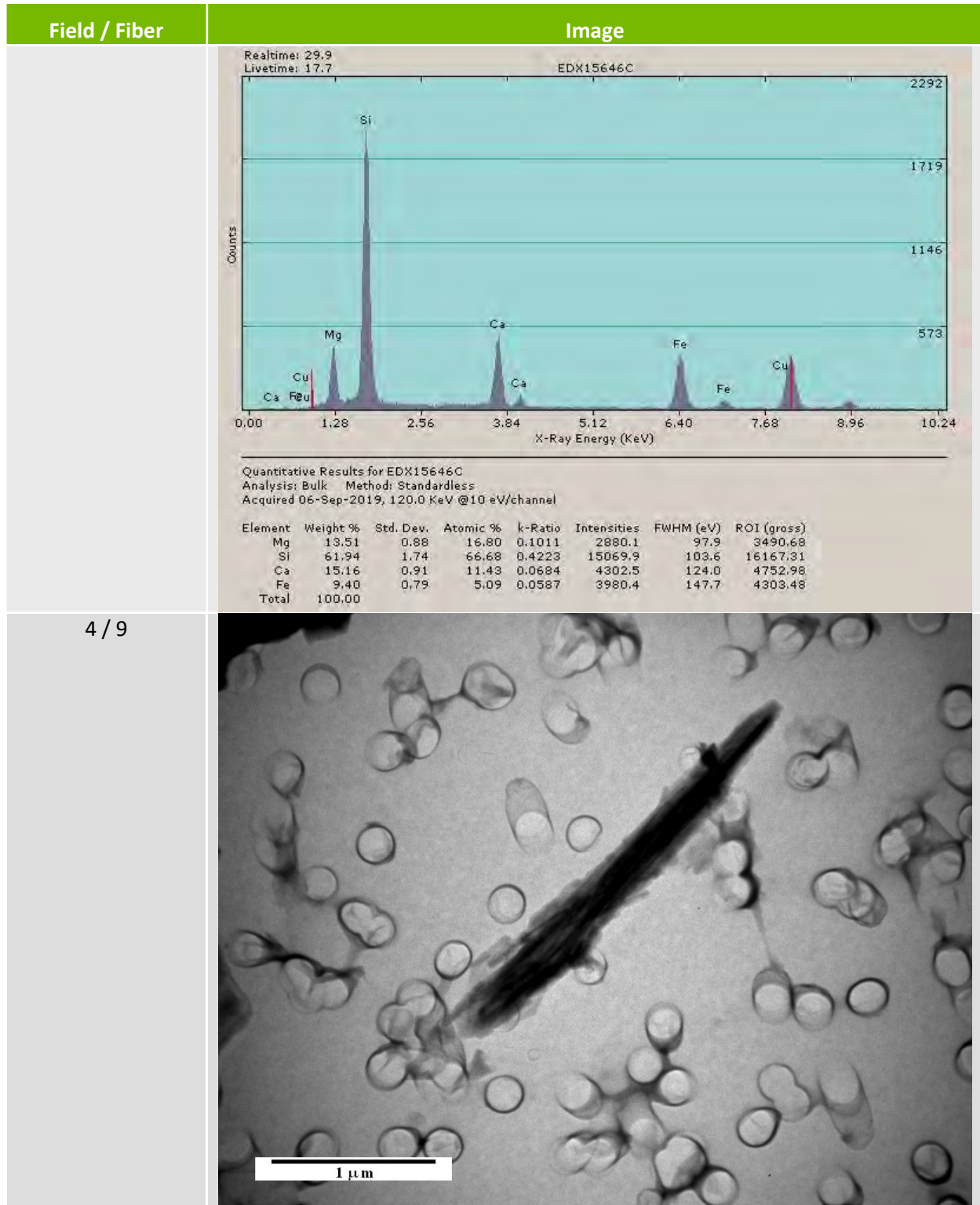
Field / Fiber	Image
2 / 8	 <p>A transmission electron micrograph showing a single, dark, elongated fiber oriented diagonally from the lower-left to the upper-right. The fiber is surrounded by a dense field of small, circular particles, many of which appear to be cross-sections of similar fibers. A scale bar in the bottom-left corner indicates a length of 1 μm.</p>
2 / 10	 <p>A transmission electron micrograph showing a single, dark, elongated fiber oriented horizontally across the center. The fiber is surrounded by a dense field of small, circular particles, many of which appear to be cross-sections of similar fibers. A scale bar in the bottom-left corner indicates a length of 1 μm.</p>

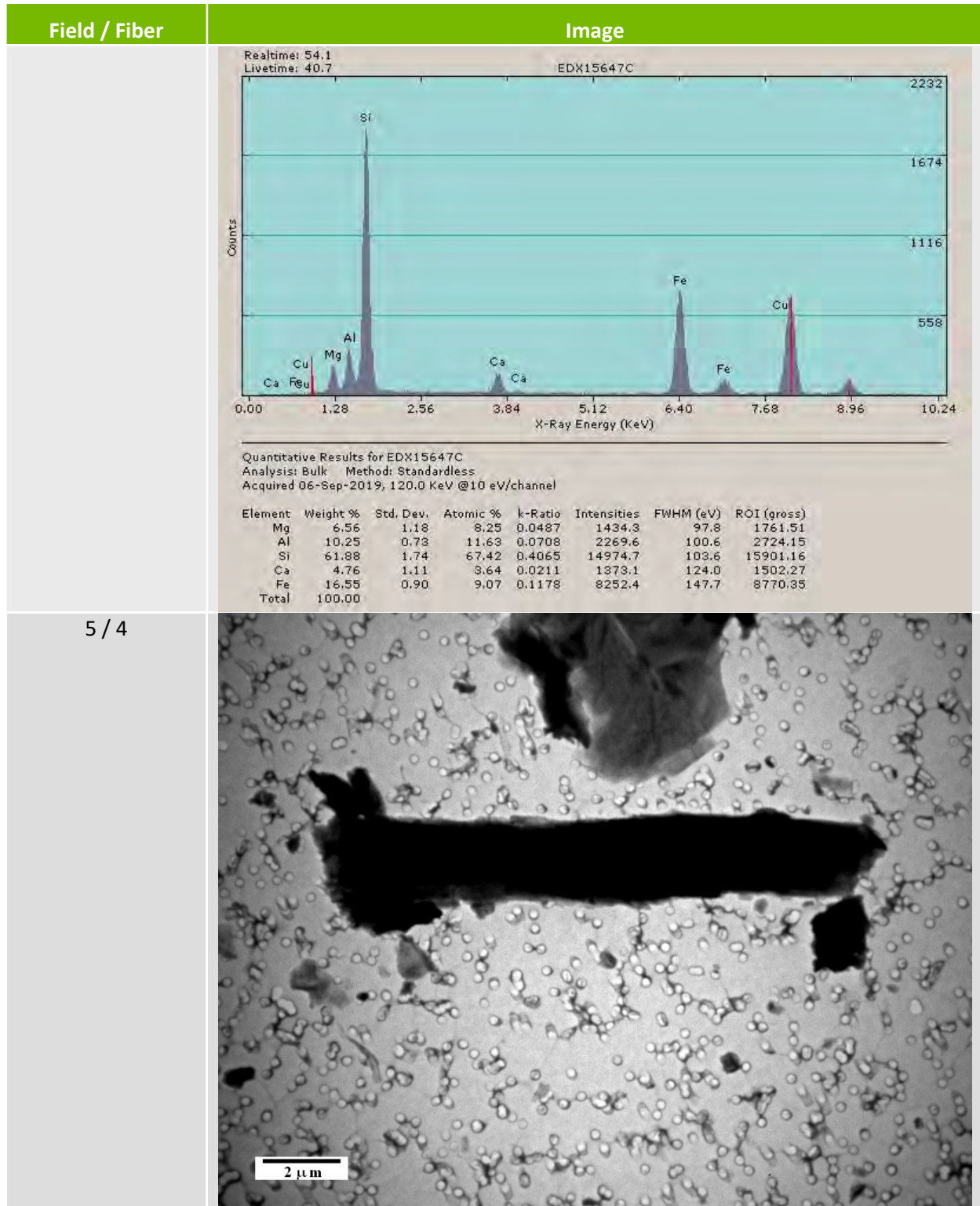


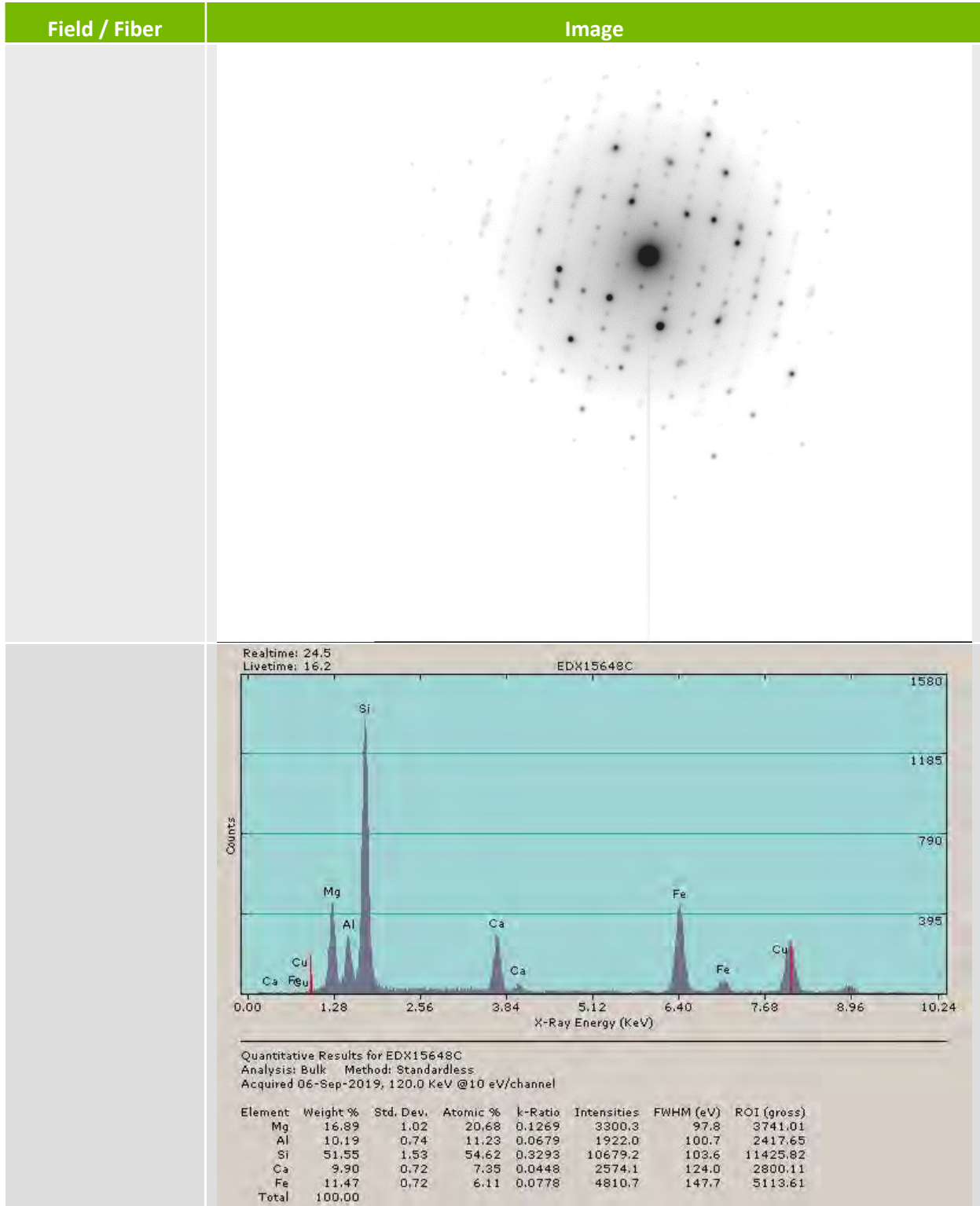


Field / Fiber	Image
4 / 2	 A grayscale micrograph showing a cross-section of a fiber. The central core is a dark, elongated, irregular shape. The surrounding cladding consists of numerous small, circular, light-colored regions arranged in a somewhat regular pattern. A scale bar at the bottom left indicates 1 μm.
	 A grayscale diffraction pattern showing a central dark spot surrounded by a series of smaller, lighter spots arranged in a grid-like pattern. The spots are arranged in a regular grid, with a central spot and surrounding spots of varying intensity.

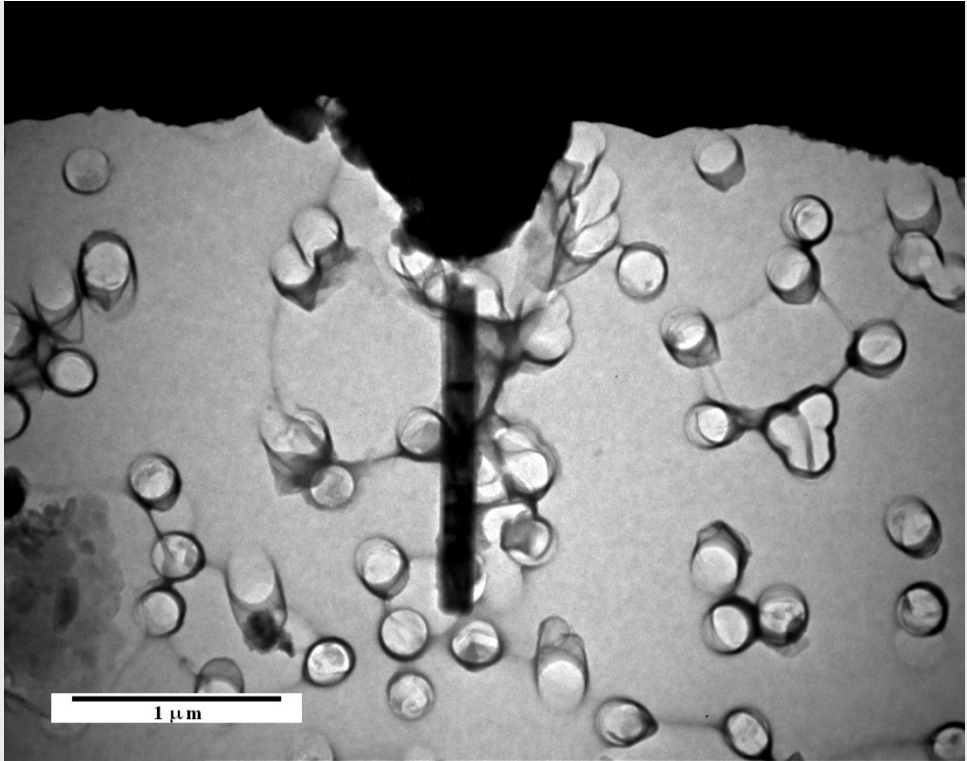
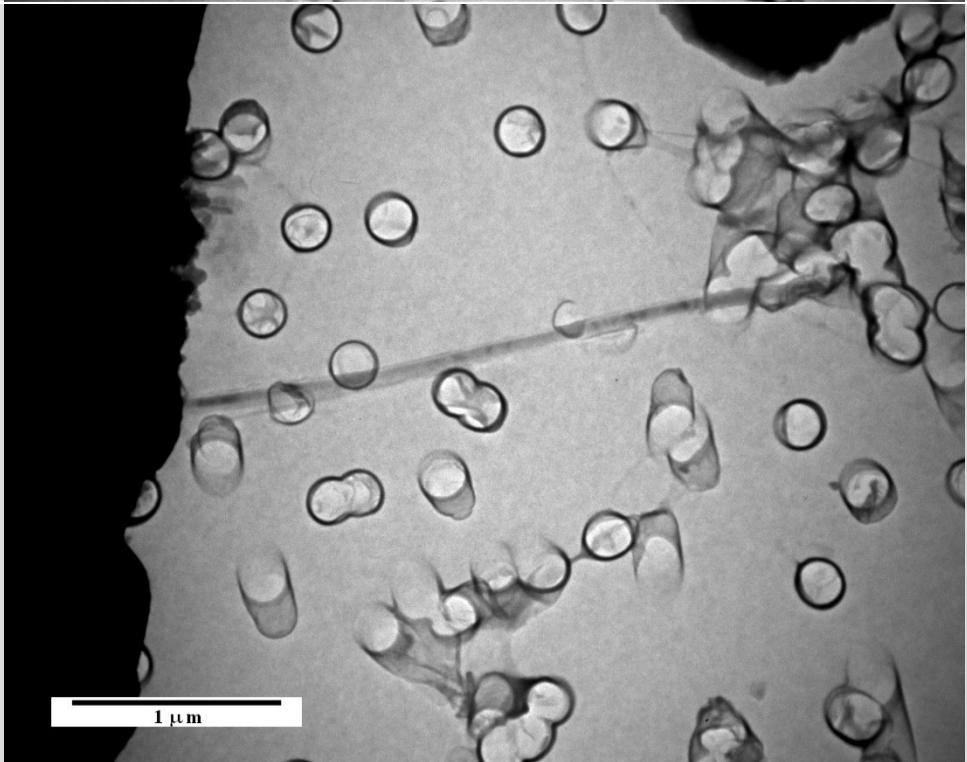




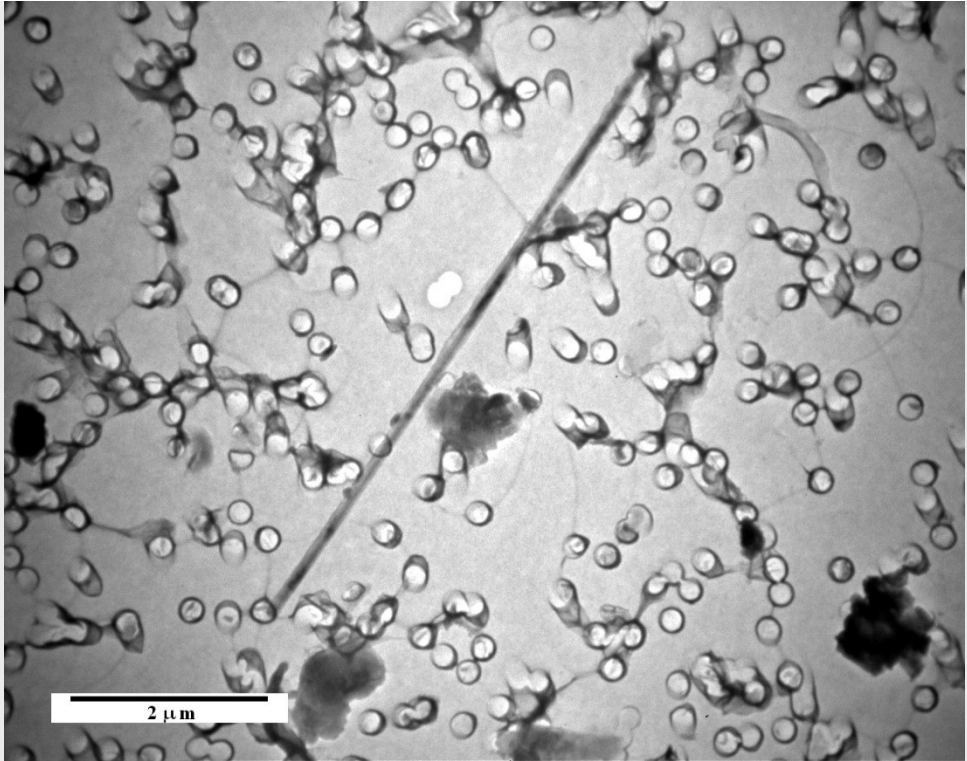
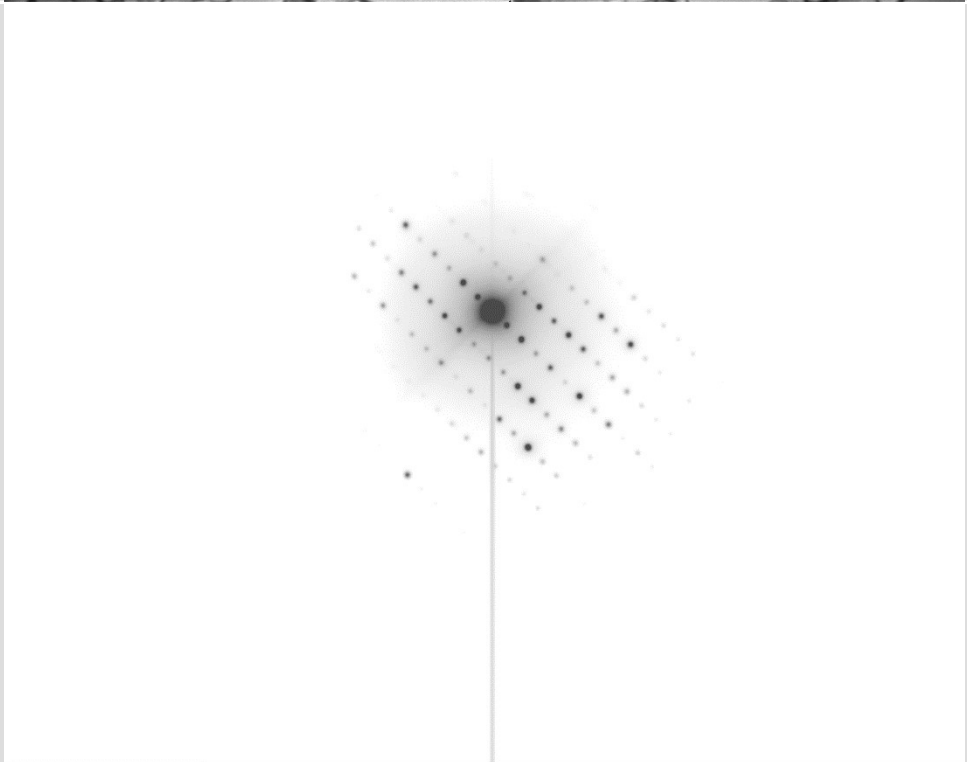


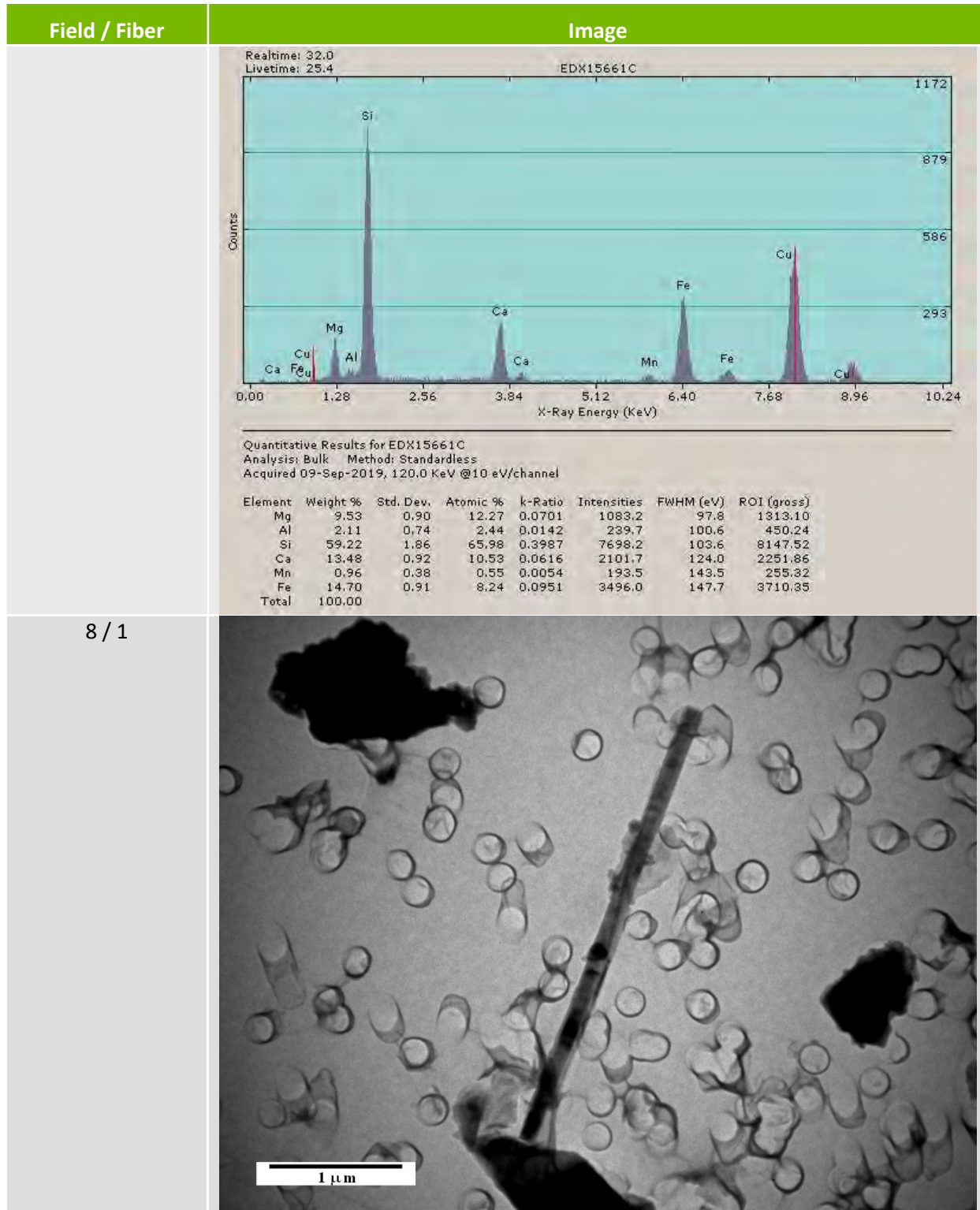


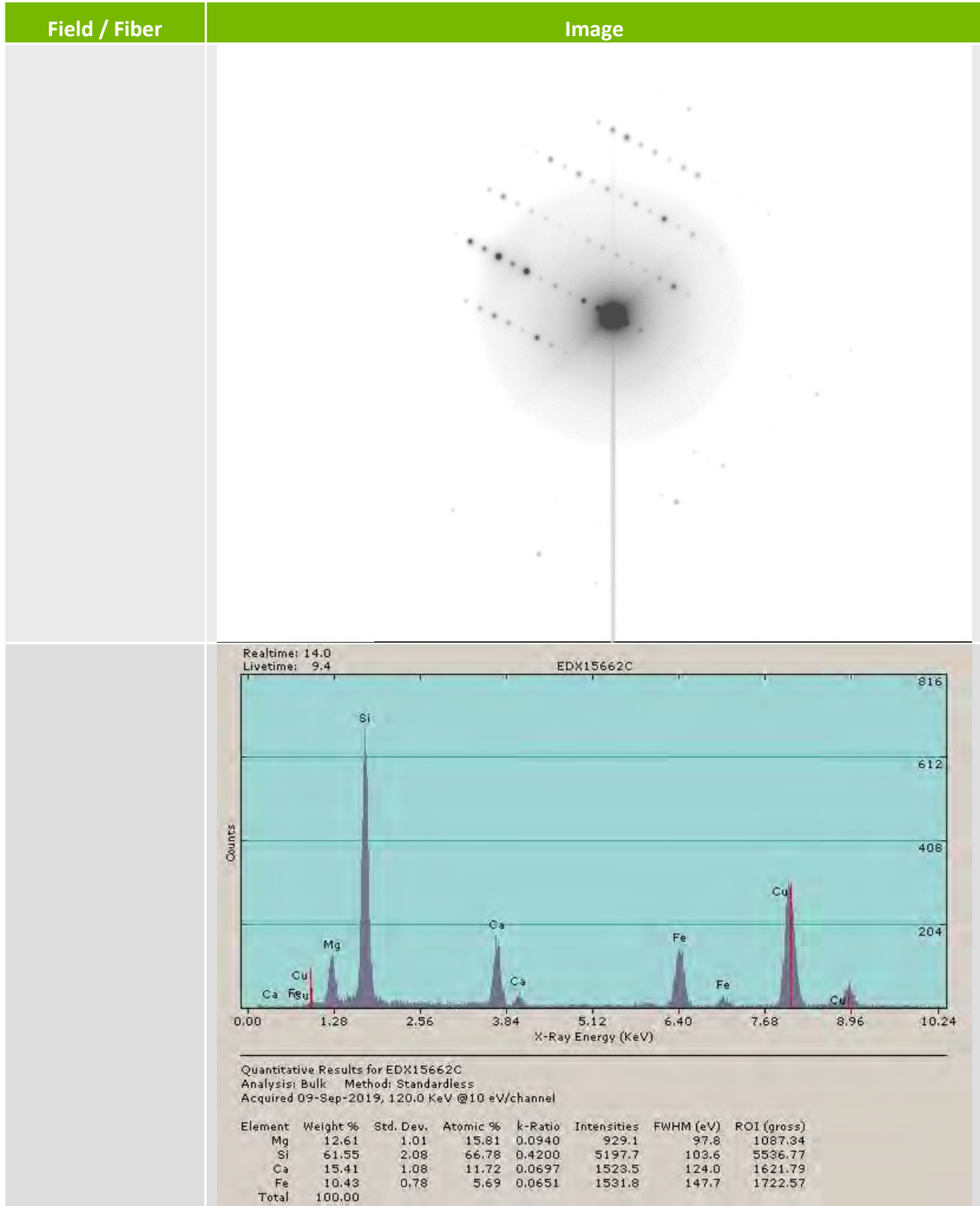


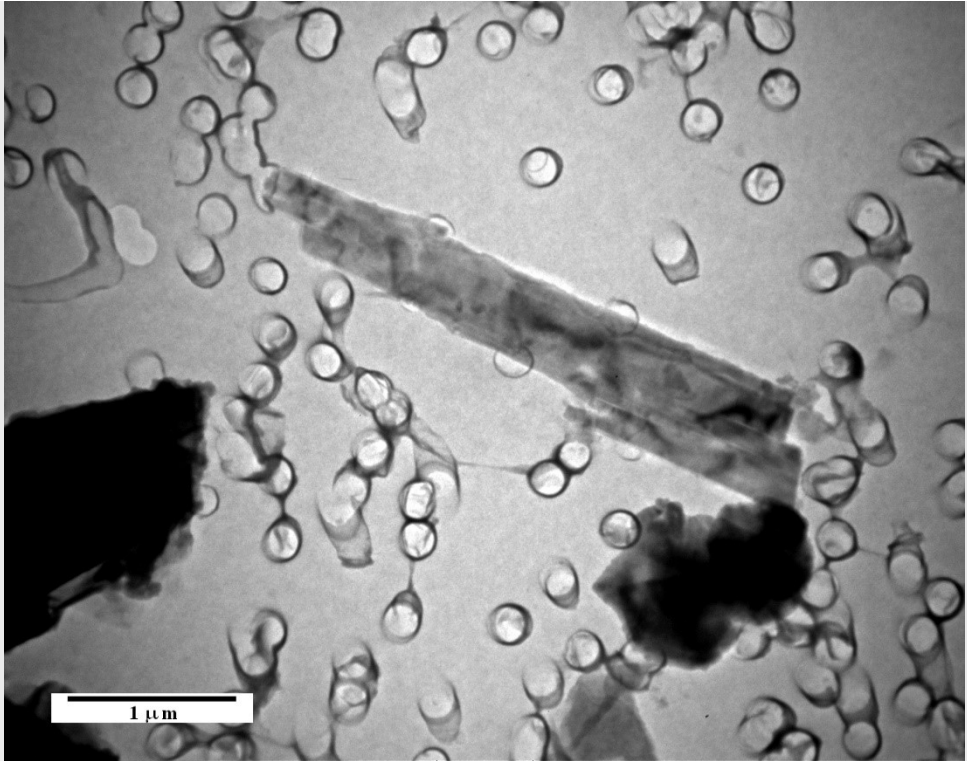
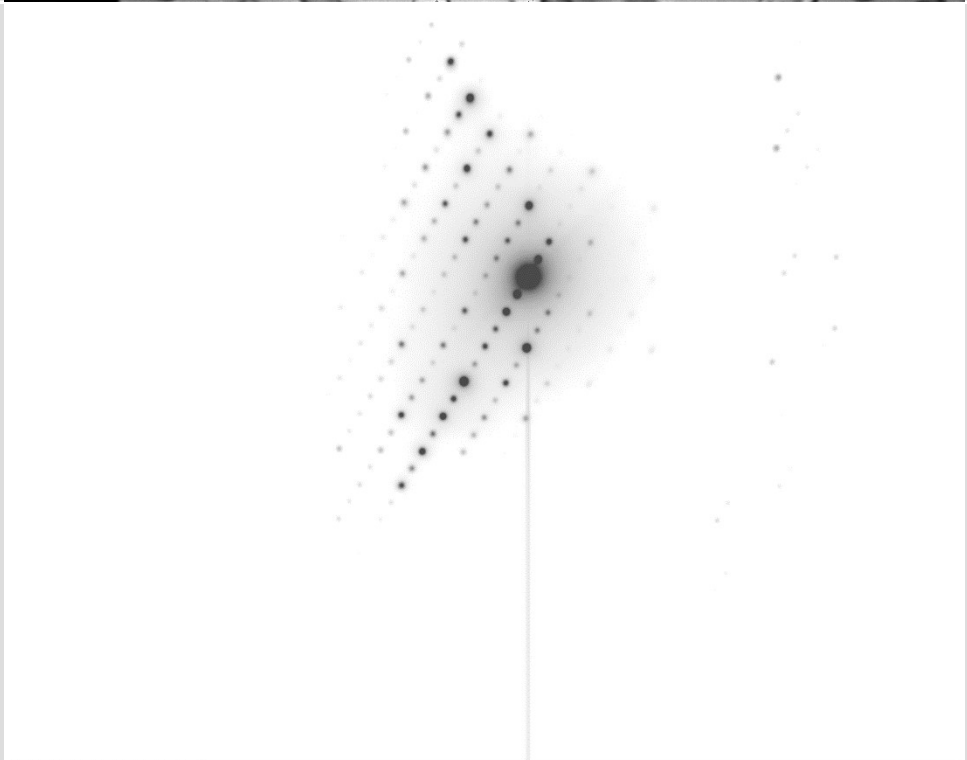
Field / Fiber	Image
6 / 2	
6 / 4	



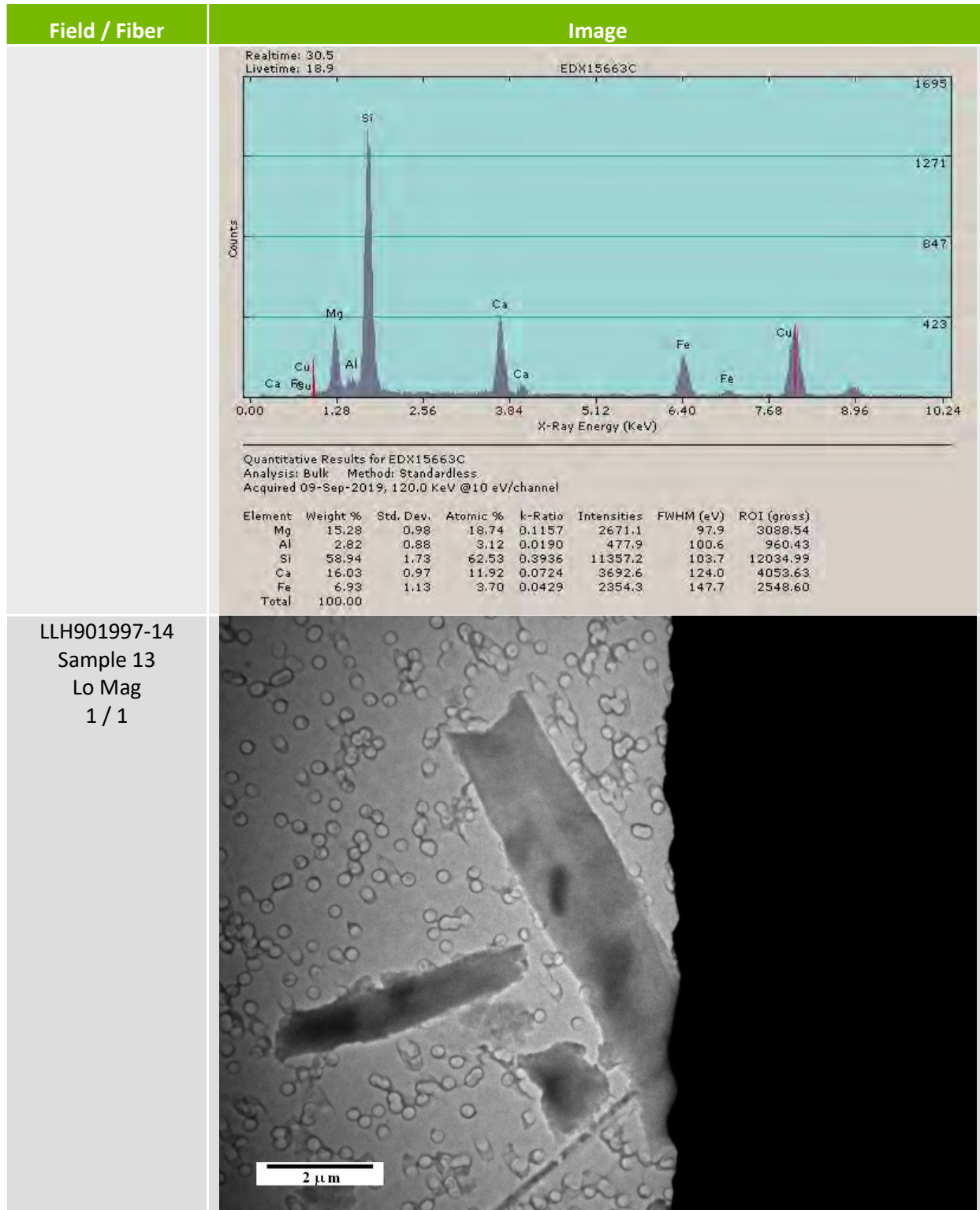
Field / Fiber	Image
6 / 5	 A grayscale micrograph showing a network of interconnected fibers. The fibers are composed of numerous small, roughly spherical or oval particles. A single, thicker fiber runs diagonally from the lower-left towards the upper-right. A white scale bar in the bottom-left corner is labeled "2 μm".
	 A grayscale diffraction pattern corresponding to the fiber above. It features a central dark spot surrounded by a series of smaller, discrete spots arranged in a roughly circular pattern, indicating a degree of structural order or periodicity in the fiber's composition.

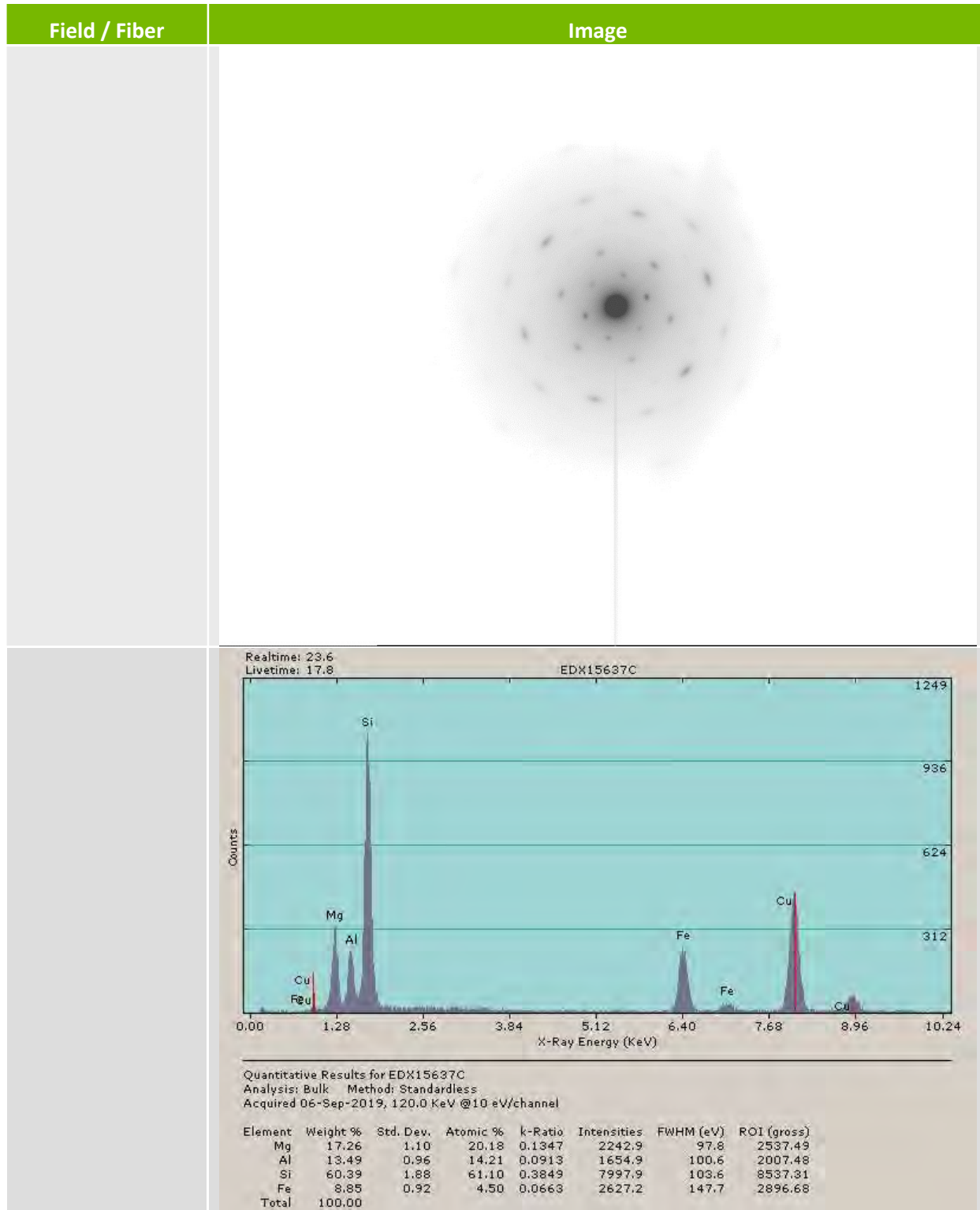


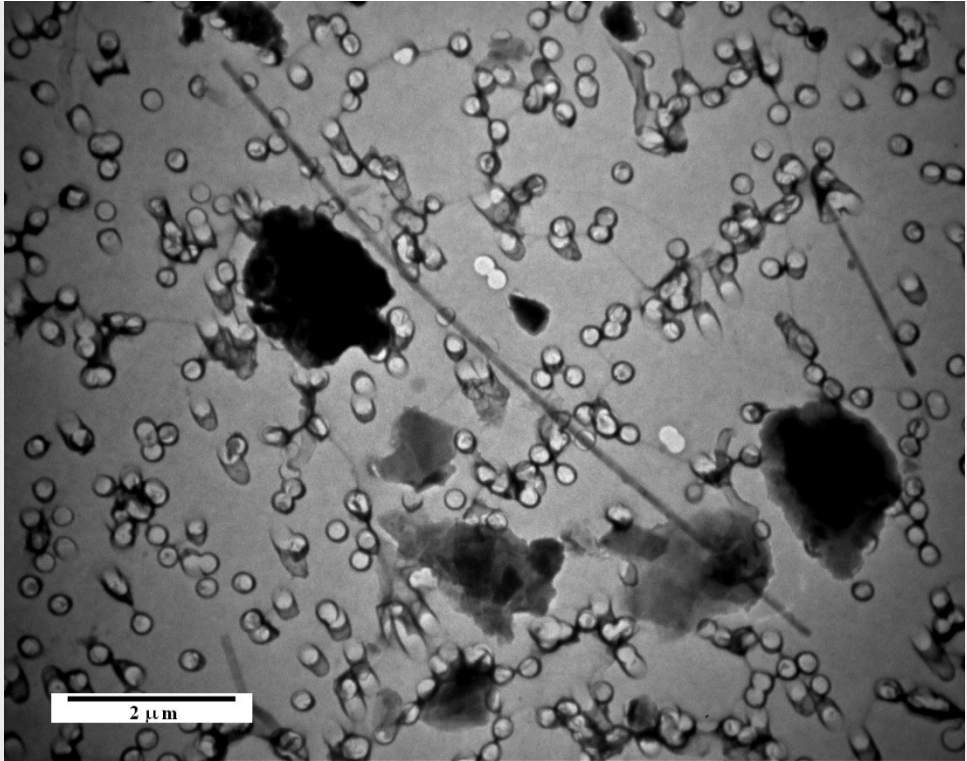
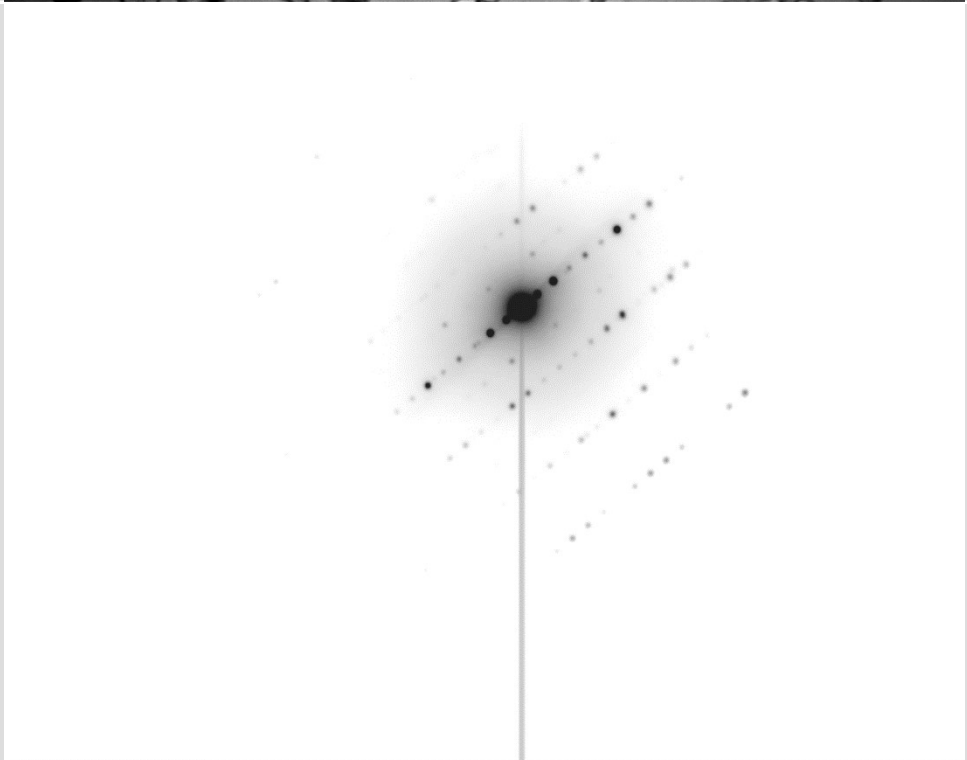


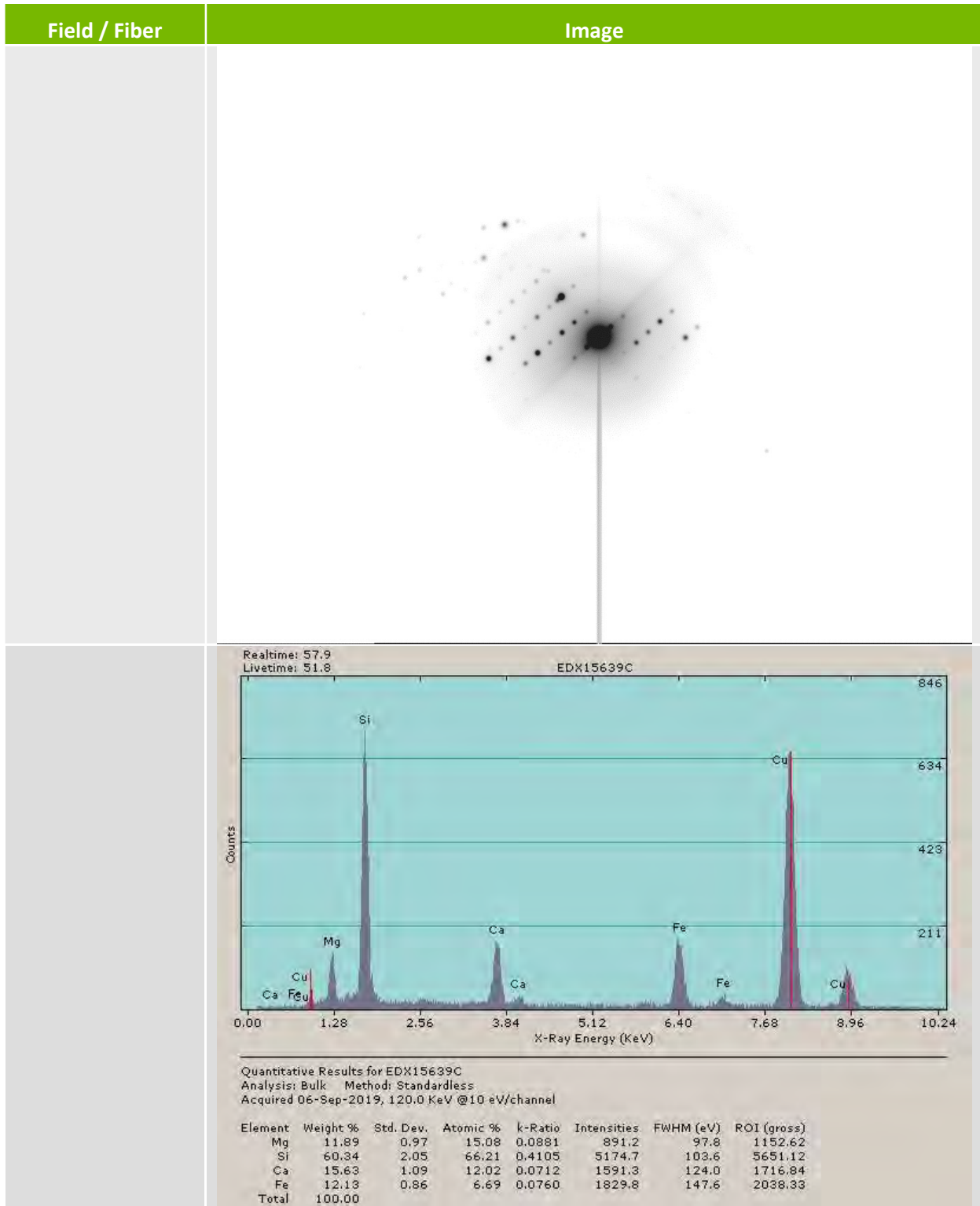
Field / Fiber	Image
8 / 8	 A grayscale micrograph showing a cross-section of a fiber. The fiber is a long, thin, rectangular structure oriented diagonally from the upper left to the lower right. It is surrounded by numerous small, circular, ring-like structures. A white scale bar in the bottom left corner of the image is labeled "1 μm".
	 A grayscale diffraction pattern corresponding to the micrograph above. It shows a central dark spot with a series of smaller, discrete spots arranged in a roughly circular pattern around it, characteristic of a crystalline or semi-crystalline structure.



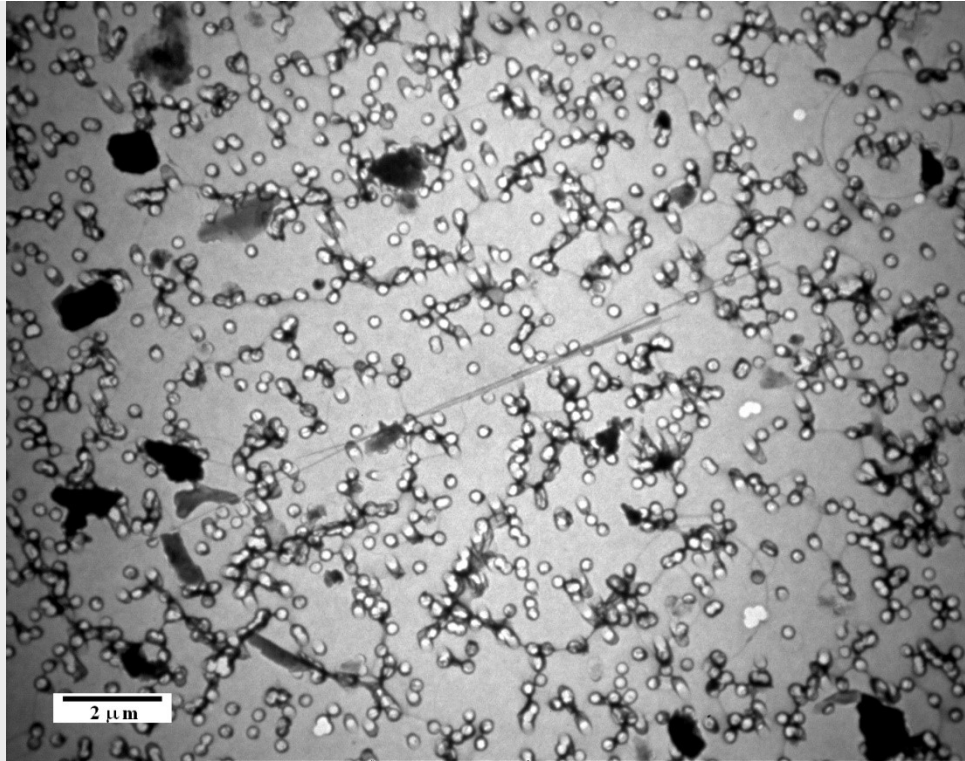
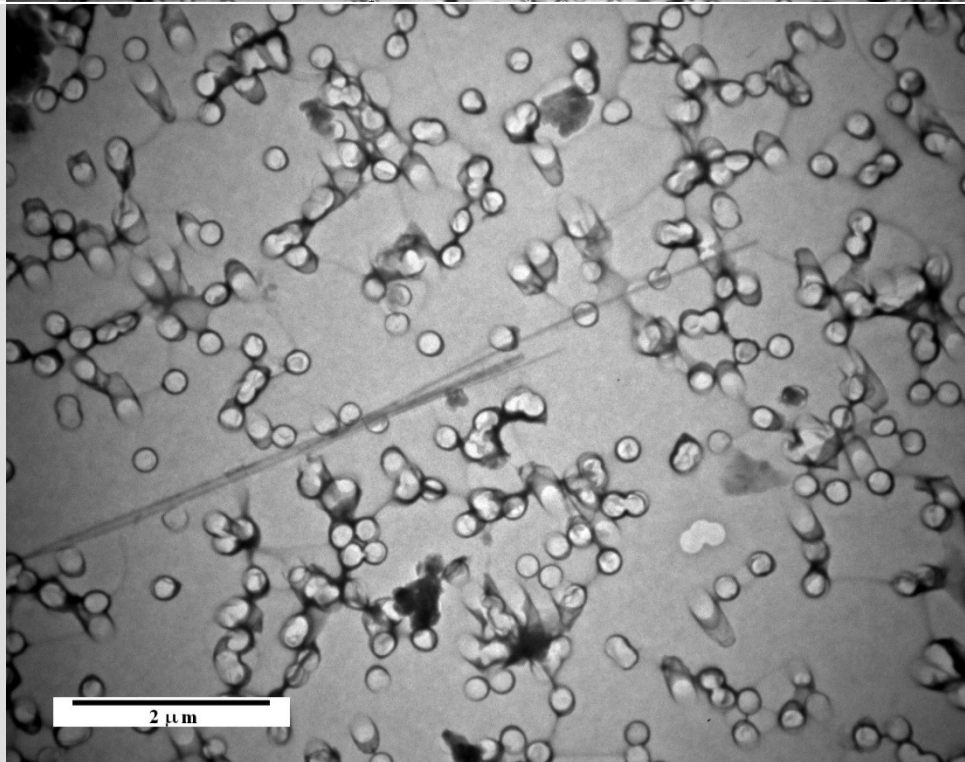


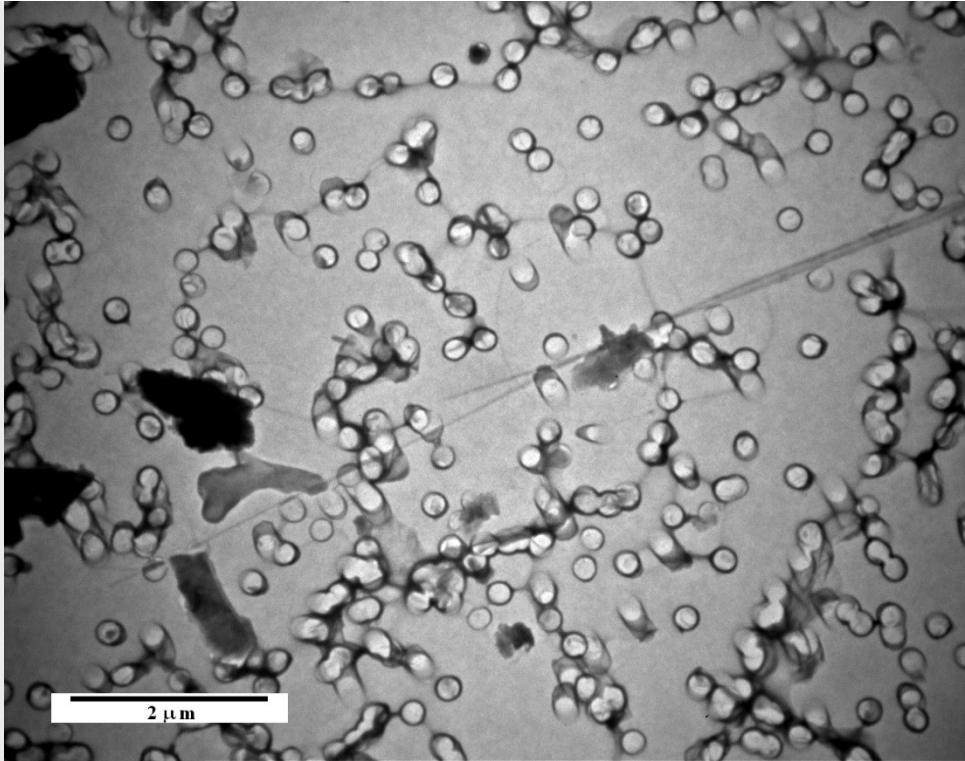
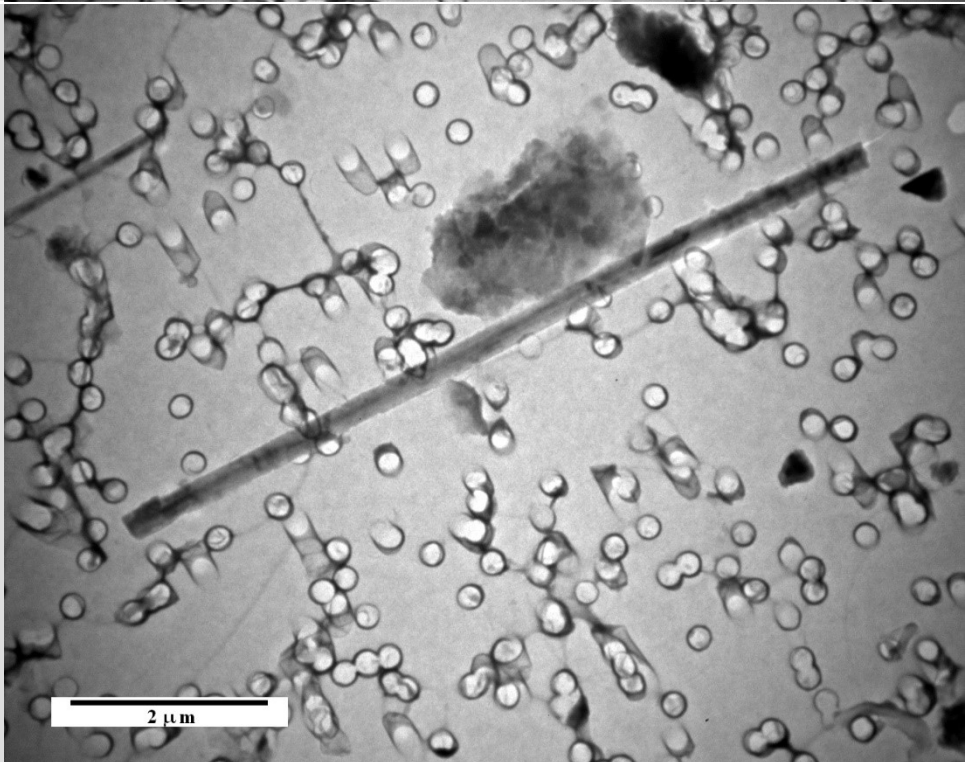


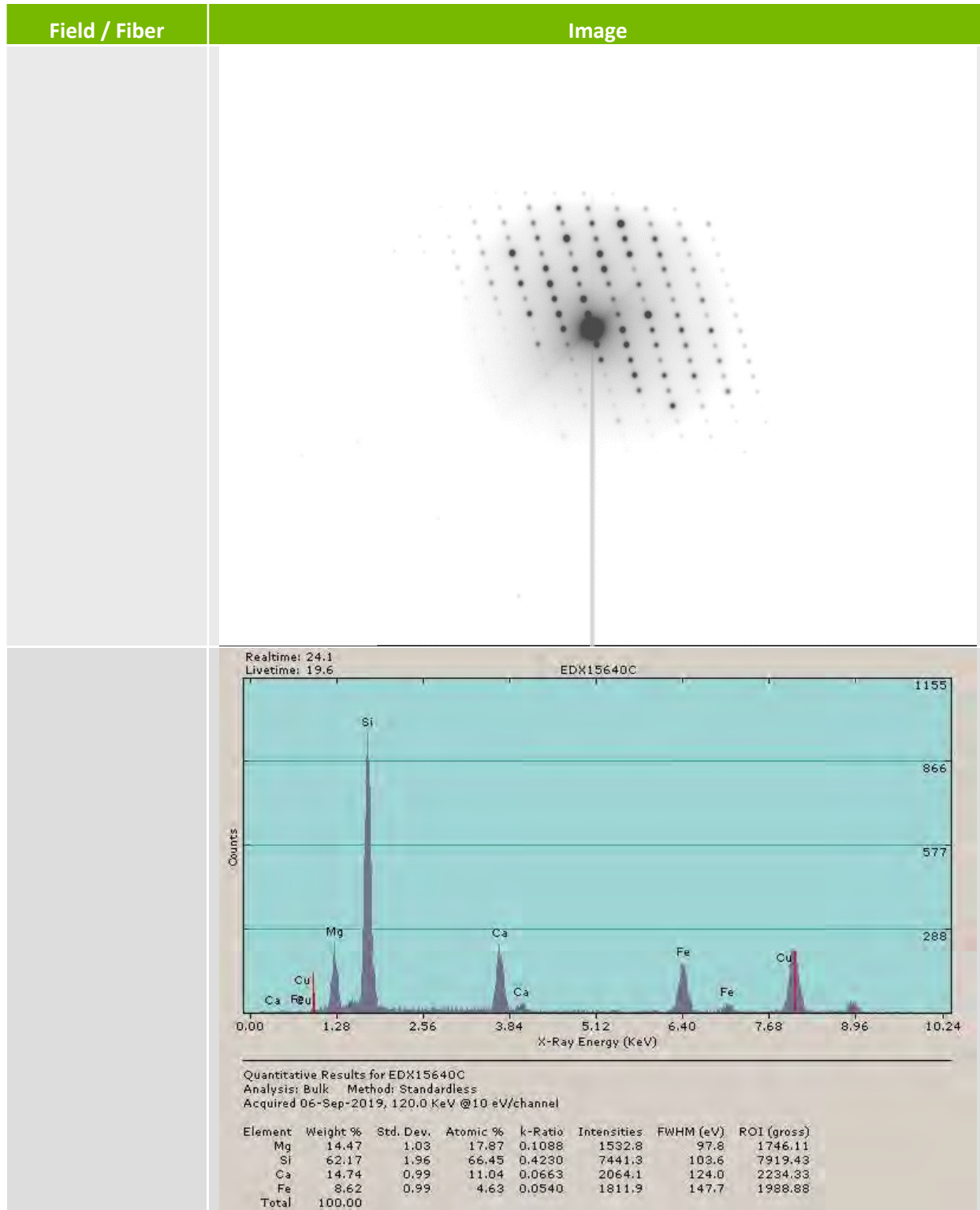
Field / Fiber	Image
7 / 1	 A grayscale micrograph showing a cross-section of a fiber. The central core is a dark, irregularly shaped region. The surrounding cladding is composed of numerous small, circular, light-colored particles or fibers. A scale bar in the bottom left corner indicates a length of 2 μm.
	 A grayscale scatter plot or diffraction pattern. The central region is a dark, irregularly shaped area. The surrounding region is filled with numerous small, light-colored spots or dots, arranged in a somewhat radial pattern around the center.



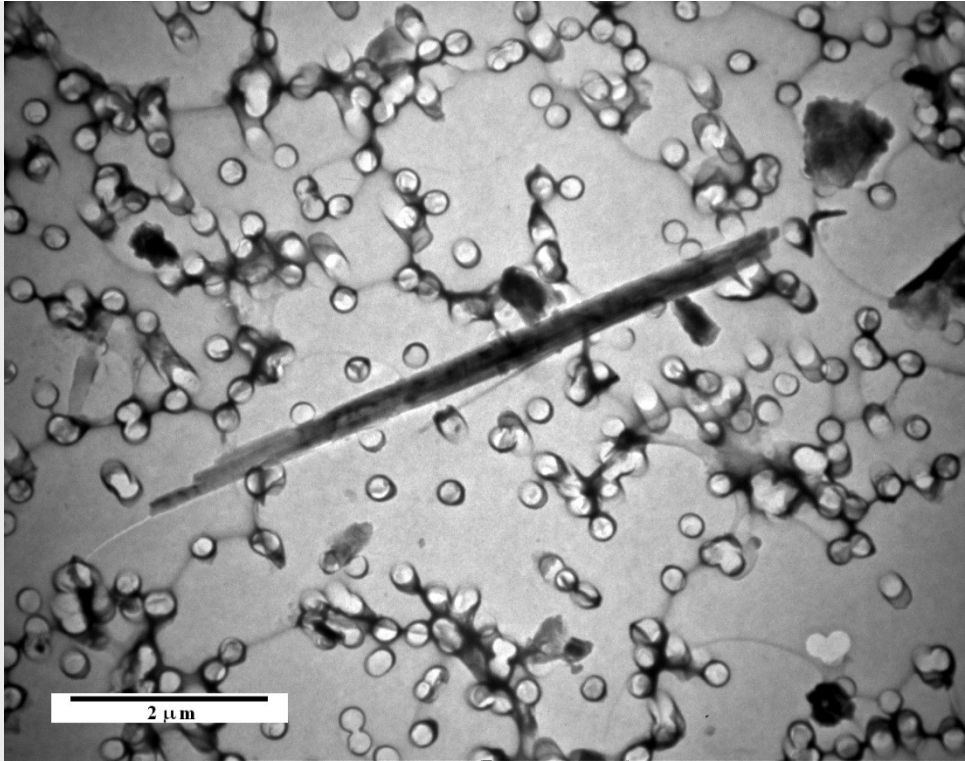
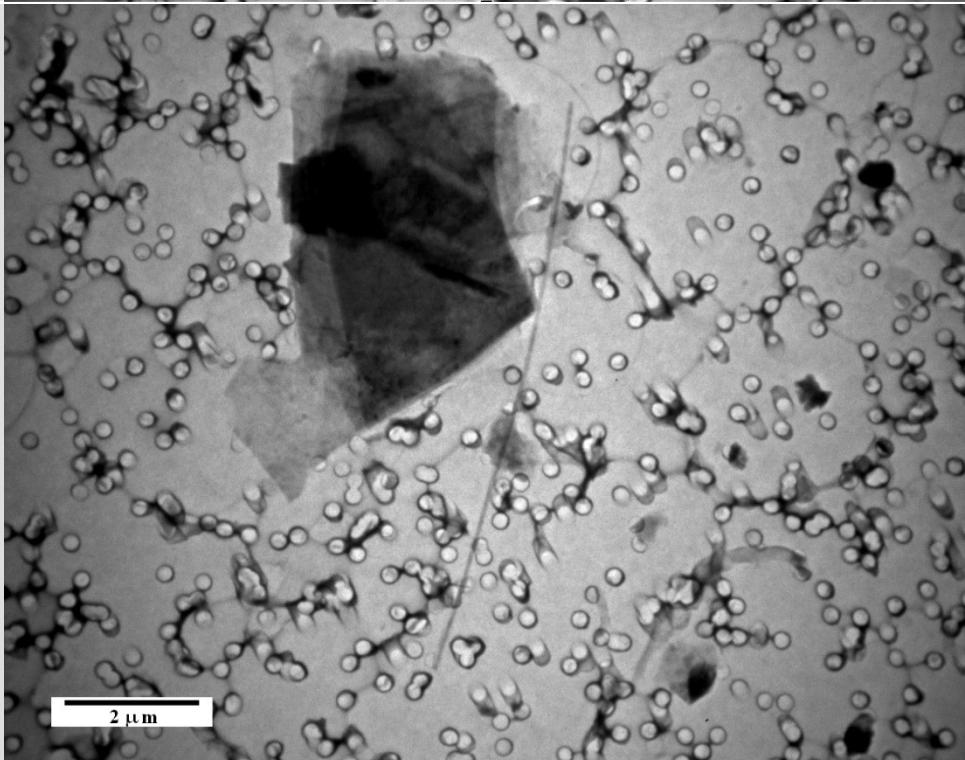


Field / Fiber	Image
8 / 1	 Micrograph showing a dense field of small, circular, light-colored particles (likely fibers or cells) against a darker background. A scale bar in the bottom left corner indicates 2 μm.
	 Micrograph showing a dense field of small, circular, light-colored particles (likely fibers or cells) against a darker background. A scale bar in the bottom left corner indicates 2 μm.

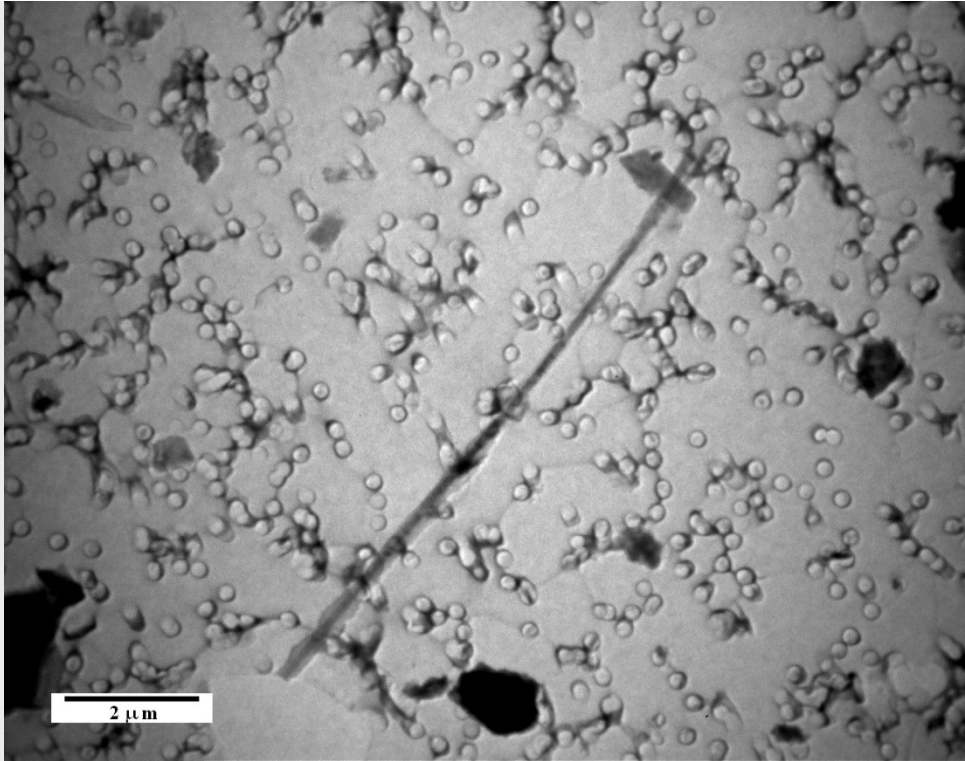
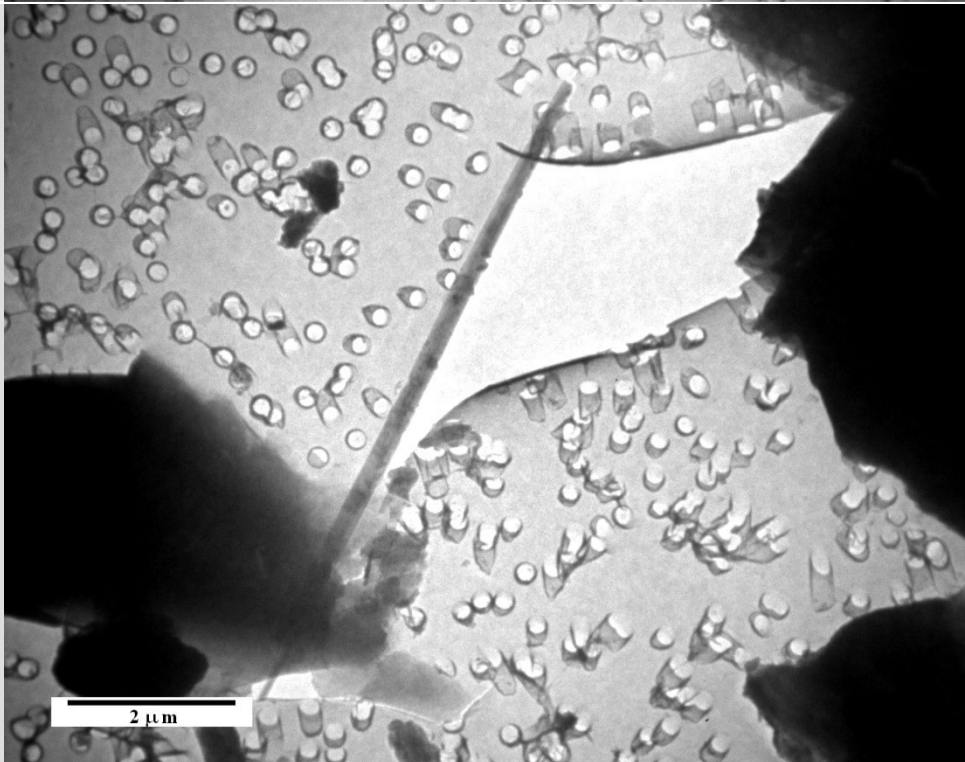
Field / Fiber	Image
	 A grayscale micrograph showing a dense field of small, circular, ring-like structures. A dark, irregularly shaped fiber is visible in the lower-left quadrant. A white scale bar with the text "2 μm" is located in the bottom-left corner of the image area.
8 / 2	 A grayscale micrograph showing a dense field of small, circular, ring-like structures. A dark, irregularly shaped fiber is visible in the upper-right quadrant. A white scale bar with the text "2 μm" is located in the bottom-left corner of the image area.

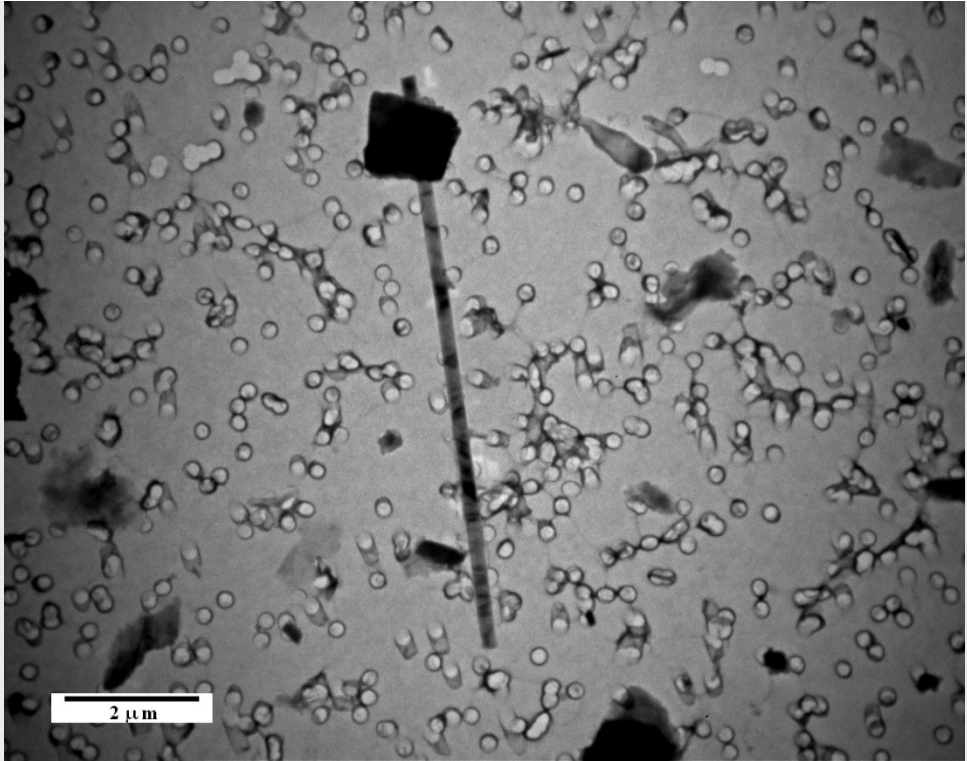
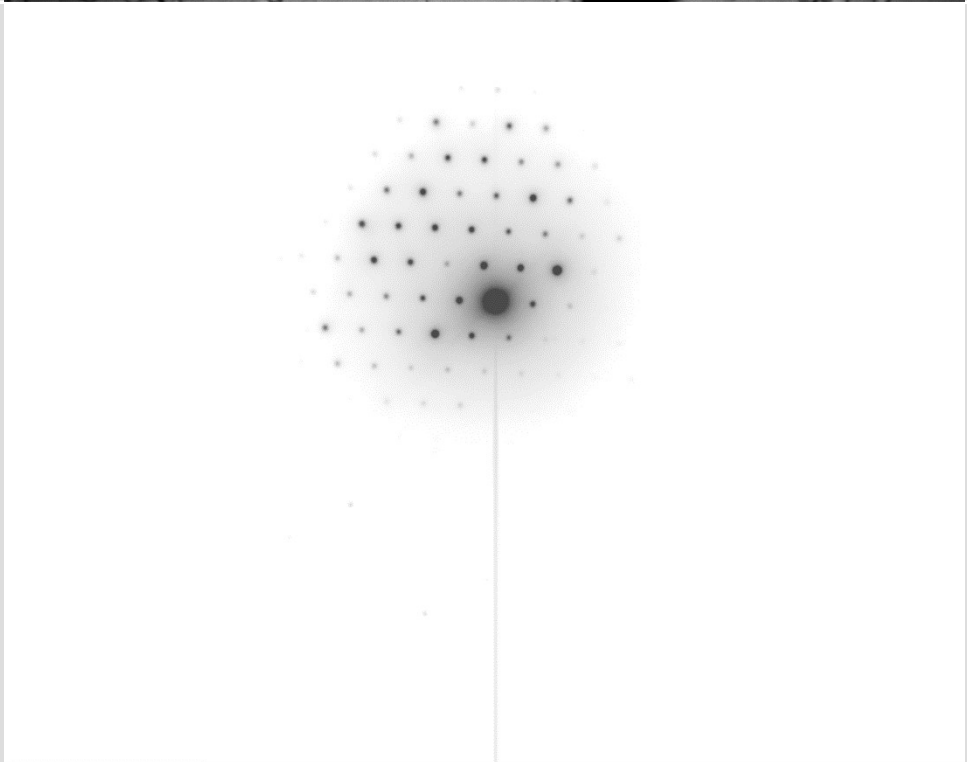


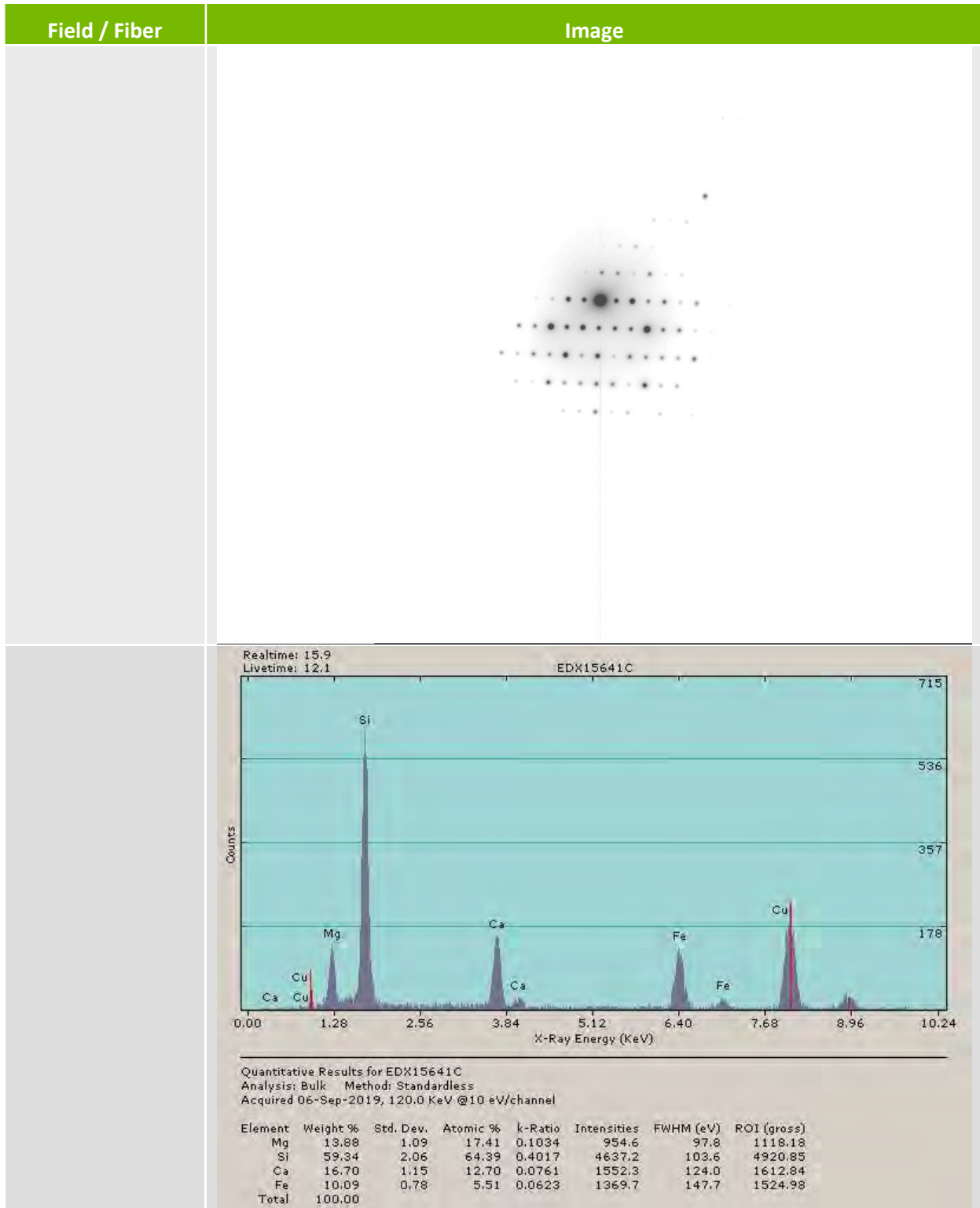


Field / Fiber	Image
10 / 1	 <p>A grayscale micrograph showing a dense field of small, circular, light-colored particles. A single, long, dark, cylindrical fiber is oriented diagonally across the center of the field. A white scale bar in the bottom-left corner of the image is labeled "2 μm".</p>
10 / 2	 <p>A grayscale micrograph showing a dense field of small, circular, light-colored particles. A large, dark, irregularly shaped inclusion is present in the upper-left quadrant. A thin, dark fiber is visible near the center of the field. A white scale bar in the bottom-left corner of the image is labeled "2 μm".</p>

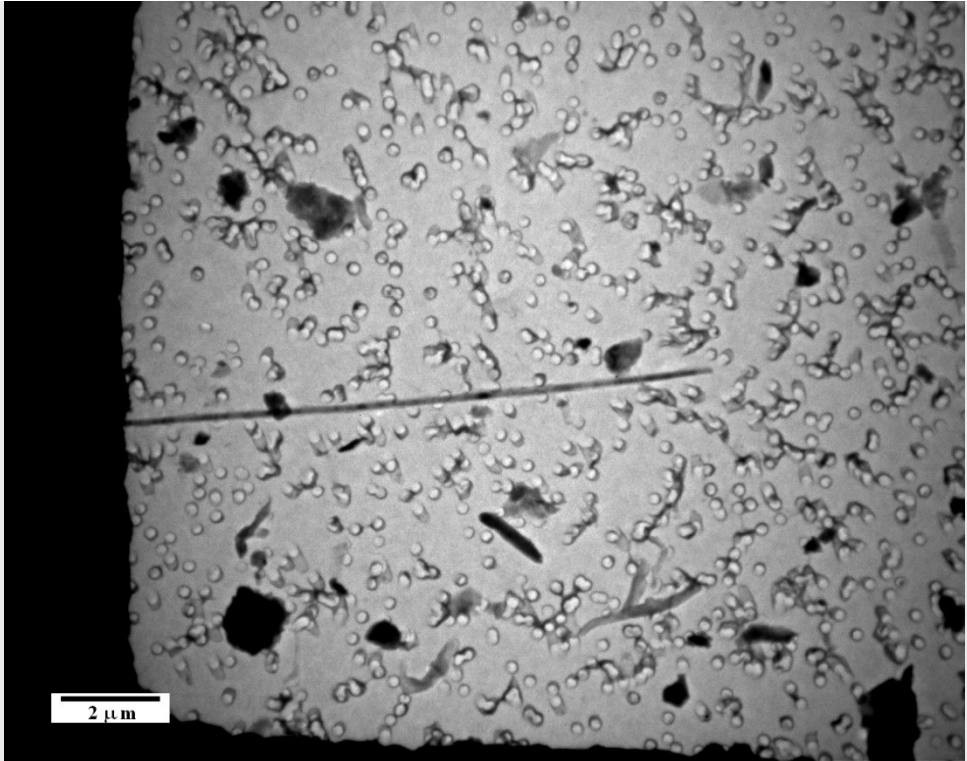
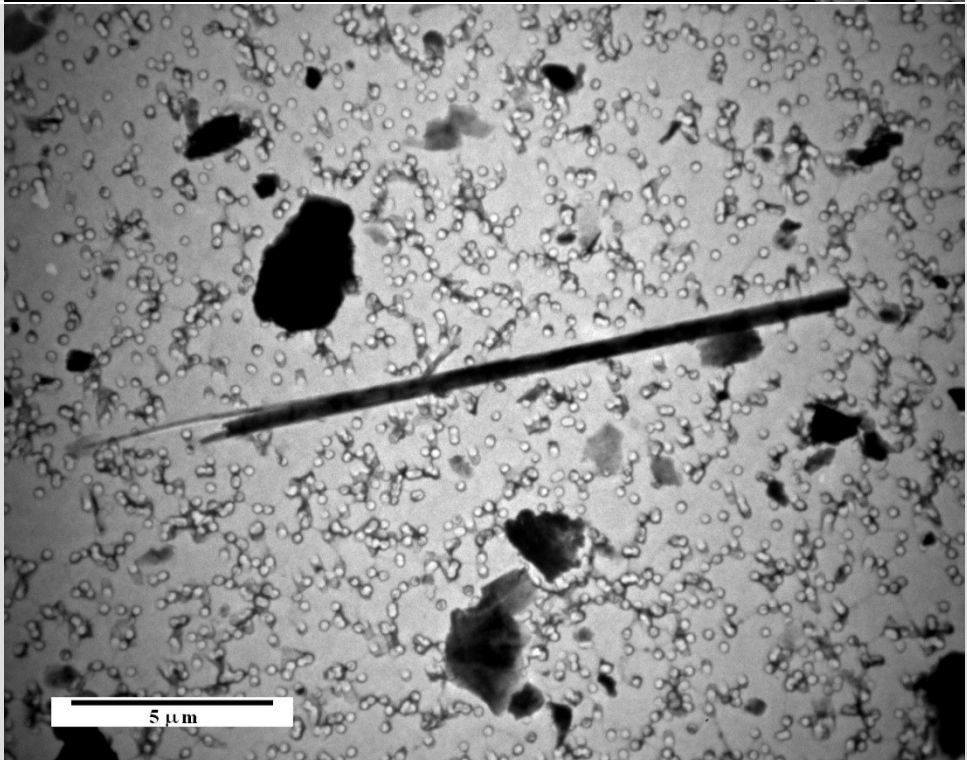


Field / Fiber	Image
12 / 1	 <p>A transmission electron micrograph showing a single, thin, dark fiber oriented diagonally across the frame. The fiber is surrounded by a dense field of small, circular, light-colored particles, likely cross-sections of fibers or small droplets. A scale bar in the bottom left corner indicates a length of 2 μm.</p>
13 / 1	 <p>A transmission electron micrograph showing a single, thin, dark fiber oriented diagonally. The fiber is surrounded by a dense field of small, circular, light-colored particles. A large, dark, irregularly shaped region is visible on the right side of the image, partially overlapping the fiber. A scale bar in the bottom left corner indicates a length of 2 μm.</p>

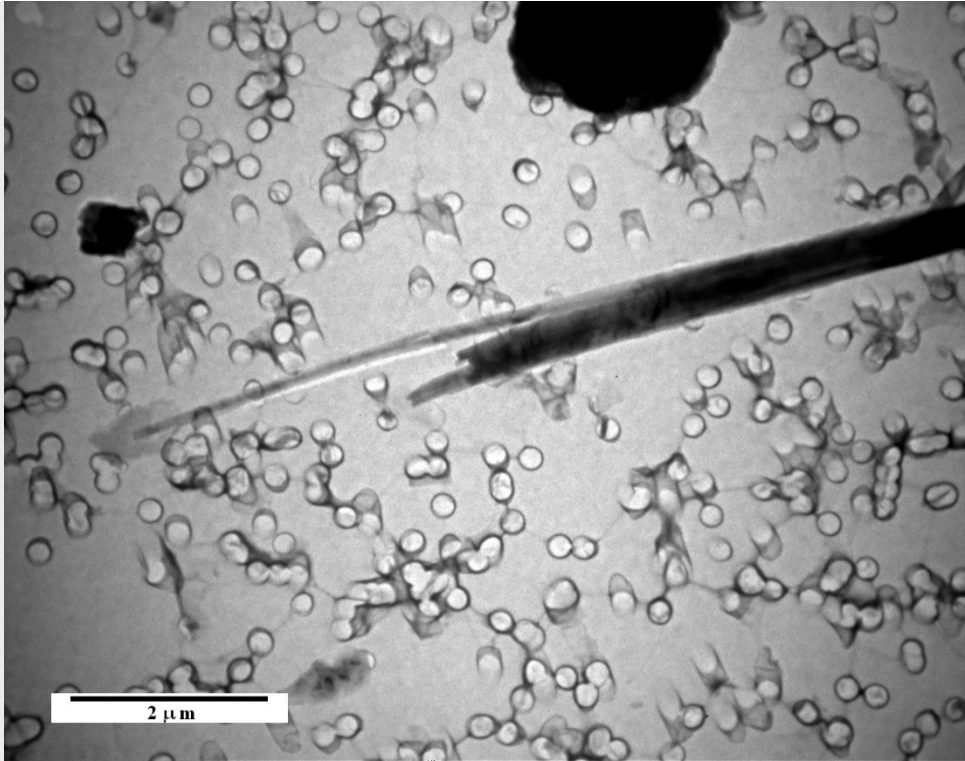
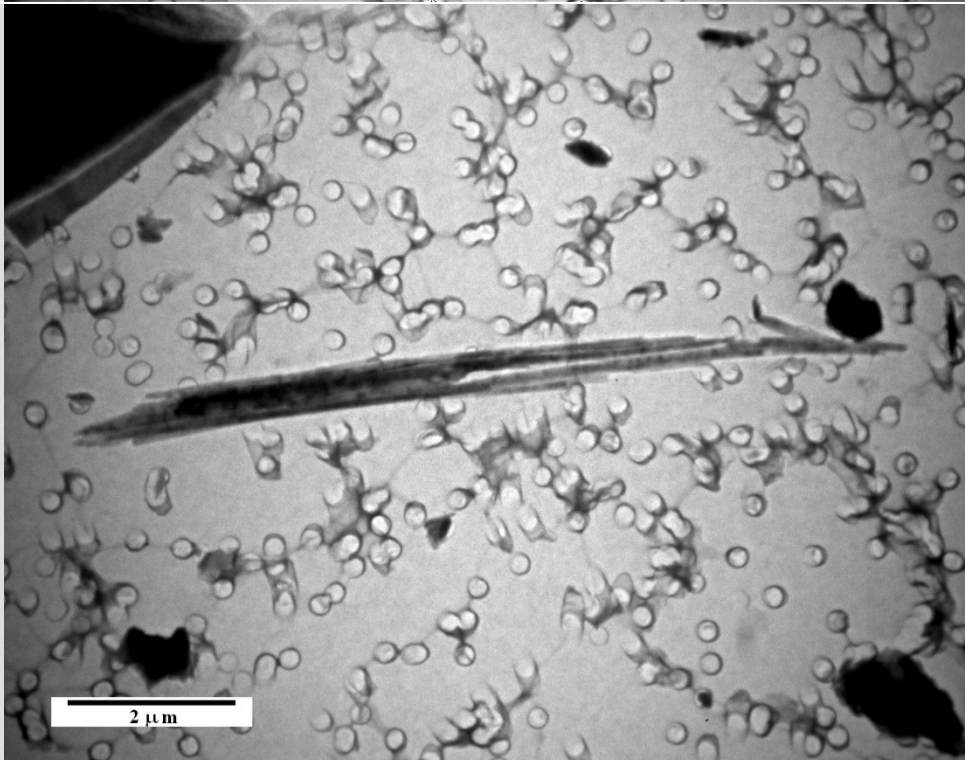
Field / Fiber	Image
14 / 1	 A grayscale micrograph showing a fiber structure. A dark square is attached to a thin vertical line. The background is filled with numerous small, circular, ring-like structures. A scale bar in the bottom left corner indicates 2 μm.
	 A grayscale diffraction pattern showing a central dark spot surrounded by a grid of smaller spots, indicating a periodic structure. A thin vertical line extends downwards from the center of the pattern.

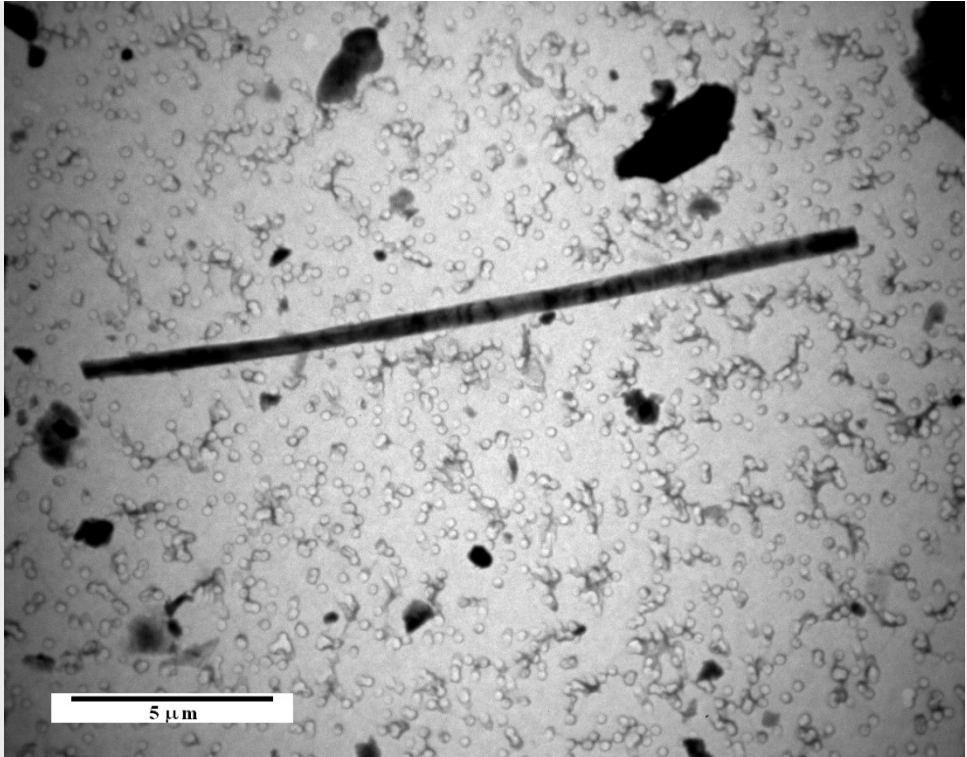
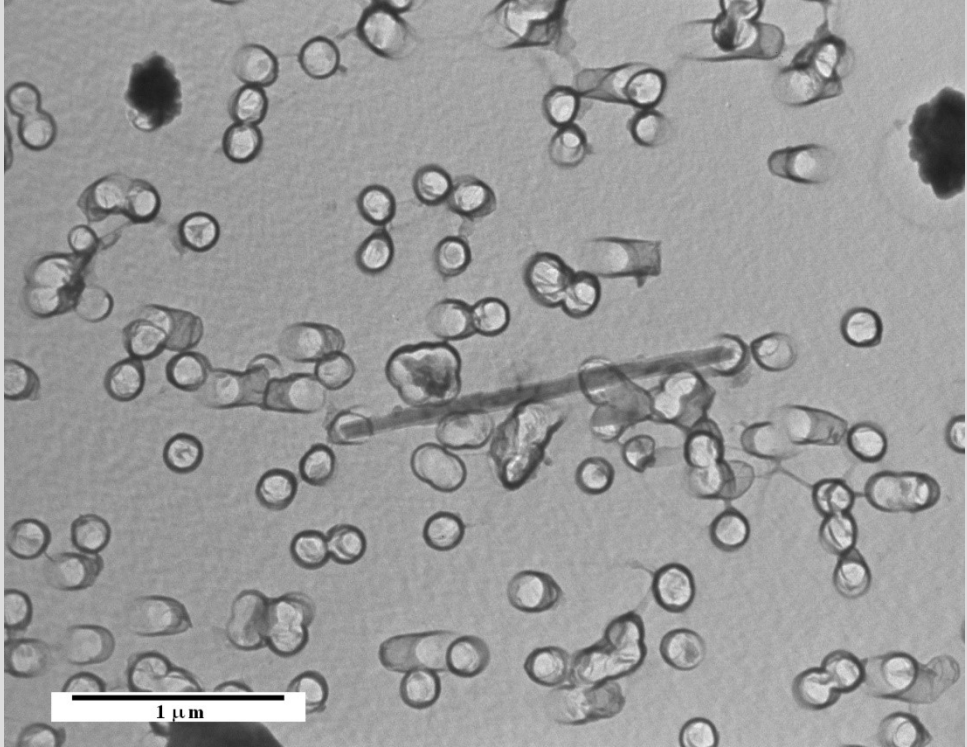


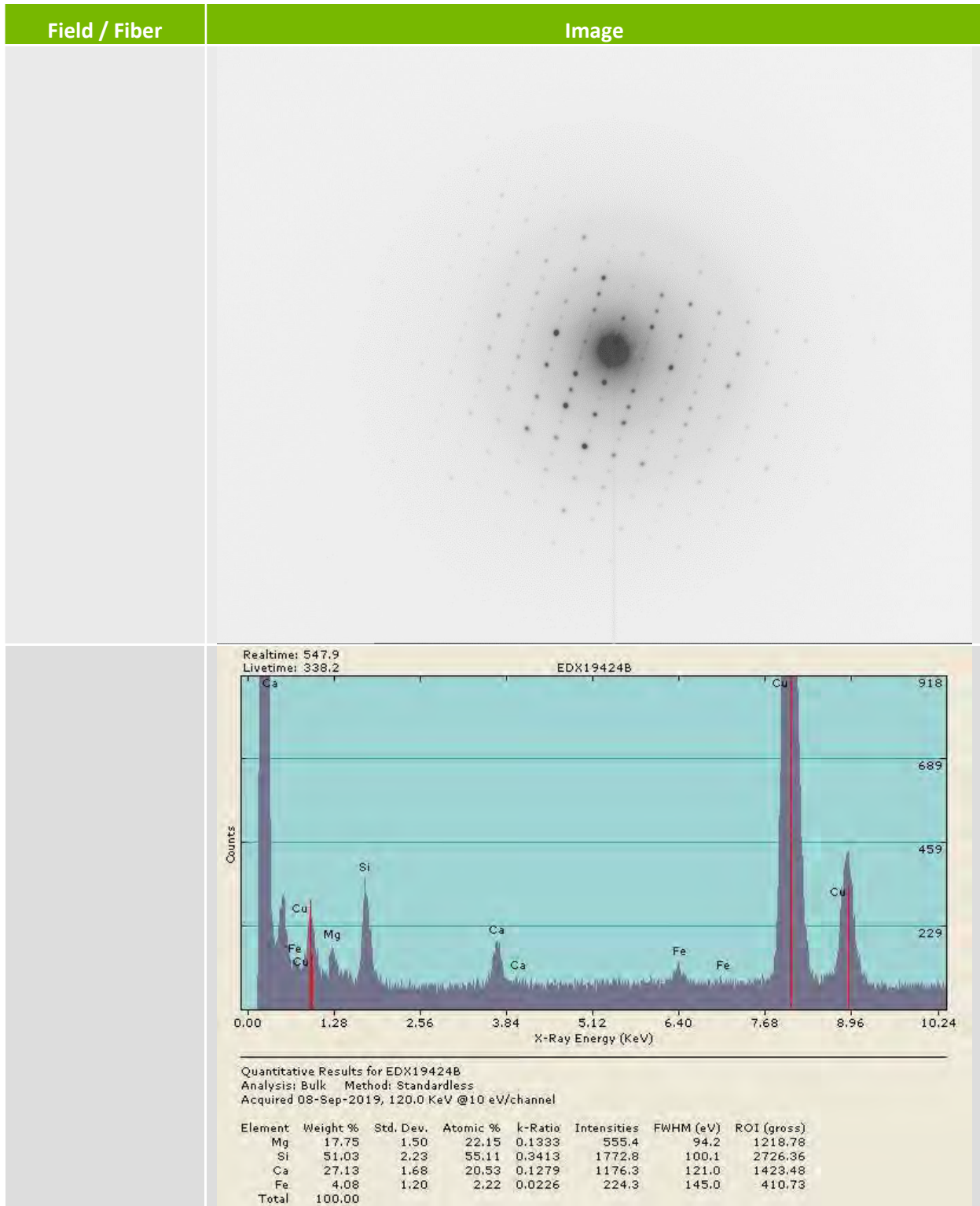


Field / Fiber	Image
16 / 1	 Micrograph showing a cross-section of a fiber with a dark outer boundary and a porous, cellular interior. A thin, dark horizontal line is visible across the center. A scale bar in the bottom left corner indicates 2 μm.
21 / 1	 Micrograph showing a cross-section of a fiber with a dark outer boundary and a porous, cellular interior. A thin, dark horizontal line is visible across the center. A scale bar in the bottom left corner indicates 5 μm.

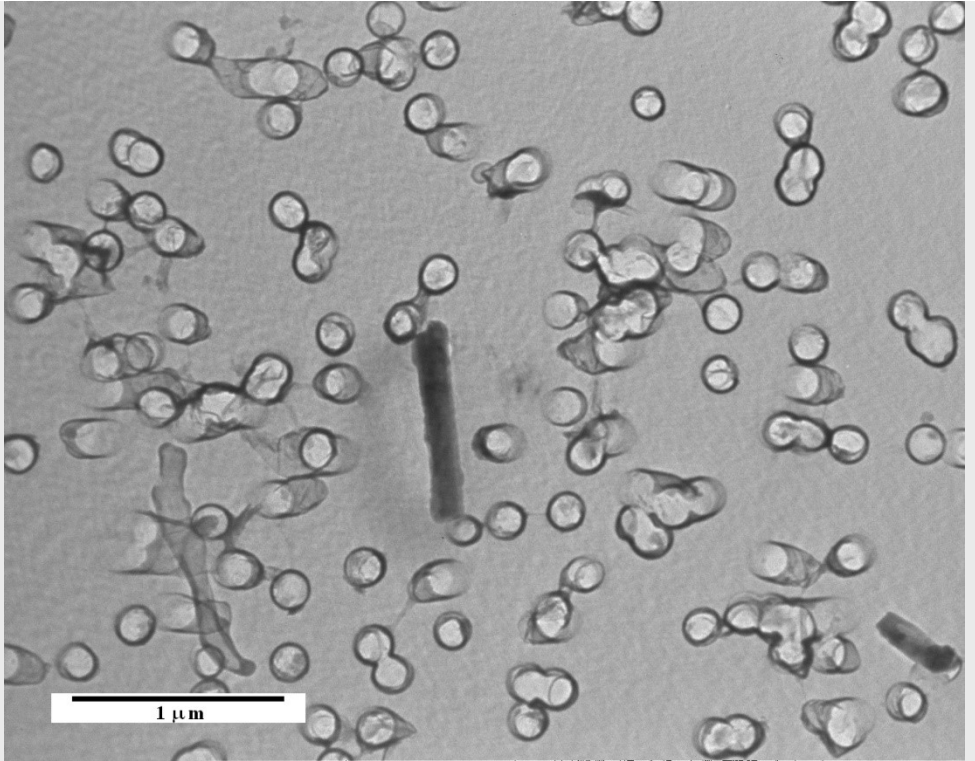
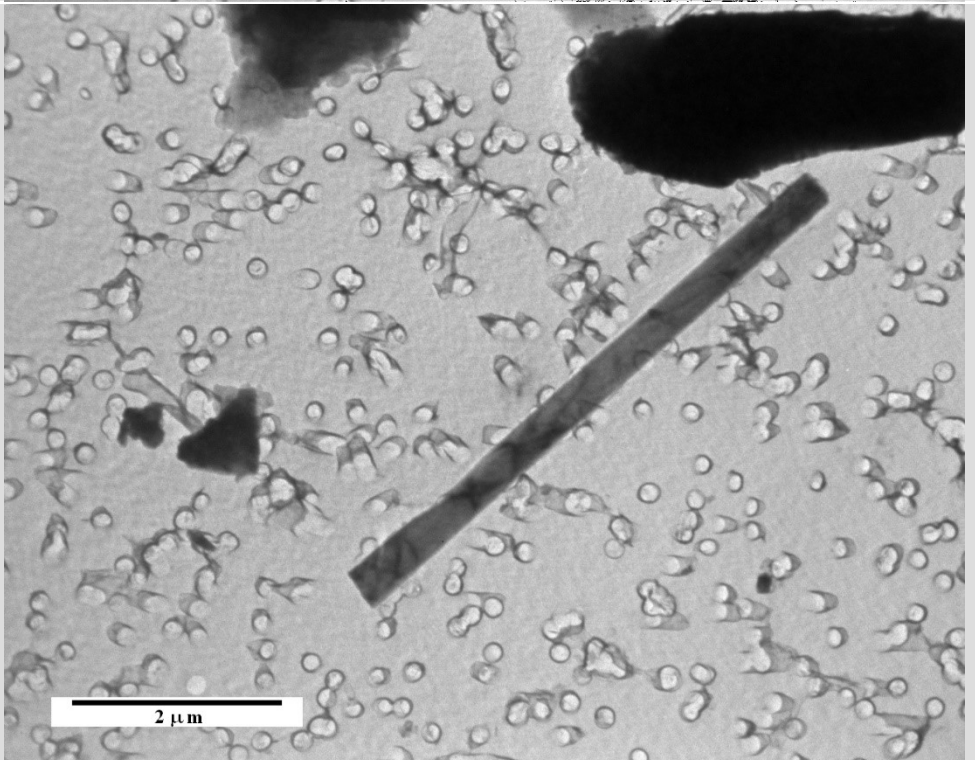


Field / Fiber	Image
	
22 / 1	

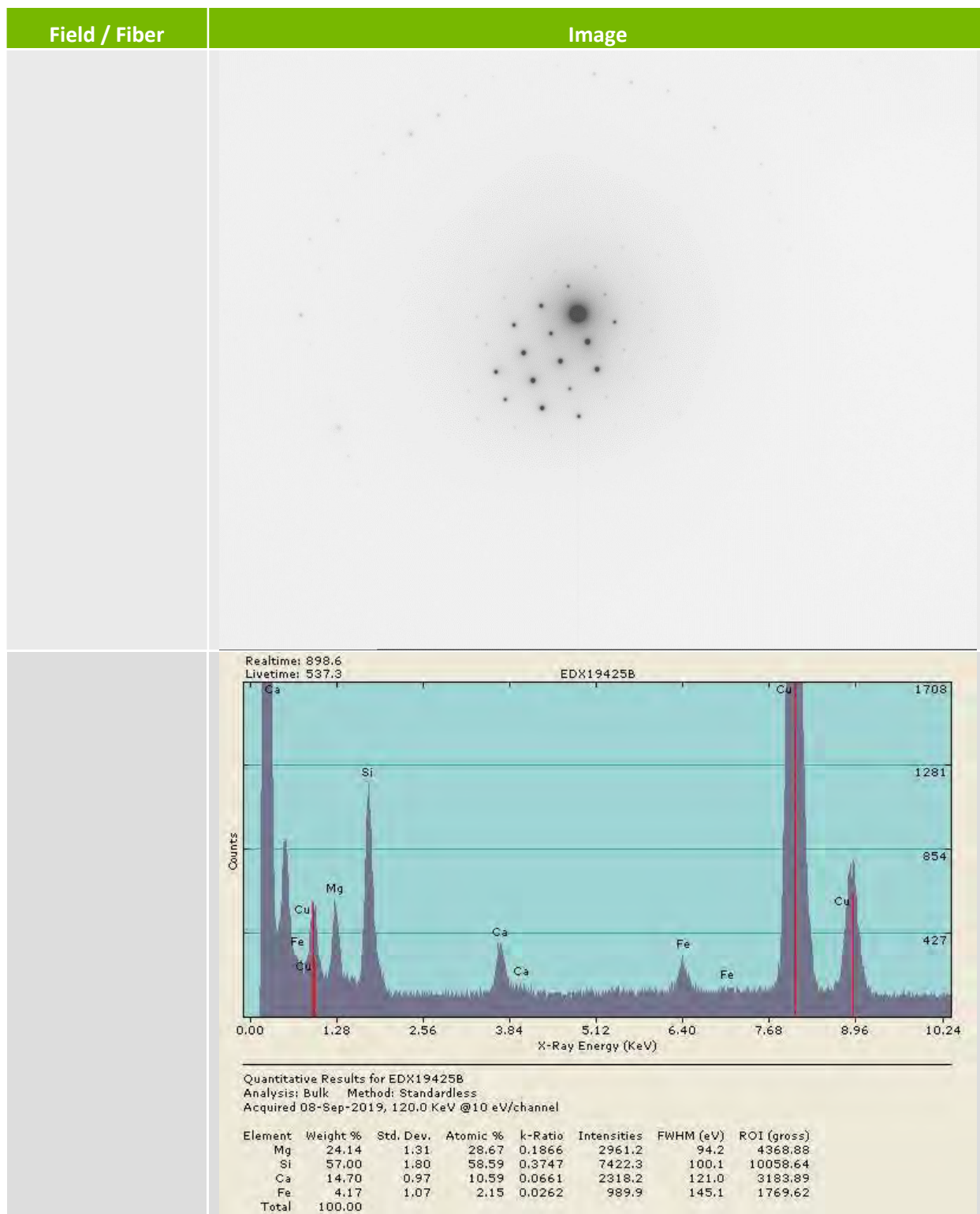
Field / Fiber	Image
25 / 1	 <p>A grayscale micrograph showing a long, thin, dark fiber oriented horizontally across the center. The background is filled with numerous small, circular, light-colored particles, some of which appear to be clustered or attached to the fiber. A white scale bar in the bottom left corner indicates a length of 5 μm.</p>
LLH901997-14 Sample 15 Hi Mag 1 / 1	 <p>A high-magnification grayscale micrograph showing a fiber and many small, circular particles. The fiber is oriented horizontally and appears to have some internal structure or texture. The particles are more clearly defined than in the previous image, showing some internal detail. A white scale bar in the bottom left corner indicates a length of 1 μm.</p>

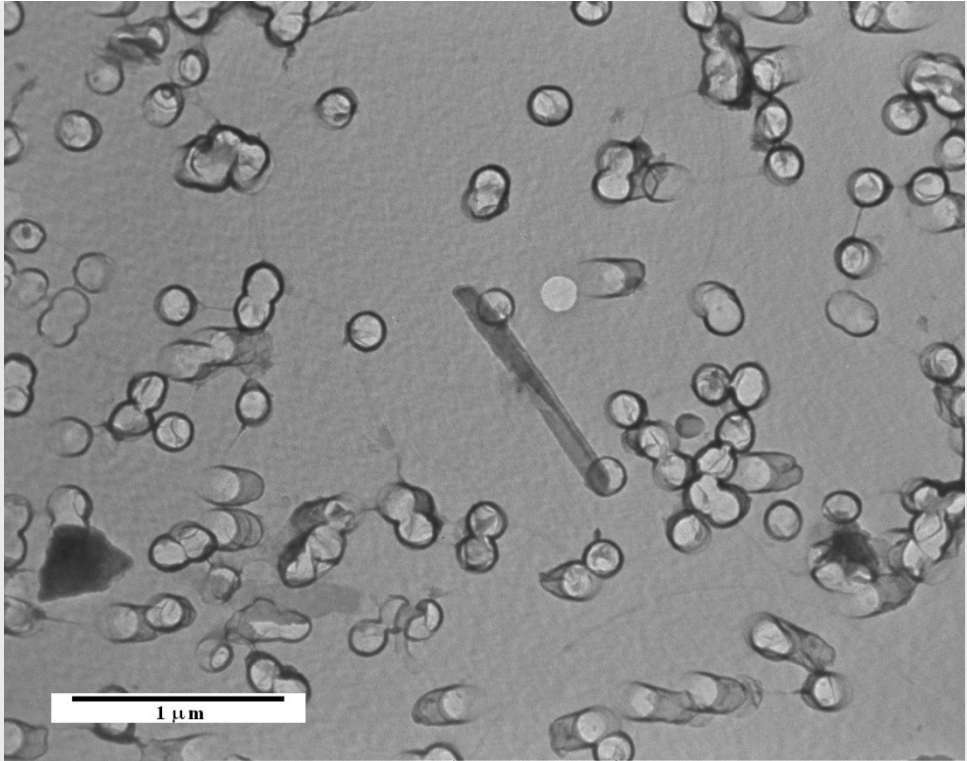
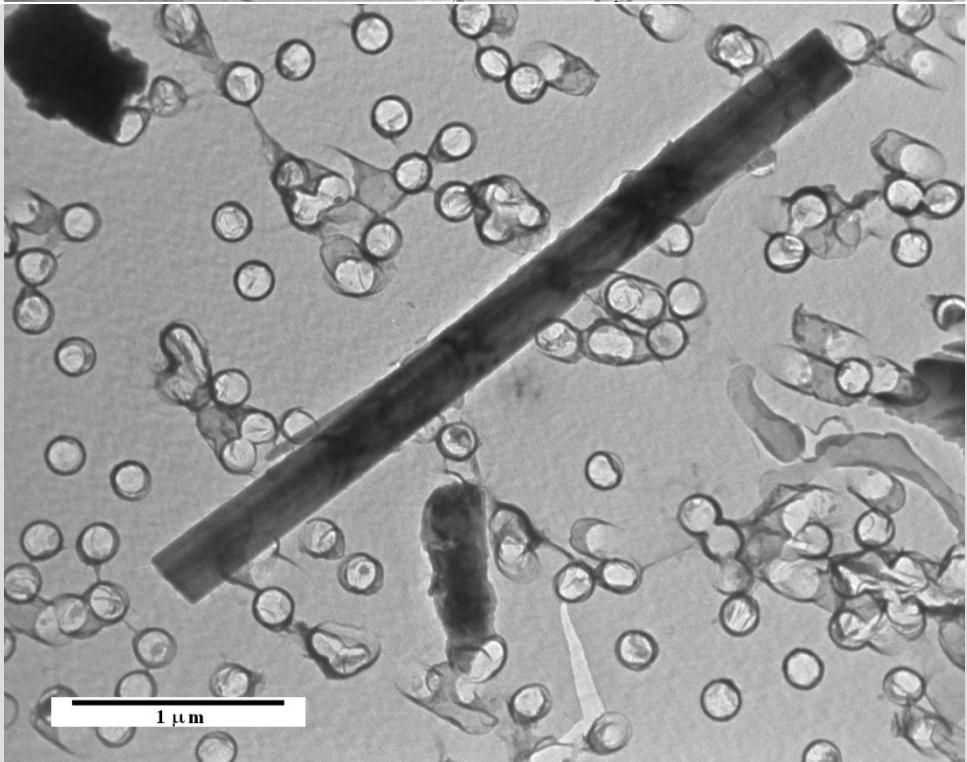


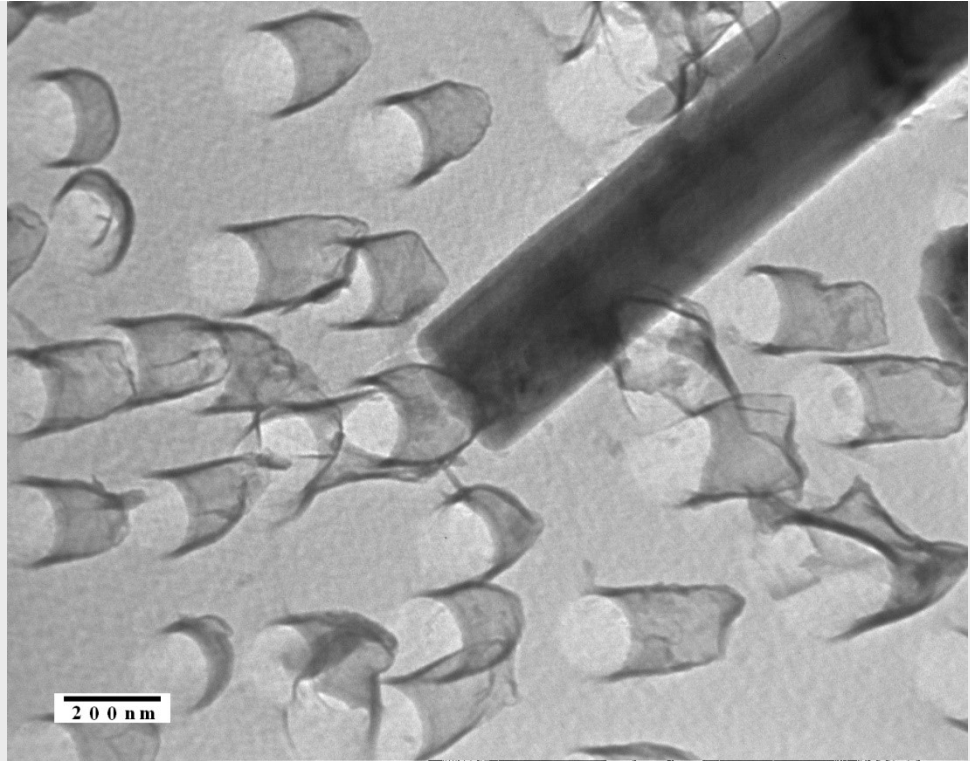
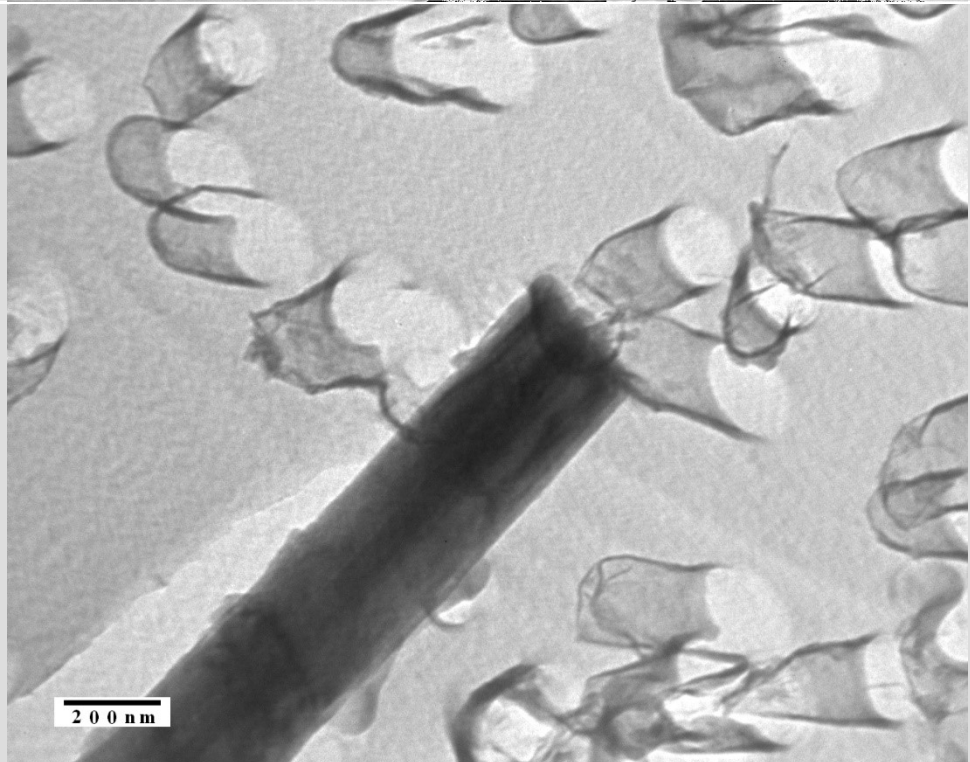


Field / Fiber	Image
2 / 1	 <p>A transmission electron micrograph showing a dense field of small, roughly spherical particles. A single, elongated, cylindrical fiber is visible in the center. A scale bar at the bottom left indicates 1 μm.</p>
3 / 1	 <p>A transmission electron micrograph showing a dense field of small, roughly spherical particles. A single, elongated, cylindrical fiber is visible in the center. A scale bar at the bottom left indicates 2 μm.</p>

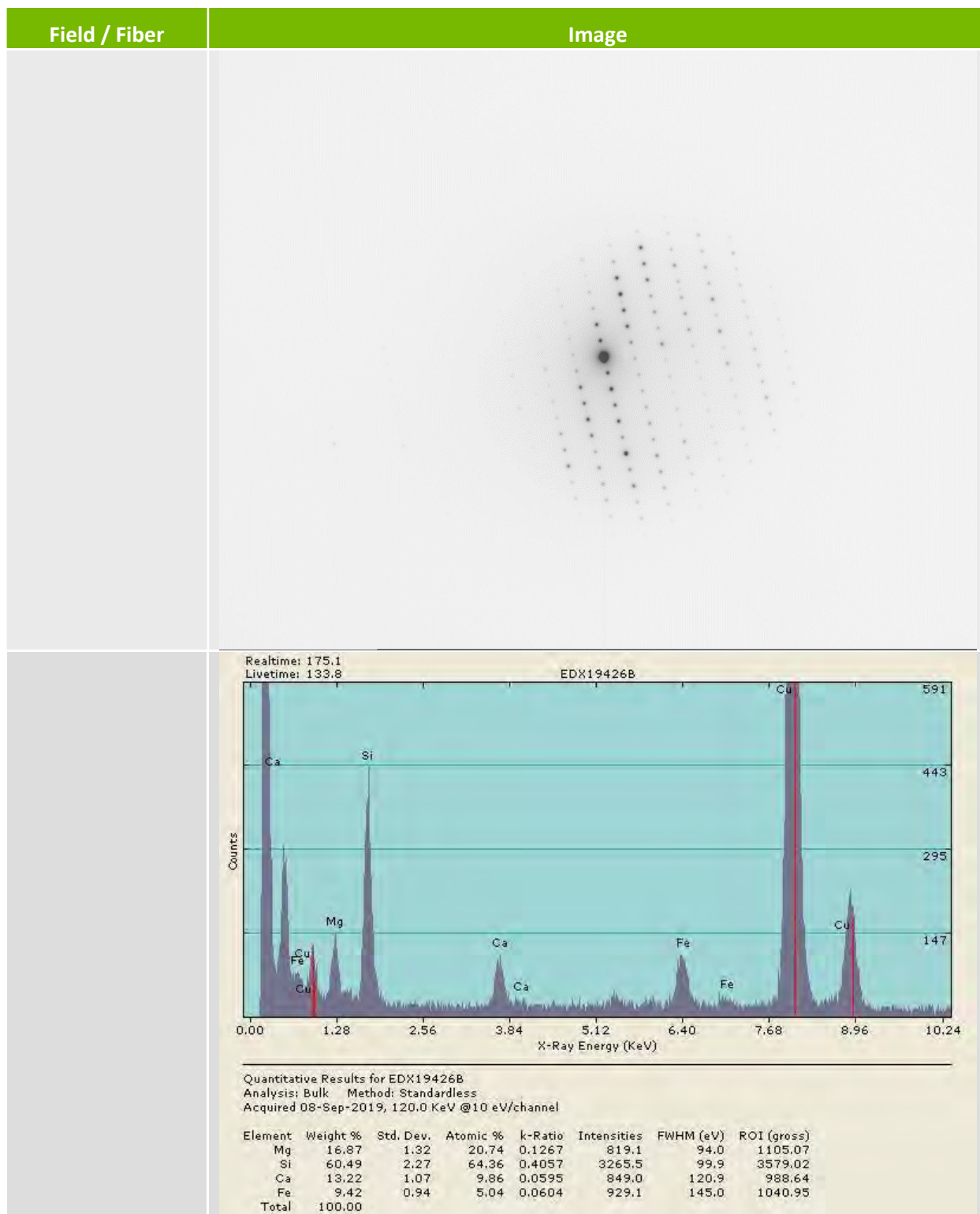




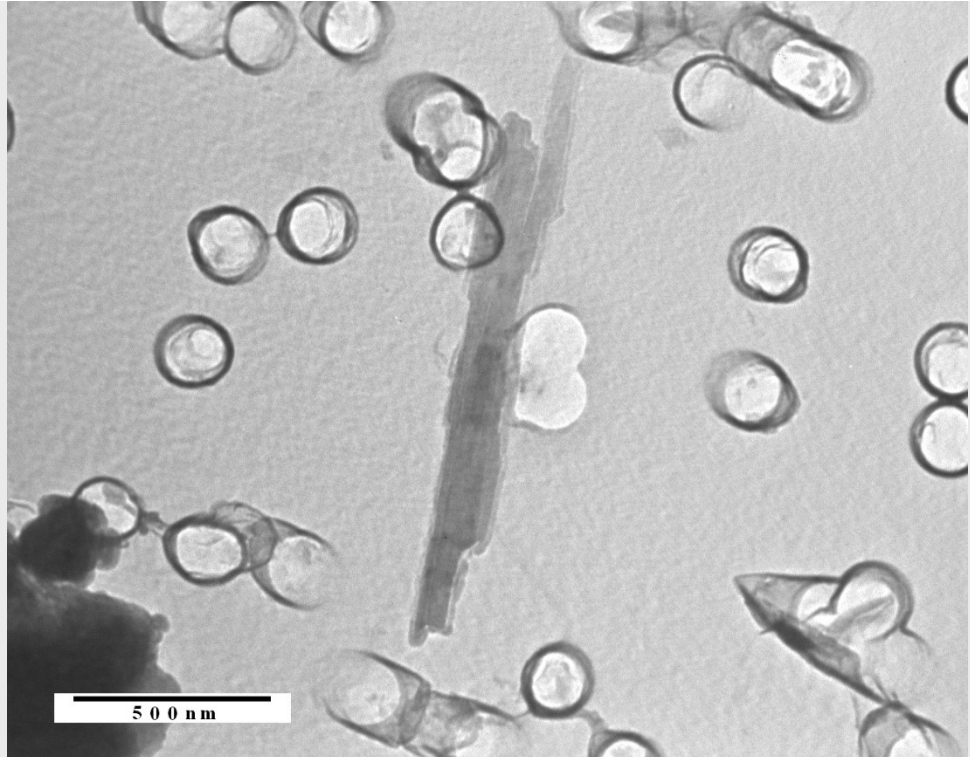
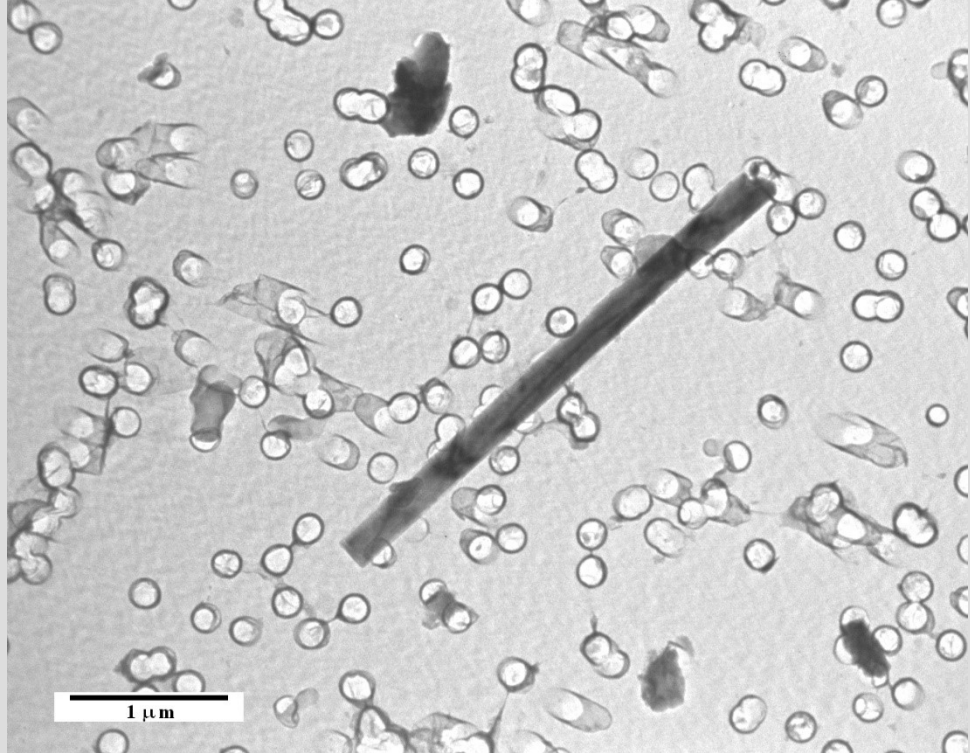
Field / Fiber	Image
4 / 1	
7 / 1	

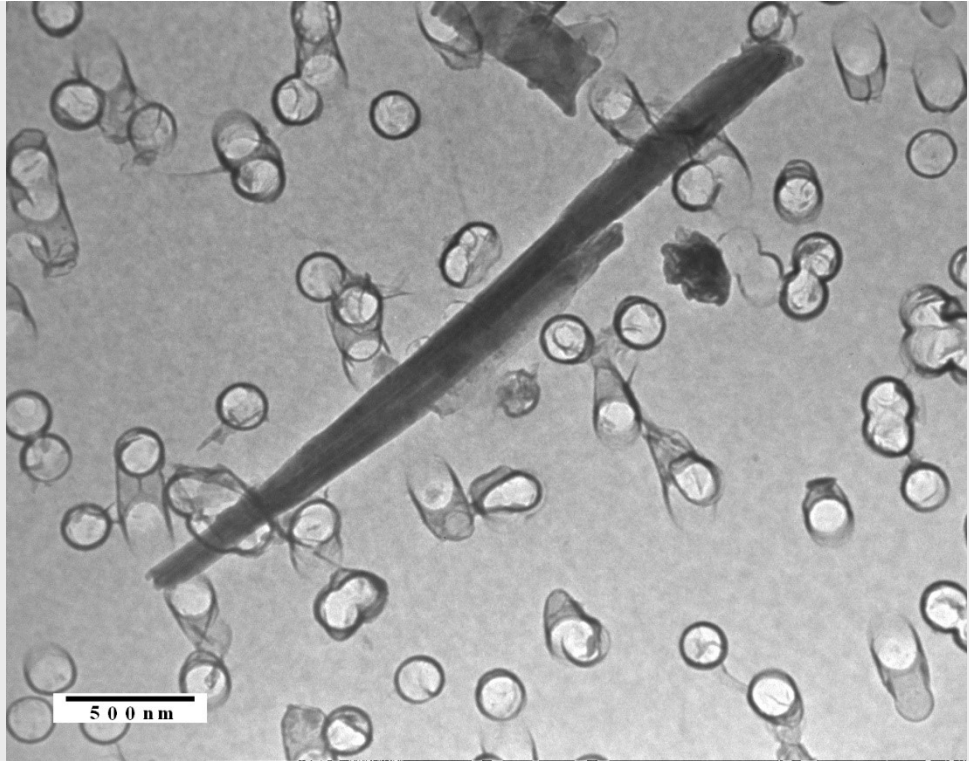
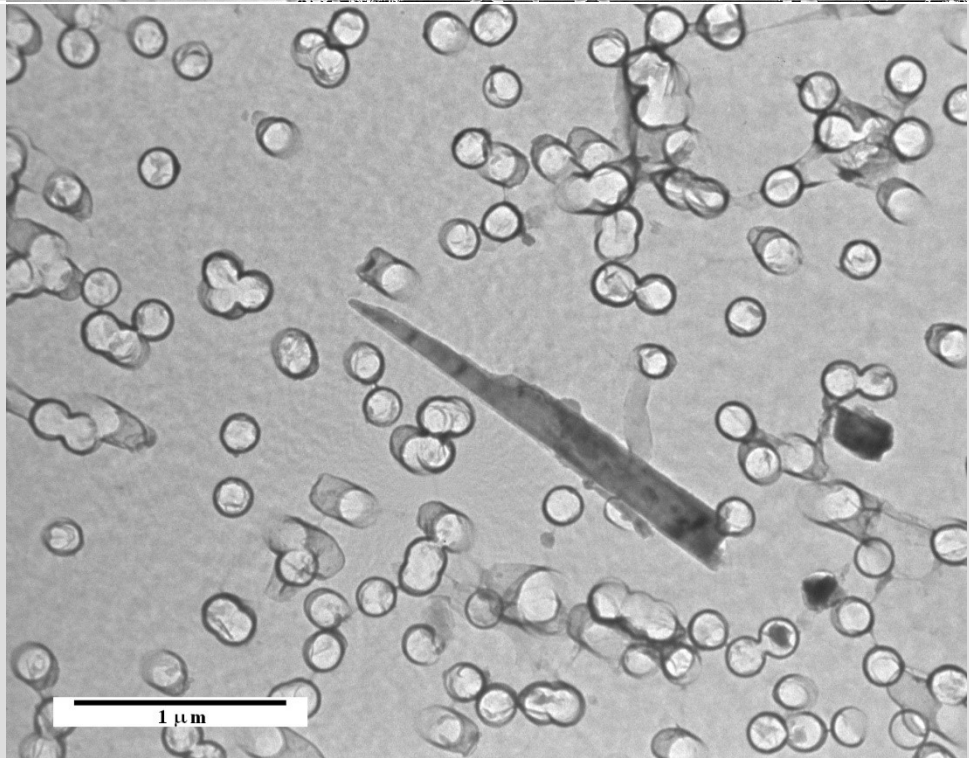
Field / Fiber	Image
	 <p>A transmission electron micrograph (TEM) showing a dark, cylindrical fiber oriented diagonally from the top right towards the center. The background is filled with a dense field of smaller, similar fibers, many of which are curved or bent. A white scale bar in the bottom left corner of the image is labeled "200 nm".</p>
	 <p>A transmission electron micrograph (TEM) showing a dark, cylindrical fiber oriented diagonally from the bottom left towards the center. The background is filled with a dense field of smaller, similar fibers, many of which are curved or bent. A white scale bar in the bottom left corner of the image is labeled "200 nm".</p>



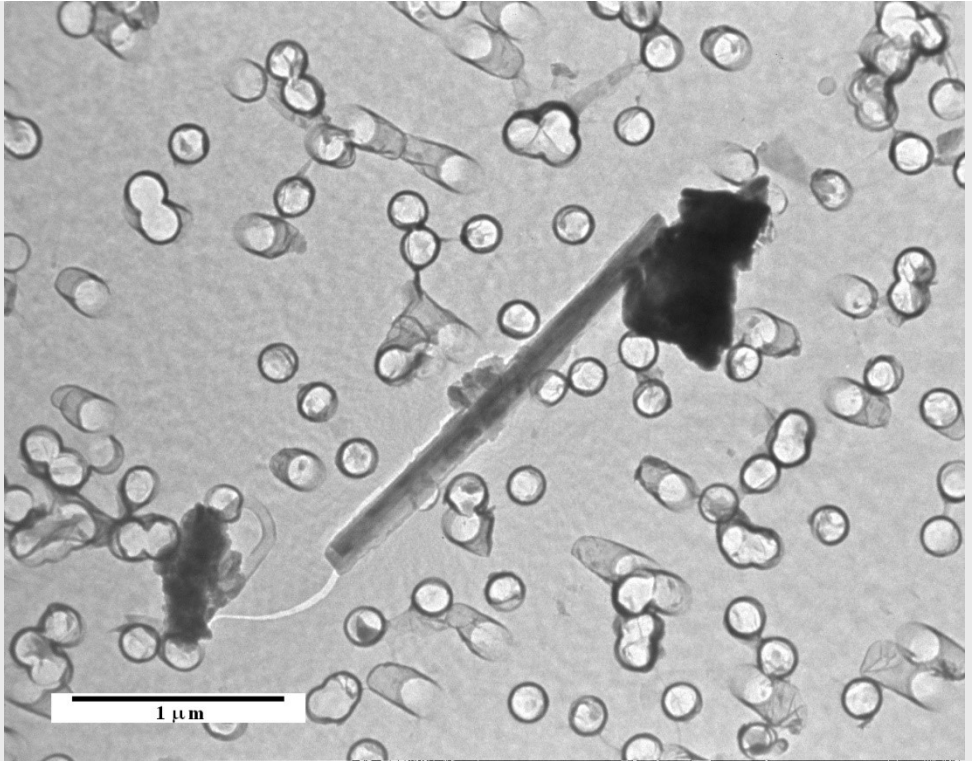
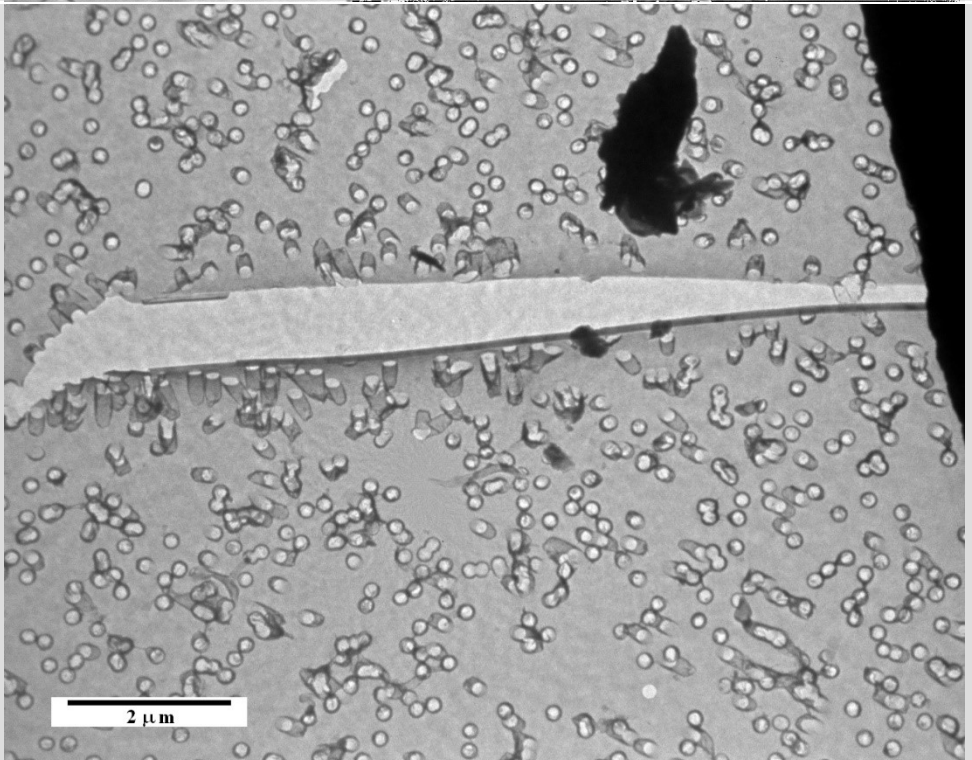


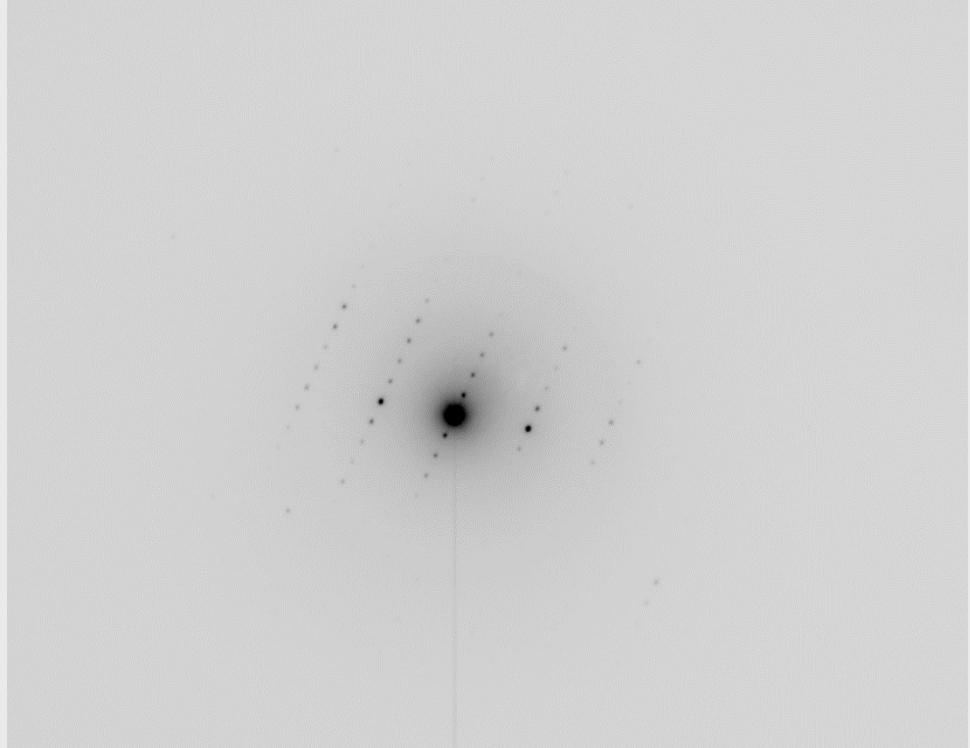
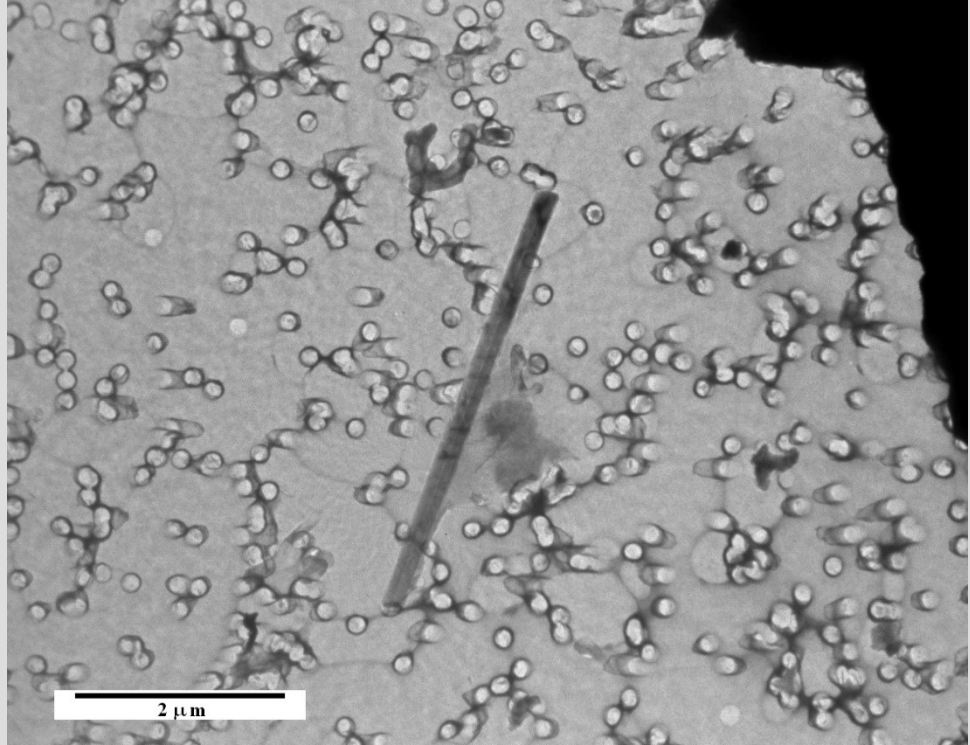


Field / Fiber	Image
7 / 2	 <p>A transmission electron micrograph showing a central, elongated, dark fiber-like structure. Surrounding the fiber are numerous circular, ring-like structures, some appearing as double rings. A scale bar at the bottom left indicates 500 nm.</p>
8 / 1	 <p>A transmission electron micrograph showing a central, elongated, dark fiber-like structure. The field is densely populated with circular, ring-like structures, some appearing as double rings. A scale bar at the bottom left indicates 1 μm.</p>

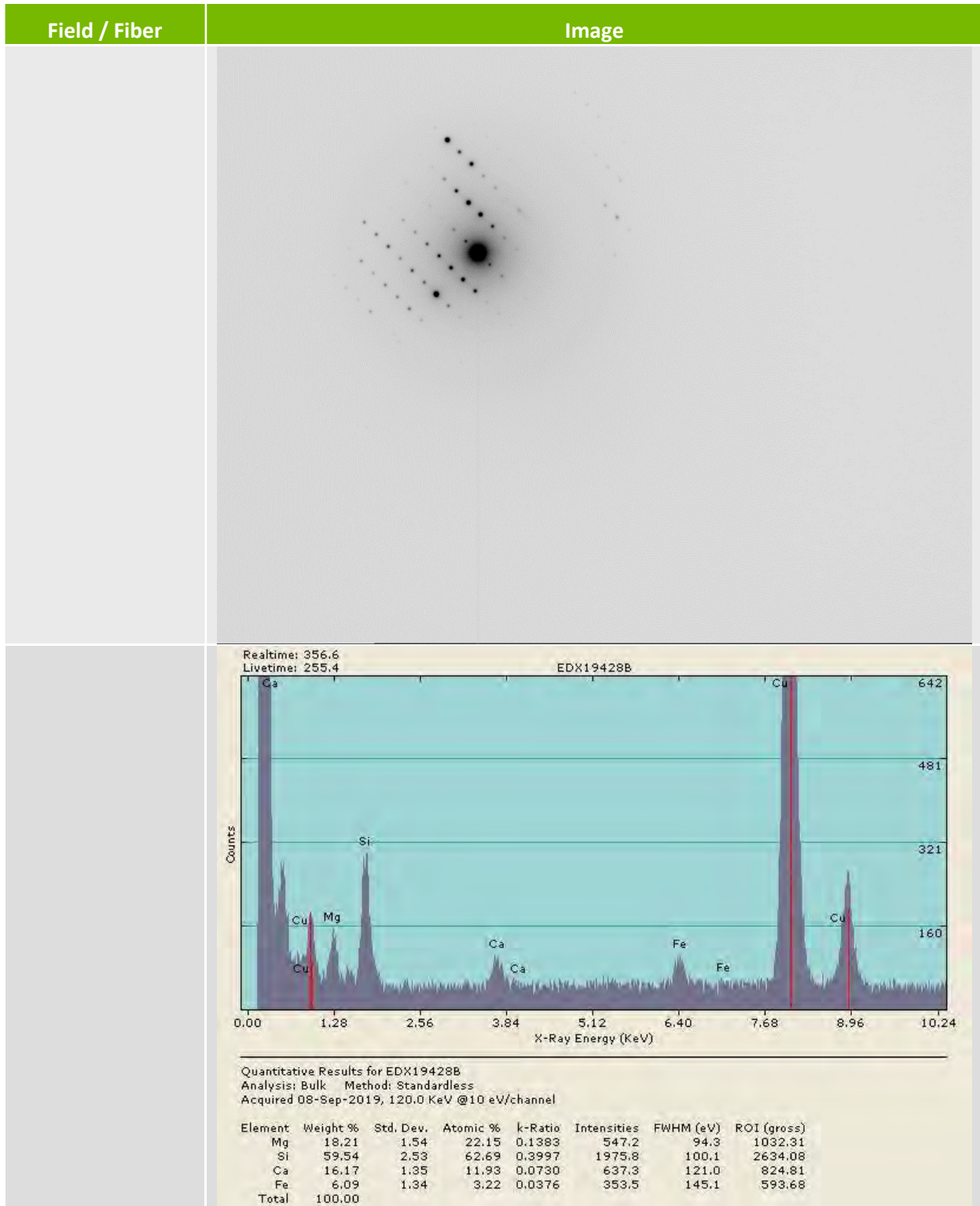
Field / Fiber	Image
9 / 1	
9 / 2	

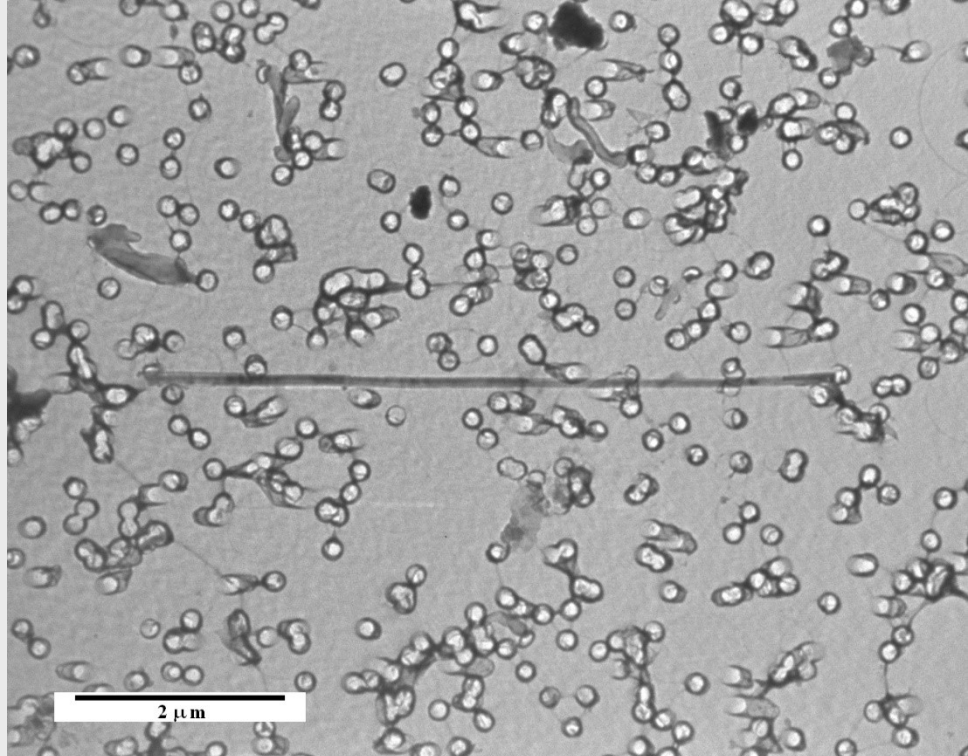


Field / Fiber	Image
10 / 1	
10 / 2	

Field / Fiber	Image
	
LLH901997-14 Sample 15 Lo Mag 10 / 1	





Field / Fiber	Image
11 / 1	 <p>A grayscale micrograph showing a dense distribution of small, dark, circular features, likely inclusions or defects, within a lighter matrix. The features vary in size and are scattered across the field of view. A horizontal scale bar is located in the lower-left corner, labeled "2 μm".</p>

# **CORE BORING AND HAND SAMPLE ANALYTICAL RESULTS**



RJ Lee Group, Inc.

RJ Lee Group, Inc.  
350 Hochberg Road, Monroeville, PA 15146  
Tel: 724-325-1776 | Fax: 724-733-1799

### Laboratory Report

K & L Gates  
17 North Second Street  
18th Floor  
Harrisburg, PA 17101  
United States  
Attention: Mr. David Raphael  
Telephone: 717-231-4504

Report Date 06/26/2019  
Sample Receipt Date 05/30/2019  
RJ Lee Group Job No. LLH901997-8  
Authorization/P.O. No.  
Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count  
Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158814.HPL	#1 - CB-1 #1	Yes	1	0.20 AC	0.10 OF	99.70	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.1% Actinolite Cleavage								
Weight Loss: 0.0%								
3158815.HPL	#2 - CB-1 #3	Yes	1	ND	0.20 OF	99.80	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.2% Actinolite Cleavage								
Weight Loss: 0.0%								
3158816.HPL	#3 - CB-2 #4	Yes	1	ND	0.20 OF	99.80	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.2% Actinolite Cleavage								
Weight Loss: 0.0%								



## Laboratory Report (Cont)

Client Job No./Name: RJ Lee Group Job No: LLH901997-8

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158817.HPL	#4 - CB-2 #5	Yes	1	ND	0.10 OF	99.90	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.1% Actinolite Cleavage								
Weight Loss: 0.0%								
3158818.HPL	#5 - CB-2 #6	Yes	1	0.10 TR	0.30 OF	99.60	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.3% Actinolite Cleavage								
Weight Loss: 0.0%								
3158819.HPL	#6 - CB-3 #7	Yes	1	ND	0.30 OF	99.70	Q, AM, OP, M	AV-06/26/2019
Description: Grey Crushed Rock 1000 Point Count. Detection Limit=0.1% OF= Actinolite Cleavage								
Weight Loss: 0.0%								
3158820.HPL	#7 - CB-3 #8	Yes	1	ND	0.20 OF	99.80	Q, AM, OP, MI, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.2% Actinolite Cleavage								
Weight Loss: 0.0%								
3158821.HPL	#8 - CB-3 #9	Yes	1	ND	<0.1 OF	100.00	CA, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=<0.1% Actinolite Cleavage								
Weight Loss: 0.0%								

Client Job No./Name:

RJ Lee Group Job No: LLH901997-8

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158822.HPL	#9 - CB-4 #10	Yes	1	ND	<0.1 OF	100.00	CA, AM, OP, M	DF-06/26/2019

Description: Gray Crushed Rock  
 1000 Point Count. Detection Limit=0.1%  
 OF=<0.1% Actinolite Cleavage

Weight Loss: 0.0%

Client Job No./Name: **LLH901997-8** RJ Lee Group Job No: **LLH901997-8**

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
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Authorized Signature:

Donald Fike

**ASBESTOS**

- AM = Amosite
- AC = Actinolite
- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite

**NON-ASBESTOS**

- CE = Cellulose
- MW = Mineral Wool
- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
- OF = Other Fibers

**NON-FIBROUS MATERIALS**

- AM = Amphibole
- B = Binder
- CA = Carbonates
- CL = Clay
- F = Feldspar
- G = Gypsum
- HY = Hydromagnesite
- M = Miscellaneous
- MI = Mica
- OP = Opaque
- OR = Organic
- P = Perlite
- Q = Quartz
- T = Tar
- V = Vermiculite

**DISCLAIMER NOTES**

- "ND" indicates no asbestos was detected; the method detection limit is 0.25%.
- "Trace" or "<" indicates asbestos was identified in the sample, but the concentration is less than the method quantitation limit. PLM coefficients of variance range from approximately 1.8 at the quantitation limit of 0.25% to 0.32 at high fiber concentrations.
- Samples are archived for three months following analysis and are then properly discarded.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
- This test report relates to the items tested.
- This report is not valid unless it bears the name of a NVLAP Lab Code 101208-0 approved signatory.
- Any reproduction of this document must be in full in order for the report to be valid.
- This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0, any agency of the U.S. Government or any other laboratory accrediting agency.
- Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar nonfriable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as "non-asbestos-containing."
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory results are limited to the reported values.
- ((100-A)/B)\*C = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.

# Request for Environmental and IH Laboratory Analytical Services

LLH 901997-8

<b>ATTENTION TO:</b>		Purchase Order No.:		Client Job No.:	
<b>Lab Use Only</b>		Project No.:		Rock Hill Quarry	
Date Logged In:		Client No.:		Rush Charges Authorized? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Name: Andrew Gutshall		Logged In By:		Sample Purpose: Information <input type="checkbox"/> Regulatory <input type="checkbox"/> Accreditation (please list below):	
Company: Hanson Aggregates Pa, LLC		Address: 7660 Imperial Way		System ID #: N/A	
City, State, Zip: Allentown, PA 18195		Phone: 610-366-4819		DOH Source #: N/A	
Email Results To:		Email: Andrew.Gutshall@LabRightHanson.com		Multiple Sources #: N/A	
Name:		If a hard copy of invoice is needed, check here <input type="checkbox"/>		Sample Purpose: A <input type="checkbox"/> B <input type="checkbox"/> Other <input type="checkbox"/> N/A	
Company:		Email:		Preservation: Unpres H <sub>2</sub> SO <sub>4</sub> Matrix: WW=Wastewater P=Plastic	
Address:		City, State, Zip:		4 °C HCl GW=Groundwater G=Class	
Phone:		Phone:		HNO <sub>3</sub> NaOH S=Soil/Sludge W=Water	
Special Instructions		Invoice per project setup with Drew Van Orden		E=Extract X=Other A=Air (filter or tube)	
Client Sample ID		Sample Description		Sample Date	
1		CB-1 #1		5/23/19	
2		CB-1 #3		5/23/19	
3		CB-2 #4		5/23/19	
4		CB-2 #5		5/23/19	
5		CB-2 #6		5/23/19	
6		CB-3 #7		5/23/19	
7		CB-3 #8		5/23/19	
8		CB-3 #9		5/23/19	
9		CB-4 #10		5/23/19	
Chain of Custody		Date: 5/23/19 Time: 1530		Received By (Signature): <i>[Signature]</i>	
Chain of Custody		Date: Relinquished To:		Received By (Print Name): Liz Vavien	
Chain of Custody		Date: Relinquished To:		Company Name: RSLB	
Chain of Custody		Date: Relinquished To:		Method of Shipment:	
Chain of Custody		Date: Relinquished To:		Received By (Signature): <i>[Signature]</i>	
Chain of Custody		Date: Relinquished To:		Received By (Print Name): <i>[Signature]</i>	
Chain of Custody		Date: Relinquished To:		Company Name: <i>[Signature]</i>	
Chain of Custody		Date: Relinquished To:		Method of Shipment:	



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/11/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 315 9814  
 RJ Lee Group  
 Project Number: LLH 901997-8  
 Analysis Method:

Comments / # of Layers: 1000 pt count. Detection Limit = <sup>0.1%</sup> ~~0.25%~~ 06/11/19 DF

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
				Color	Pleochroism		⊥				
	0.2%	Act	W (S)	6016R	Col	1.634	1.627	L (M)	B N	RL	Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
			W C S					L M	P N		
			W C S					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	0.1%	Act. cleavage		R.I.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	150 99	99	100	100	100	100	100	99	797
cleav	1	0	0	0	0	0	0	0	1
Asb	0	1	0	0	0	0	0	1	2
Total	100	100	100	100	100	100	100	100	800

$$\text{Detection Limit} = \frac{1}{1000} \times 100\% = 0.1\%$$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/11/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158814 RJ Lee Group Project Number: LLH901997-8

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAs	100	100							997
Asb	0	0							2
Clev	0	0							0
Total									1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples

Date: 06/13/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158815  
 RJ Lee Group  
 Project Number:  
 Analysis Method: LH901997-8

Comments / # of Layers: 1000 pt count, Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥	Y N	Y N	Y N	
		<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>		<u>Quartz</u> Carbonates Vermiculite
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		Tar Binder <u>Opauques</u>
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		Perlite <u>Amphibole</u> Gypsum
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Talc Feldspar Mica
	<u>0.2%</u>	<u>Actin. cleav.</u>		<u>R. I.</u>							Clay Organic Part. Diatoms
											<u>Misc. Particles</u> Foam Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>99</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>799</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>1000</u>	<u>800</u>

06/13/19 DF

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/13/19 Analyst: DF Microscope: 036-OPT

RJ Lee Group Sample Number: 3158815 RJ Lee Group Project Number: LLH901997-8

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	<sup>99</sup> 100 <sub>06/13/19 DF</sub>	100							199
cle	<sup>06/13/19 DF</sup> 1	0							1
Asb	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: DF Scope: 036-0P1

Sample Description: Gray crushed Rock

RJ Lee Group  
 Sample Number: 3158016  
 RJ Lee Group  
 Project Number: LLH901997-8  
 Analysis Method:

Comments /  
 # of Layers: 1000 point count. Detection Limit = 0.1%

Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
						⊥		⊥				
			<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		<u>Quartz</u> Carbonates Vermiculite
				<u>WCS</u>					<u>L M</u>	<u>P N</u>		Tar Binder <u>Opakes</u>
				<u>WCS</u>					<u>L M</u>	<u>P N</u>		Perlite <u>Amphibole</u> Gypsum
			% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Talc Feldspar Mica
		<u>0.2%</u>	<u>Actin. cleavage</u>		<u>R.I.</u>							Clay Organic Part. Diatoms
												<u>Misc Particles</u> Foam Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>98</u>	<u>100</u>	<u>100</u>	<u>798</u>
<u>cleav.</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>2</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Effective Date: March 2019  
 Form F OPT.001

PLM Point Count Additional Slides Worksheet

 Date: 06/20/19 Analyst: DF Microscope: 036 OPT

 RJ Lee Group Sample Number: 3158816 RJ Lee Group Project Number: LLH401997-8

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
clv	0	0							0
Asb	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158817  
 RJ Lee Group  
 Project Number: LLH901997-8  
 Analysis Method:

Comments / # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥	L M	P N	Y N	
		<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>		<u>Quartz</u> Carbonates Vermiculite
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		Tar Binder <u>Opaques</u>
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		Perlite <u>Amphibole</u> Gypsum
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Talc Feldspar Mica
	<u>0.1%</u>	<u>Actin. cleavage</u>		<u>R.I.B</u>							Clay Organic Part. Diatoms
											<u>Misc Particles</u> Foam Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>99</u>	<u>100</u>	<u>799</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
<u>Ash</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>





**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 315 8818  
 RJ Lee Group  
 Project Number: LLH90797-8  
 Analysis Method:

Comments /  
 # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥				
	0.1%	Trem	WCS	Col	col	1.635	1.625	L M	⊕ N	0°	Quartz Carbonates Vermiculite Tar Blinder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
			WCS					L M	P N		
			WCS					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	0.3%	Actin. cleavage		R.I.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	99	99	98	100	100	100	796
cle	0	0	1	0	2	0	0	0	3
Asb	0	0	0	1	0	0	0	0	1
Total	100	100	100	100	100	100	100	100	800

Effective Date: March 2019  
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**PLM Point Count Additional Slides Worksheet**

Date: 06/20/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158818 RJ Lee Group Project Number: LLH901997-8

Type	Slide 9	Slide 10	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100	1						200
cle	0	0							0
Asb	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: AVD Scope: 025-0PT

Sample Description: Grey Crushed Rock

Comments / # of Layers: 1000 Pnt Count. Detection Limit = 0.1%

RJ Lee Group Sample Number: <u>3158819</u> RJ Lee Group Project Number: <u>LL1901997-8</u> Analysis Method:		Stereoscope		# of Preps:		Homogenous Y N		QC Y N		QC Analyst:	
%	%	Asbestos Type	Morphology	Color/Pleochroism    ⊥		Indices of Refraction    ⊥		Birefringence L M	Sign of Elongation P N	Extinction Angle	NFM% <u>99.71</u>
	<u>ND</u>		W C S					L M	P N		Quartz
			W C S					L M	P N		Tar
			W C S					L M	P N		Carbonates
											Blender
											Opagues
											Perlite
											Amphibole
											Gypsum
											Talc
											Feldspar
											Mica
											Clay
											Organic Part.
											Diatoms
											Misc Particles
											Foam
											Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	<u>98</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>99</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>797</u>
clew	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>
ASB	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total									

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/20/19 Analyst: AVP Microscope: 025-OPT

RJ Lee Group Sample Number: 3158819 RJ Lee Group Project Number: LLH901997-8

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<u>NAB</u>	<u>100</u>	<u>100</u>							<u>997</u>
<u>clew</u>	<u>0</u>	<u>9</u>							<u>3</u>
<u>ASB</u>	<u>0</u>	<u>0</u>							<u>0</u>
<b>Total</b>									<u>1000</u>

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158820  
 RJ Lee Group  
 Project Number: LL4901997-8  
 Analysis Method:

Comments /  
 # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥				
		<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		<u>Quartz</u> Carbonates Vermiculite
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		Tar Binder <u>Opalines</u>
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		Perlite <u>Amphibole</u> Gypsum
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Talc Feldspar <u>Mica</u>
	<u>0.2%</u>	<u>Actin clev.</u>		<u>R.I.</u>							Clay Organic Part. Diatoms
											<u>Misc Particles</u> Foam Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAs</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>99</u>	<u>99</u>	<u>100</u>	<u>100</u>	<u>798</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>
<u>Ash</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Effective Date: March 2019  
 Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

 Date: 06/20/19 Analyst: DF Microscope: 036-0PT

 RJ Lee Group Sample Number: 3158820 RJ Lee Group Project Number: LLH901997-8

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAs	100	100							200
cle	0	0							0
Asb	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: DF Scope: 036 OPT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158821  
 RJ Lee Group  
 Project Number: LH 901997-8  
 Analysis Method:

Comments /  
 # of Layers: 1000 point count. Detection Limit = 0.1%

Stereo-scope		Asbestos Type		Morphology		Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%		
%	%				⊥		⊥	L M	P N				Quartz	Carbonates	Vermiculite
		<u>ND</u>		W C S						L M	P N				
				W C S						L M	P N				
				W C S						L M	P N				
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix					

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/20/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158821 RJ Lee Group Project Number: LLH 901997-8

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
clz	0	0							0
Ash	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/24/17 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158822  
 RJ Lee Group  
 Project Number: LLH901997-8  
 Analysis Method:

Comments /  
 # of Layers: 1000 point count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%	
					⊥		⊥					
		<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		Quartz Tar Perlite Talc Clay <u>Misc Particles</u>	
			<u>WCS</u>					<u>L M</u>	<u>P N</u>			Carbonates Binder <u>Amphibole</u> Feldspar Organic Part.
			<u>WCS</u>					<u>L M</u>	<u>P N</u>			Vermiculite <u>Opacities</u> Gypsum Mica Diatoms Foam Foil
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>799</u>
<u>clv</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/24/19 Analyst: DF Microscope: 036-OPT

RJ Lee Group Sample Number: 3158822 RJ Lee Group Project Number: LLH901997-8

Type	Slide 1	Slide 10	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
NAS	100	100							200
ele	0	0							
Asb	0	0							
Total	100	100							1000

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

Type	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Slide ___	Total
Total									

## Laboratory Report

K & L Gates  
 17 North Second Street  
 18th Floor  
 Harrisburg, PA 17101  
 United States  
 Attention: Mr. David Raphael  
 Telephone: 717-231-4504

Report Date 06/27/2019  
 Sample Receipt Date 05/30/2019  
 RJ Lee Group Job No. LLH901997-7  
 Authorization/P.O. No.  
 Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count  
 Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158807.HPL	#1 - DB-1	Yes	1	0.10 AC	0.20 OF	99.70	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.2% Actin. Cleavage								
Weight Loss: 0.0%								
3158808.HPL	#2 - DB-2	Yes	1	ND		100.00	Q, AM, OP, M	DF-06/27/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%								
Weight Loss: 0.0%								
3158809.HPL	#3 - DB-3	Yes	1	ND		100.00	Q, AM, OP, M	DF-06/27/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%								
Weight Loss: 0.0%								

Client Job No./Name: RJ Lee Group Job No: LLH901997-7

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158810.HPL	#4 - DB-4	Yes	1	ND		100.00	Q, CA, OP, M	DF-06/27/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1%								
Weight Loss: 0.0%								
3158811.HPL	#1 - Hand Sample #1	Yes	1	ND	0.10 OF	99.90	Q, CA, OP, M	DF-06/27/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF= 0.1% Actinolite Cleavage								
Weight Loss: 0.0%								
3158812.HPL	#2 - Hand Sample #2	Yes	1	ND		100.00	Q, CA, OP, M	DF-06/27/2019
Description: White Crushed Rock 1000 Point Count. Detection Limit=0.1%								
Weight Loss: 0.0%								
3158813.HPL	#3 - Vein 7	Yes	1	0.10 AC	0.40 OF	99.50	Q, AM, OP, M	DF-06/27/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=0.4% Actinolite Cleavage								
Weight Loss: 0.0%								



Client Job No./Name: RJ Lee Group Job No: LLH901997-7

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
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Authorized Signature:

Donald Fike

**ASBESTOS**

- AM = Amosite
- AC = Actinolite
- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite
- CE = Cellulose
- MW = Mineral Wool
- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
- OF = Other Fibers

**NON-ASBESTOS**

- AM = Amphibole
- B = Binder
- CA = Carbonates
- CL = Clay
- F = Feldspar
- G = Gypsum

**NON-FIBROUS MATERIALS**

- HY = Hydromagnesite
- M = Miscellaneous
- MI = Mica
- OP = Opaque
- OR = Organic
- P = Perlite
- Q = Quartz
- T = Tar
- V = Vermiculite

**DISCLAIMER NOTES**

- "ND" indicates no asbestos was detected; the method detection limit is 0.1%.
- "Trace" or "<=" indicates asbestos was identified in the sample, but the concentration is less than the method quantitation limit. PLM coefficients of variance range from approximately 1.8 at the quantitation limit of 0.25% to 0.32 at high fiber concentrations.
- Samples are archived for three months following analysis and are then properly discarded.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
- This test report relates to the items tested.
- This report is not valid unless it bears the name of a NVLAP Lab Code 101208-0 approved signatory.
- Any reproduction of this document must be in full in order for the report to be valid.
- This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0, any agency of the U.S. Government or any other laboratory accrediting agency.
- Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar nonfriable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as "non-asbestos-containing."
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory results are limited to the reported values.
- ((100-A)/B)\*C = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/25/19 Analyst: DF Scope: 336-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158807  
 RJ Lee Group  
 Project Number: LLH901997-7  
 Analysis Method:

Comments /  
 # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:	
					⊥		⊥					
	0.1	Frem Actin actin/actin	WCS	GR	Col	1.634	1.627	L (M)	(P) N			
			WCS					L M	P N			
			WCS					L M	P N			
		% Non-Asbestos Fibers		Optical Properties	Layered Results		Asbestos	Non-Asb.	Matrix	NFM%		
	0.2	Actin. Clev.		R.I.						Quartz	Carbonates	Vermiculite
										Tar	Binder	Opales
										Perlite	Amphibole	Gypsum
										Talc	Feldspar	Mica
										Clay	Organic Part.	Diatoms
										Misc Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	99	100	99	99	100	100	100	100	797
Clev.	0	0	1	1	0	0	0	0	2
Asb	1	0	0	0	0	0	0	0	1
Total	100	100	100	100	100	100	100	100	800

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/25/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158807 RJ Lee Group Project Number: LLH901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
clev.	0	0							0
Asb	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/26/19 Analyst: DF Scope: 036-00T

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158808  
 RJ Lee Group  
 Project Number: LLH901997-7  
 Analysis Method:

Comments /  
 # of Layers: 1000 pt count . Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:
					⊥		⊥	Y	N	Y	N	
		<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>			
			<u>W C S</u>					<u>L M</u>	<u>P N</u>			
			<u>W C S</u>					<u>L M</u>	<u>P N</u>			
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM%	
											<u>Quartz?</u> Carbonates Vermiculite Tar Binder <u>Opakes</u> Perllite <u>Amphibole</u> Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms <u>Misc Particles</u> Foam Foli	

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>



Effective Date: March 2019  
Form F OPT.001

PLM Point Count Additional Slides Worksheet

Date: 06/26/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158808 RJ Lee Group Project Number: LLH901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
cle	0	0							
Asb	0	0							
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/26/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158809  
 RJ Lee Group  
 Project Number: LLH 901997-7  
 Analysis Method:

Comments / # of Layers: 1000 pt. Count. Detection Limit = 0.1%

Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
						⊥		⊥				
			<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		<u>Quartz</u> Carbonates Vermiculite
				<u>WCS</u>					<u>L M</u>	<u>P N</u>		Tar Binder <u>Opakes</u>
				<u>WCS</u>					<u>L M</u>	<u>P N</u>		Perlite <u>Amphibole</u> Gypsum
			% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Talc Feldspar Mica
												Clay Organic Part. Diatoms
												<u>Misc Particles</u> Foam Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/26/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158809 RJ Lee Group Project Number: LL4901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<u>NAs</u>	<u>100</u>	<u>100</u>							<u>200</u>
<u>cle</u>	<u>0</u>	<u>0</u>							
<u>Asb</u>	<u>0</u>	<u>0</u>							
<b>Total</b>	<u>100</u>	<u>100</u>							<u>1000</u>

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/27/19 Analyst: DF Scope: 036-005

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158810  
 RJ Lee Group  
 Project Number: LLH 901997-7  
 Analysis Method:

Comments / # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%		Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:
	%	%				⊥		⊥	Y	N	Y	N	
			<u>ND</u>	<u>WCS</u>					<u>L</u>	<u>M</u>	<u>P</u>	<u>N</u>	
				<u>WCS</u>					<u>L</u>	<u>M</u>	<u>P</u>	<u>N</u>	
				<u>WCS</u>					<u>L</u>	<u>M</u>	<u>P</u>	<u>N</u>	
			% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		

- Quartz    Carbonates    Vermiculite
- Tar    Binder    Opacities
- Perlite    Amphibole    Gypsum
- Talc    Feldspar    Mica
- Clay    Organic Part.    Diatoms
- Misc Particles    Foam    Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>cle</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Ash</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>



Effective Date: March 2019  
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**PLM Point Count Additional Slides Worksheet**

Date: 06/27/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158810 RJ Lee Group Project Number: LLH901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
cle	0	0							
Asb	0	0							
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 02/27/19 Analyst: DF Scope: 055-APT  
019-APT  
02/27/19 AP Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158811  
 RJ Lee Group  
 Project Number: LLH901997-7  
 Analysis Method:

Comments /  
 # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥				
	<u>ND</u>		W C S					L M	P N		Quartz
			W C S					L M	P N		Carbonate
			W C S					L M	P N		Vermiculite
											Tar
											Blinder
											Opagues
											Perlite
											Amphibole
											Gypsum
											Talc
											Feldspar
											Mica
											Clay
											Organic Part.
											Diatoms
											Misc Particles
											Foam
											Foli

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>99</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>799</u>
<u>clew</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>800</b>

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: <sup>06/27/19 PF</sup> ~~3158811~~ 06/27/19 Analyst: DF Microscope: <sup>055-0PT</sup> ~~019-0PT~~ 06/27/19 PF

RJ Lee Group Sample Number: 3158811 RJ Lee Group Project Number: LLH901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							999
clev	0	0							1
Ash	0	0							0
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/27/19 Analyst: DF Scope: GSS-OPT

Sample Description: White Crushed Rock

RJ Lee Group  
 Sample Number: 3158812  
 RJ Lee Group  
 Project Number: LLH901997-7  
 Analysis Method:

Comments / # of Layers: 1000 Pt count. Detection Limit = 0.1%

Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:
						⊥		⊥	Y	N	Y	N	
			<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>			
				<u>W C S</u>					<u>L M</u>	<u>P N</u>			
				<u>W C S</u>					<u>L M</u>	<u>P N</u>			
			% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		

- NFM%
- Quartz
  - Carbonates
  - Vermiculite
  - Tar
  - Binder
  - Opakes
  - Perlite
  - Amphibole
  - Gypsum
  - Talc
  - Feldspar
  - Mica
  - Clay
  - Organic Part.
  - Diatoms
  - Misc Particles
  - Foam
  - Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>Clev</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	
<u>Asb</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	
<b>Total</b>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/27/19 Analyst: DF Microscope: OSS-OPT

RJ Lee Group Sample Number: 3158812 RJ Lee Group Project Number: LLH901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							1000
Clev	0	0							0
Asb	0	0							0
<b>Total</b>	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples

Date: 06/27/19 Analyst: DF Scope: OSS-OPT

Sample Description: Gray Crushed Rock

RJ Lee Group  
Sample Number: 31578813  
RJ Lee Group  
Project Number: LLH901997-7  
Analysis Method:

Comments / # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥				
	0.1%	Actin	WCS	Gr	Col	1.634	1.627	L (M)	(P) N	PL	Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
			WCS					L M	P N		
			WCS					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	0.4%	Actinolite Clev.		R.I.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	98	99	99	99	100	100	795
CLC	0	0	2	1	0	1	0	0	4
Asb	0	0	0	0	1	0	0	0	1
Total	100	100	100	100	100	100	100	100	800

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/27/19 Analyst: DF Microscope: 055-0PT

RJ Lee Group Sample Number: 3158813 RJ Lee Group Project Number: LLH901997-7

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							995
Cle	0	0							4
Asb	0	0							1
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

## Laboratory Report

K & L Gates  
 17 North Second Street  
 Harrisburg, PA 17101  
 United States  
 Attention: David Raphael  
 Telephone: 717-231-4504

Report Date 11/07/2019  
 Sample Receipt Date 11/06/2019  
 RJ Lee Group Job No. LLH901997-20  
 Authorization/P.O. No.  
 Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count  
 Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3161701.HPL	DB-1 Duplicatae	Yes	1	0.60 TR	5.0 OF	94.40	Q, F, OP, M	AC-11/07/2019

Description: Grey Powder  
 1000 Point Count. Detection Limit of 0.1%.  
 5.0% OF= 5.0% Amphibole Cleavage

Weight Loss: 0.0%



Client Job No./Name:

RJ Lee Group Job No: LLH901997-20

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
--------------------	----------------------	-------------	-------------	----------------------	------------------------	--------------------------	-----------------	-------------------------



Authorized Signature: \_\_\_\_\_

Alexandra Cheek

**ASBESTOS**

- AM = Amosite
- AC = Actinolite
- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite

**NON-ASBESTOS**

- CE = Cellulose
- MW = Mineral Wool
- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
- OF = Other Fibers

**NON-FIBROUS MATERIALS**

- AM = Amphibole
- B = Binder
- CA = Carbonates
- CL = Clay
- F = Feldspar
- G = Gypsum
- HY = Hydromagnesite
- M = Miscellaneous
- MI = Mica
- OP = Opaque
- OR = Organic
- P = Perlite
- Q = Quartz
- T = Tar
- V = Vermiculite

**DISCLAIMER NOTES**

- "ND" indicates no asbestos was detected; the method detection limit is 0.1%.
- "Trace" or "<" indicates asbestos was identified in the sample, but the concentration is less than the method quantitation limit. PLM coefficients of variance range from approximately 1.8 at the quantitation limit of 0.25% to 0.32 at high fiber concentrations.
- Samples are archived for three months following analysis and are then properly discarded.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
- This test report relates to the items tested.
- This report is not valid unless it bears the name of a NVLAP Lab Code 101208-0 approved signatory.
- Any reproduction of this document must be in full in order for the report to be valid.
- This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0, any agency of the U.S. Government or any other laboratory accrediting agency.
- Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar nonfriable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as "non-asbestos-containing."
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratorys results are limited to the reported values.
- $((100-A)/B)*C$  = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.

## Final Laboratory Report

### TEM Bulk Protocol

Attention: David Raphael  
K & L Gates  
17 North Second Street  
Harrisburg, PA 17101  
US

Report Date: 10/28/2019  
Sample Receipt Date: 10/21/2019  
RJ Lee Group Job No.: LLH901997-16  
Authorization/P.O. No.:  
Samples Received: 1  
Client Job No.:

Method: EPA/R-93/600/116

**TABLE 1 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos**

Client Sample Number	RJLG Sample Number	<u>Total Structures</u>				-----Weight Percent----- <u>Total Structures</u> Analytical Sensitivity			
		Chry	Amph	Cleavage	Non Asbestos	Chry	Amph Asb	Amph Cleavage Fragment	Non Asbestos
DB-1 Duplicatae	3161701	0	0	39	0	< <b>3.2E-6</b> 3.2E-6	< <b>4.0E-6</b> 4.0E-6	<b>8.5E-2</b> 2.6E-6	< <b>2.4E-6</b> 2.4E-6

**NOTES**

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- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole:  $3.2 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

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RJ Lee Group Job No: LLH901997-16  
 Client Job No/Name:

Client: K & L Gates  
 Report Date: 10/28/2019

**TABLE 2 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos 5 μm**

Client Sample Number	RJLG Sample Number	-----Structures 5 μm-----				-----Weight Percent----- Structures 5 μm Analytical Sensitivity Amphibole			
		Chry	Amph	Cleavage	Non-Asbestos	Chry	Asb	Cleavage Fragment	Non-Asbestos
DB-1 Duplicatae	3161701	0	0	0	0	<u>&lt; 3.2E-5</u> 3.2E-5	<u>&lt; 4.0E-5</u> 4.0E-5	<u>&lt; 2.6E-5</u> 2.6E-5	<u>&lt; 2.4E-5</u> 2.4E-5

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- Density of amphibole:  $3.2 \times 10^{-3}$  ng/μm<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/μm<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/μm<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
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# RJ Lee Group, Inc.

RJ Lee Group Job No: LLH901997-16  
Client Job No/Name:

## Final Laboratory Report (cont'd)

Client: K & L Gates  
Report Date: 10/28/2019

Client Sample Number	RJLG Sample Number	Material Used (gm)	Area Analyzed Total (mm <sup>2</sup> )	Area Analyzed 5 μm (mm <sup>2</sup> )	Effective Filter Area (mm <sup>2</sup> )	Dilution Factor
DB-1 Duplicatae	3161701	0.0003	0.31853	0.31853	1220	1.0

Authorized Signature:



Ashleigh Sload, Scientist

### NOTES

- "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole:  $3.2 \times 10^{-3}$  ng/μm<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/μm<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/μm<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
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RJL: LLH901997-16	3161701.HTA2	Microscope tem2000fx2	Grid Openings	10
DB-1 Duplicatae	K & L Gates	Magnification 21 KX	Asbestos	0.0
Wt: 0.0003 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	39.0
HQ44739		Cv = 0	Nonasbestos >= 5µm	0.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	1.3	0.2	Amphibole		MgSiCaFeAl	15572D	Image1	Diff1	Acti	Cle
1	2	4.1	0.5	Amphibole		MgSiCaFe			X	Acti	Cle
1	3	4.9	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
1	4	1.2	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
1	5	1.5	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
1	6	1.3	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
1	7	1.5	0.22	Amphibole		MgSiCaFe			X	Acti	Cle
1	8	4.3	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
1	9	1.2	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
1	10	2.1	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
2	1	3.6	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
2	2	4.8	0.7	Amphibole		MgSiCaFe			X	Acti	Cle
2	3	1.1	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
2	4	3.2	0.2	Amphibole		MgSiCaFeAl	15573D	Image2	Diff2	Acti	Cle
3	1	2.2	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
3	2	2.8	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
3	3	0.9	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
3	4	4.2	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
3	5	3.9	0.5	Amphibole		MgSiCaFe			X	Acti	Cle
4	1	2.1	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
4	2	3.4	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
4	3	1.1	0.2	Amphibole		MgSiCaFe	15574D	Image3	Diff3	Acti	Cle
4	4	3.2	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
4	5	2.7	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
4	6	1.9	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
5	1	1.6	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
5	2	1.1	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
5	3	1.4	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
6	1	2.3	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
6	2	3.7	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
6	3	2.4	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
7	1	1.9	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
7	2	4.1	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
8	1	1.2	0.2	Amphibole		MgSiCaFeAl	15575D	Image4	Diff4	Acti	Cle
8	2	3.2	0.6	Amphibole		MgSiCaFe			X	Acti	Cle
8	3	1.4	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
9	1	3.2	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
9	2	4.3	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
10	1	1.6	0.22	Amphibole		MgSiCaFe			X	Acti	Cle

12% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 10/25/2019 3:41:03 PM approve by Jon Swope

Final Review: 10/28/19 9:43 AM approve by Ashleigh Sload

RJL: LLH901997-16	3161701.HTA2	Microscope tem2000fx2	Grid Openings	25
DB-1 Duplicatae	K & L Gates	Magnification 10 KX	Asbestos	0.0
Wt: 0.0003 gm	Grid: 0.0091 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	% Wt of largest asbestos structure	%
HQ44739		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3				NSD							
4				NSD							
5				NSD							
6				NSD							
7				NSD							
8				NSD							
9				NSD							
10				NSD							
11				NSD							
12				NSD							
13				NSD							
14				NSD							
15				NSD							
16				NSD							
17				NSD							
18				NSD							
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

12% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 10/26/2019 9:09:00 AM approve by Jon Swope

Final Review: 10/28/19 9:43 AM approve by Ashleigh Sload

## Final Laboratory Report

### TEM Bulk Protocol

Attention: David Raphael  
K & L Gates  
17 North Second Street  
Harrisburg, PA 17101  
US

Report Date: 11/04/2019  
Sample Receipt Date: 10/21/2019  
RJ Lee Group Job No.: LLH901997-19  
Authorization/P.O. No.:  
Samples Received: 1  
Client Job No.:

Method: EPA/R-93/600/116

**TABLE 1 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos**

Client Sample Number	RJLG Sample Number	Total Structures				-----Weight Percent----- Total Structures Analytical Sensitivity			
		Chry	Amph	Cleavage	Non Asbestos	Chry	Amph Asb	Amph Cleavage Fragment	Non Asbestos
DB-1 Duplicatae	3161701	0	0	49	0	< 2.4E-6 2.4E-6	< 3.1E-6 3.1E-6	2.8E-1 1.9E-6	< 1.8E-6 1.8E-6

**NOTES**

- "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NVLAP #101208-0, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
- Density of amphibole:  $3.2 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/  $\mu$  m<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
- Samples will be held for 90 days and then disposed of per Federal regulations.
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RJ Lee Group Job No: LLH901997-19  
 Client Job No/Name:

Client: K & L Gates  
 Report Date: 11/04/2019

**TABLE 2 -- Weight Percent of Asbestos, Cleavage Fragment Amphibole and Non-Asbestos 5 μm**

Client Sample Number	RJLG Sample Number	-----Structures 5 μm-----				-----Weight Percent----- Structures 5 μm Analytical Sensitivity Amphibole			
		Chry	Amph	Cleavage	Non-Asbestos	Chry	Asb	Cleavage Fragment	Non-Asbestos
DB-1 Duplicatae	3161701	0	0	10	0	<u>&lt; 2.4E-5</u> 2.4E-5	<u>&lt; 3.1E-5</u> 3.1E-5	<u>2.5E-1</u> 1.9E-5	<u>&lt; 1.8E-5</u> 1.8E-5

**NOTES**

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- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
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# RJ Lee Group, Inc.

# Final Laboratory Report (cont'd)

RJ Lee Group Job No: LLH901997-19  
Client Job No/Name:

Client: K & L Gates  
Report Date: 11/04/2019

Client Sample Number	RJLG Sample Number	Material Used (gm)	Area Analyzed Total (mm <sup>2</sup> )	Area Analyzed 5 μm (mm <sup>2</sup> )	Effective Filter Area (mm <sup>2</sup> )	Dilution Factor
DB-1 Duplicatae	3161701	0.0004	0.31360	0.31360	1220	1.0

Authorized Signature:



Ashleigh Sload, Scientist

## NOTES

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- Density of amphibole:  $3.2 \times 10^{-3}$  ng/μm<sup>3</sup>, density of chrysotile:  $2.55 \times 10^{-3}$  ng/μm<sup>3</sup>, density of non-asbestos:  $3.00 \times 10^{-3}$  ng/μm<sup>3</sup>.
- Abbreviations: N/A-Not Applicable, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, Asb-Asbestos Amphibole, Cleavage-Cleavage Amphibole.
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**RJ Lee Group, Inc.**  
**TEM Count Sheet**

RJL: LLH901997-19	3161701.HTA2	Microscope tem2000fx2	Grid Openings	10
DB-1 Duplicatae	K & L Gates	Magnification 21 KX	Asbestos	0.0
Wt: 0.0004 gm	Grid: 0.009 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	43.0
HQ44772		Cv = 0	Nonasbestos >= 5µm	4.0
			% Wt of largest asbestos structure	%

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1	1	1.5	0.25	Amphibole		MgSiCaFeAl	15591D	Image1	Diff1	Acti	Cle
1	2	1.2	0.12	Amphibole		MgSiCaFe			X	Acti	Cle
1	3	1.25	0.18	Amphibole		MgSiCaFe			X	Acti	Cle
1	4	2.4	0.45	Amphibole		MgSiCaFe			X	Acti	Cle
1	5	1.7	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
2	1	2.3	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
2	2	2.6	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
2	3	1.2	0.12	Amphibole		MgSiCaFe			X	Acti	Cle
2	4	1.1	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
3	1	2.3	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
3	2	1.4	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
3	3	1.3	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
3	4	1.5	0.25	Amphibole		MgSiCaFeAl	15592D	Image2	Diff2	Acti	Cle
3	5	1.4	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
3	6	5.3	0.6	Amphibole		MgSiCaFe			X	Acti	Cle
4	1	3.6	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
4	2	5.2	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
4	3	2.1	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
4	4	1.8	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
5	1	2.2	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
5	2	2.6	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
5	3	1.6	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
5	4	2.1	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
6	1	1.6	0.25	Amphibole		MgSiCaFe			X	Acti	Cle
6	2	1.1	0.2	Amphibole		MgSiCaFe	15594D	Image3	Diff3	Acti	Cle
6	3	1.8	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
6	4	1.6	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
6	5	1.2	0.22	Amphibole		MgSiCaFe			X	Acti	Cle
6	6	2.8	0.5	Amphibole		MgSiCaFe			X	Acti	Cle
7	1	1.55	0.22	Amphibole		MgSiCaFe			X	Acti	Cle
7	2	1.3	0.25	Amphibole		MgSiCaFe			X	Acti	Cle
7	3	1.6	0.22	Amphibole		MgSiCaFe			X	Acti	Cle
8	1	0.8	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
8	2	1.2	0.15	Amphibole		MgSiCaFe			X	Acti	Cle
8	3	0.6	0.12	Amphibole		MgSiCaFe			X	Acti	Cle
9	1	2.4	0.25	Amphibole		MgSiCaFe			X	Acti	Cle
9	2	1.2	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
9	3	1.5	0.18	Amphibole		MgSiCaFe			X	Acti	Cle
10	1	1.3	0.2	Amphibole		MgSiCaFe			X	Acti	Cle
10	2	2.4	0.3	Amphibole		MgSiCaFe			X	Acti	Cle
10	3	7.6	0.65	Amphibole		MgSiCaFeAl	15595D	Image4	Diff5	Acti	Cle
10	4	1.1	0.1	Amphibole		MgSiCaFe			X	Acti	Cle
10	5	8.9	1.1	Amphibole		MgSiCaFe			X	Acti	Cle
12% Particulate											

RJL: LLH901997-19	3161701.HTA2	Microscope tem2000fx2	Grid Openings	10
DB-1 Duplicatae	K & L Gates	Magnification 21 KX	Asbestos	0.0
Wt: 0.0004 gm	Grid: 0.009 mm <sup>2</sup>	Acc. Voltage 120 KV	Asbestos >= 5µm	0.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	Nonasbestos	43.0
HQ44772		Cv = 0	Nonasbestos >= 5µm	4.0
			% Wt of largest asbestos structure	%

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 11/3/2019 1:03:18 PM approve by Jon Swope

Final Review: 11/4/2019 12:39:00 PM approve by Ashleigh Sload

RJL: LLH901997-19	3161701.HTA2	Microscope tem2000fx2	Grid Openings	25
DB-1 Duplicatae	K & L Gates	Magnification 10 KX	Asbestos	0.0
Wt: 0.0004 gm	Grid: 0.009 mm <sup>2</sup>	Acc. Voltage 120 KV	Nonasbestos	6.0
Dil: 1.	Filter Size: 47 mm	Operator: Jon Swope	% Wt of largest asbestos structure	%
HQ44772		Cv = 0		

Field	Fiber	Length	Width	FiberType	Morph	EDX	File #	Photo	SAED	AmpID	C/A
1				NSD							
2				NSD							
3	1	5.3	0.8	Amphibole		MgSiCaFe			X	Acti	Cle
4	1	6.1	0.6	Amphibole		MgSiCaFeAl	15593D	Image1	Diff1	Acti	Cle
5				NSD							
6				NSD							
7	1	8.2	0.9	Amphibole		MgSiCaFe			X	Acti	Cle
8				NSD							
9				NSD							
10				NSD							
11	1	5.2	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
12				NSD							
13				NSD							
14	1	5.8	0.4	Amphibole		MgSiCaFe			X	Acti	Cle
15				NSD							
16				NSD							
17				NSD							
18	1	17.9	1.9	Amphibole		MgSiCaFe			X	Acti	Cle
19				NSD							
20				NSD							
21				NSD							
22				NSD							
23				NSD							
24				NSD							
25				NSD							

12% Particulate

**Analyst's Comments: N/A**

Abbreviations: F - Fiber, C - Cluster, B - Bundle, M - Matrix, Cle - Cleavage, Asb - Asbestiform, Bys - Byssolite

Initial Review: 11/3/2019 1:43:24 PM approve by Jon Swope

Final Review: 11/4/2019 12:39:00 PM approve by Ashleigh Sload

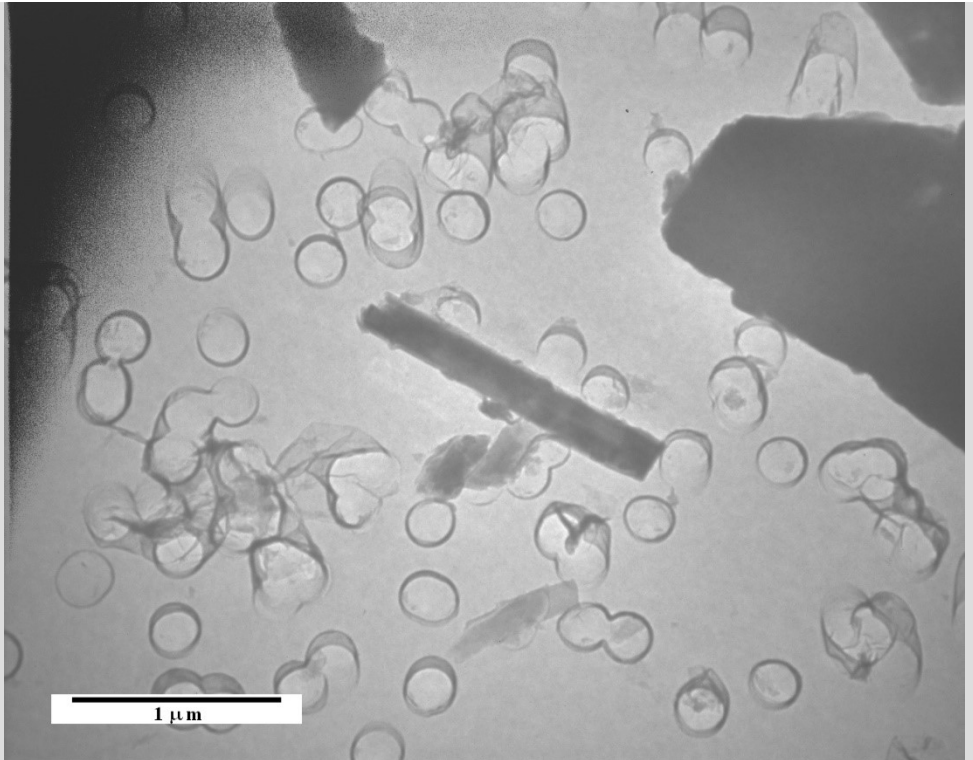


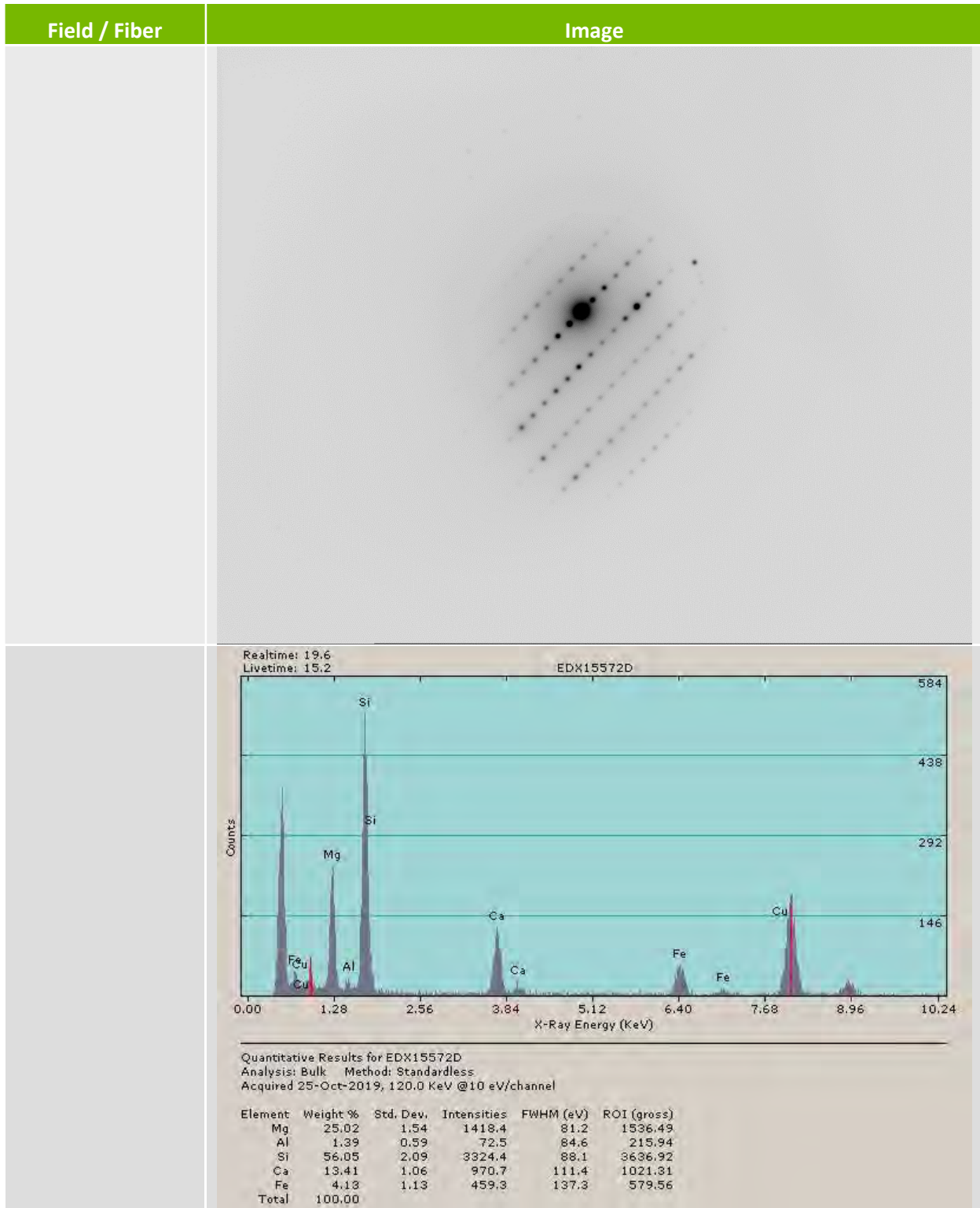


Transmission Electron Microscopy

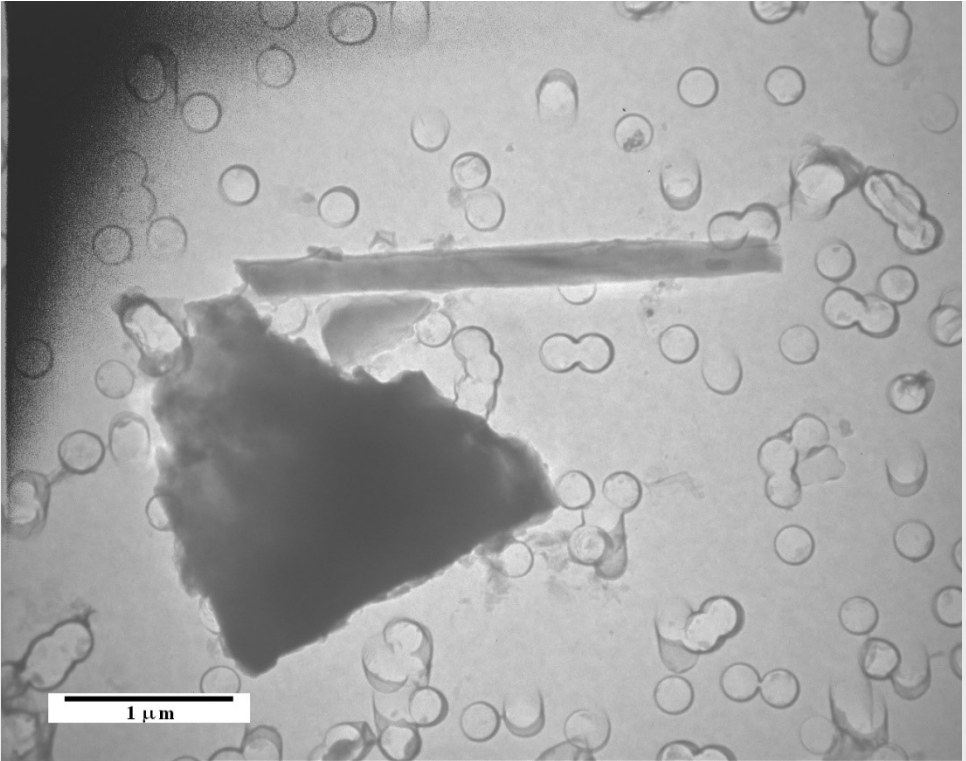
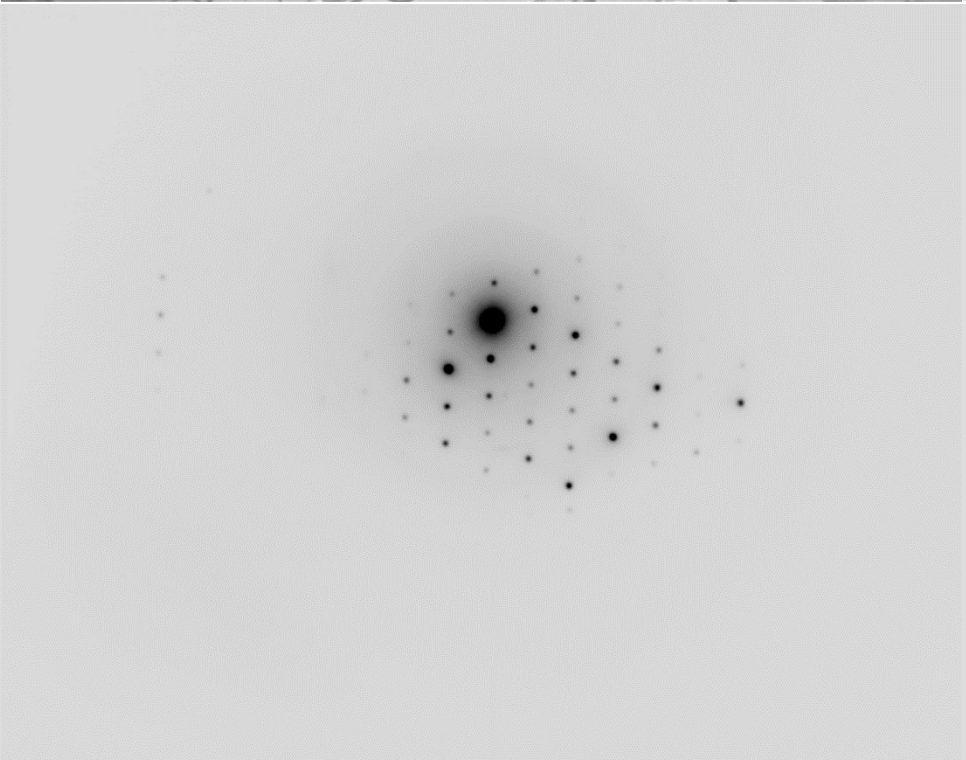
Report Dated November 4, 2019

Analysis of Sample DB-1

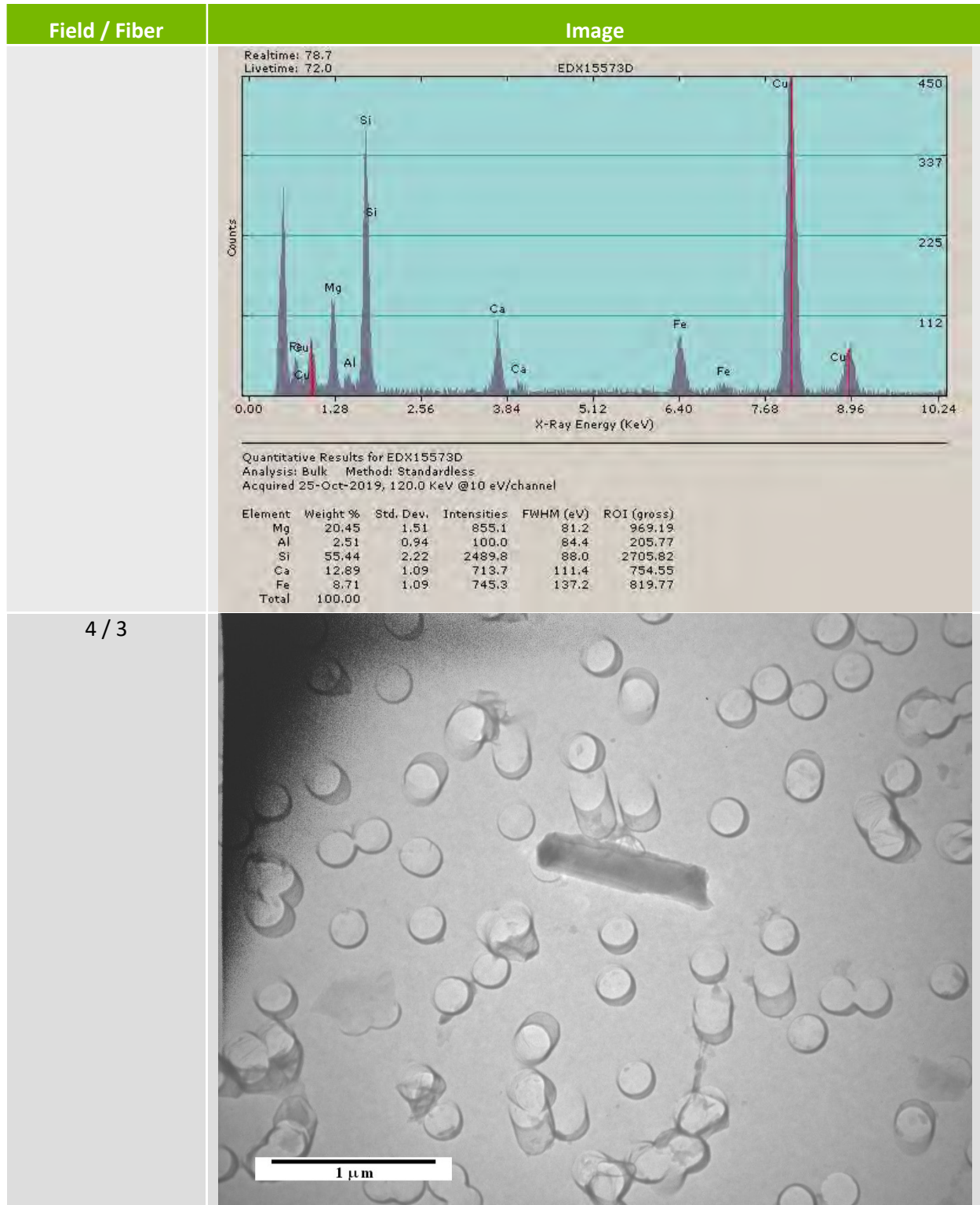
Field / Fiber	Image
LLH901997-16 Hi Mag 1 / 1	 <p>The image displays a field of view filled with numerous circular, layered structures, likely cross-sections of fibers or biological cells. A scale bar at the bottom indicates 1 μm. The structures are arranged in a somewhat random pattern, with some appearing more densely packed than others. A dark, elongated object is visible in the center of the field.</p>

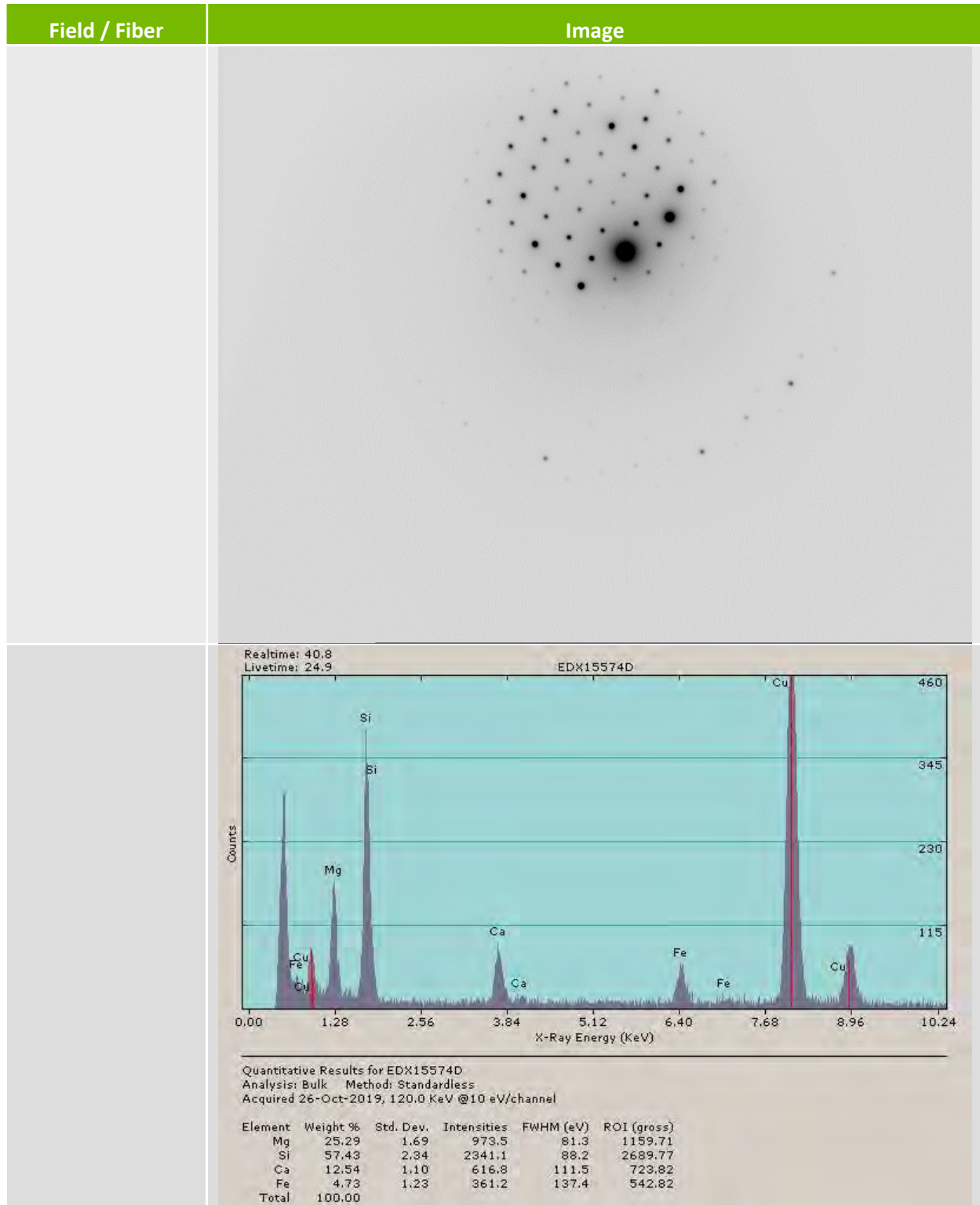


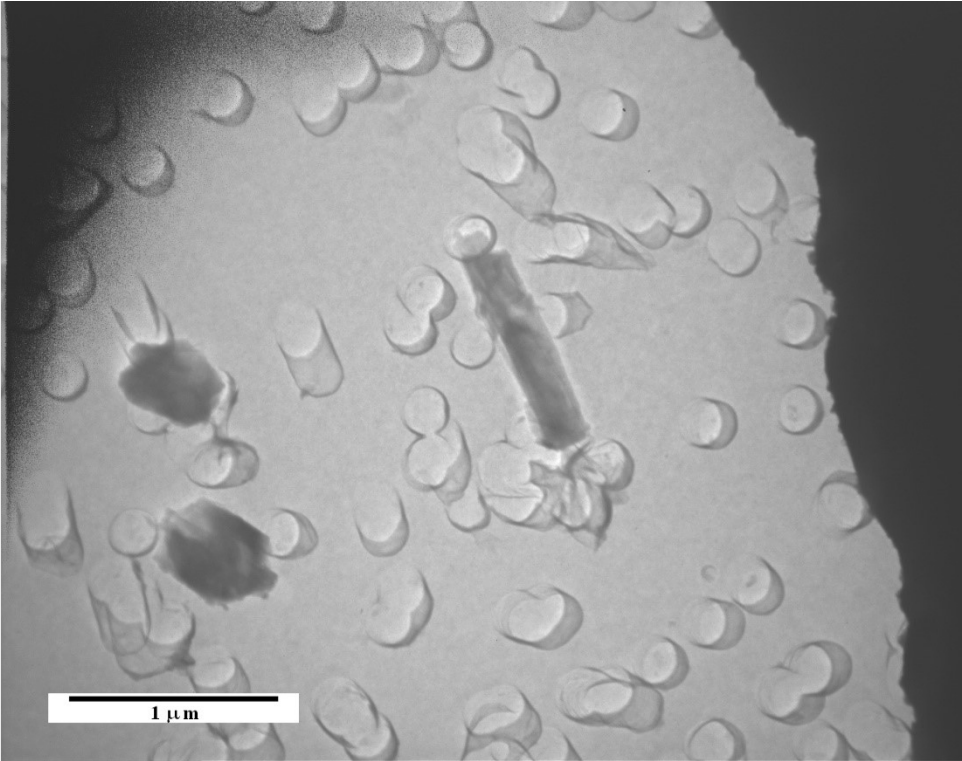
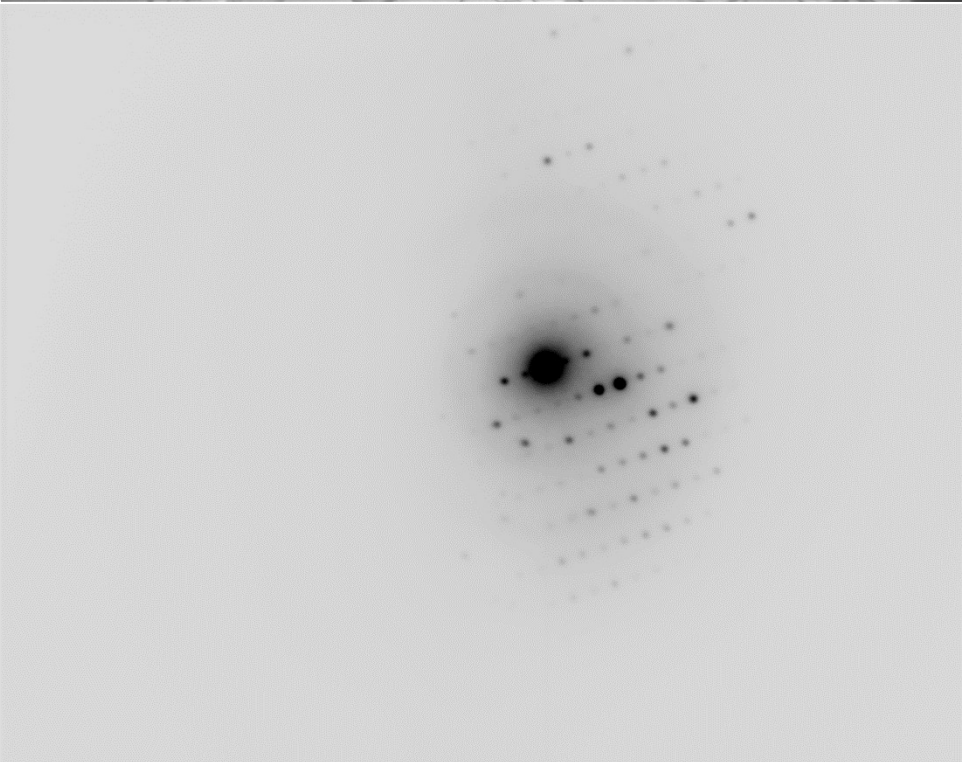


Field / Fiber	Image
2 / 4	 A transmission electron micrograph (TEM) showing a dark, irregularly shaped fiber-like structure and a smaller, dark, triangular-shaped particle. The background is filled with numerous small, circular, ring-like structures. A scale bar in the bottom left corner indicates 1 μm.
	 A selected area electron diffraction (SAED) pattern showing a central dark spot surrounded by a diffuse, circular halo of smaller spots, indicating a partially ordered or amorphous structure.

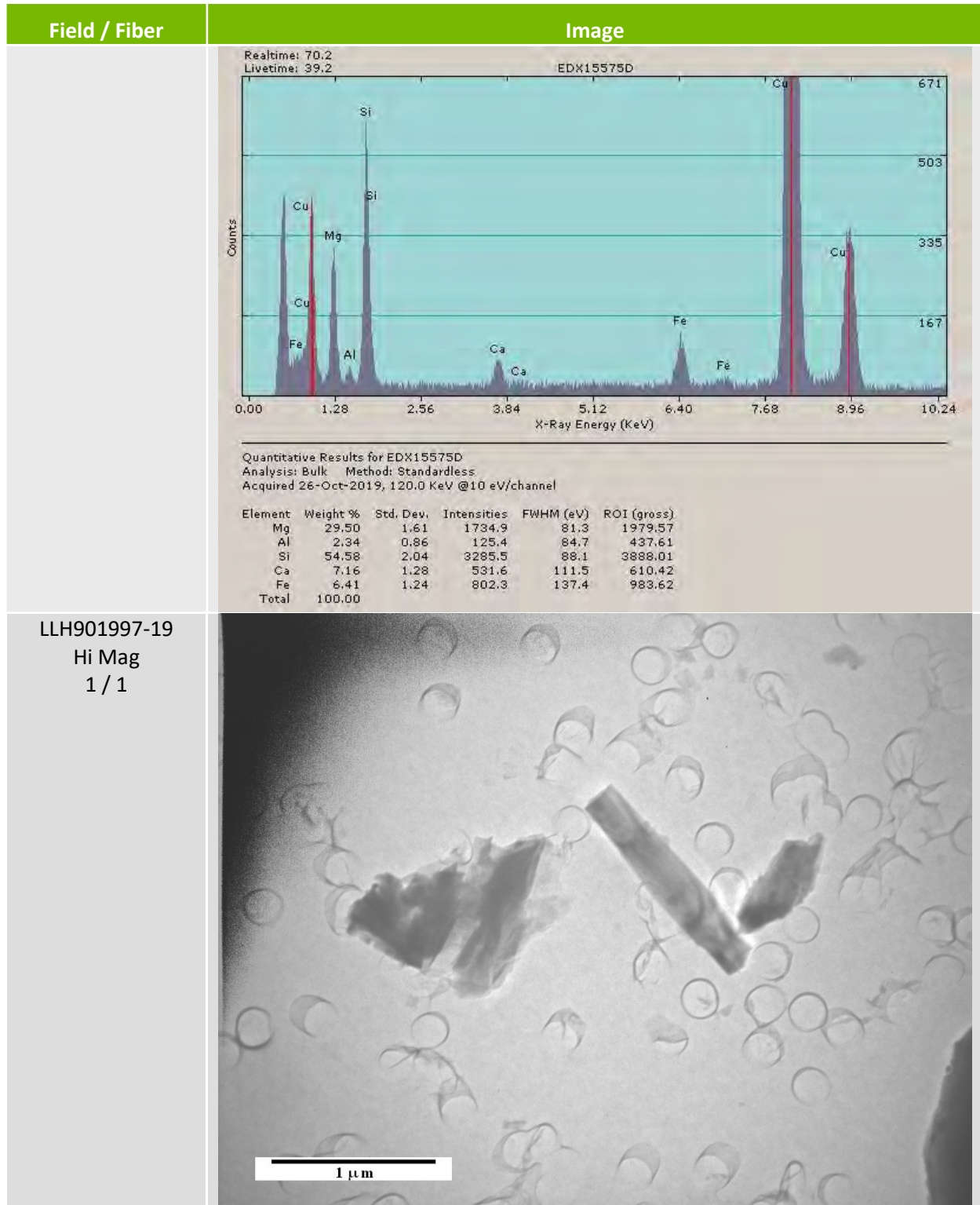




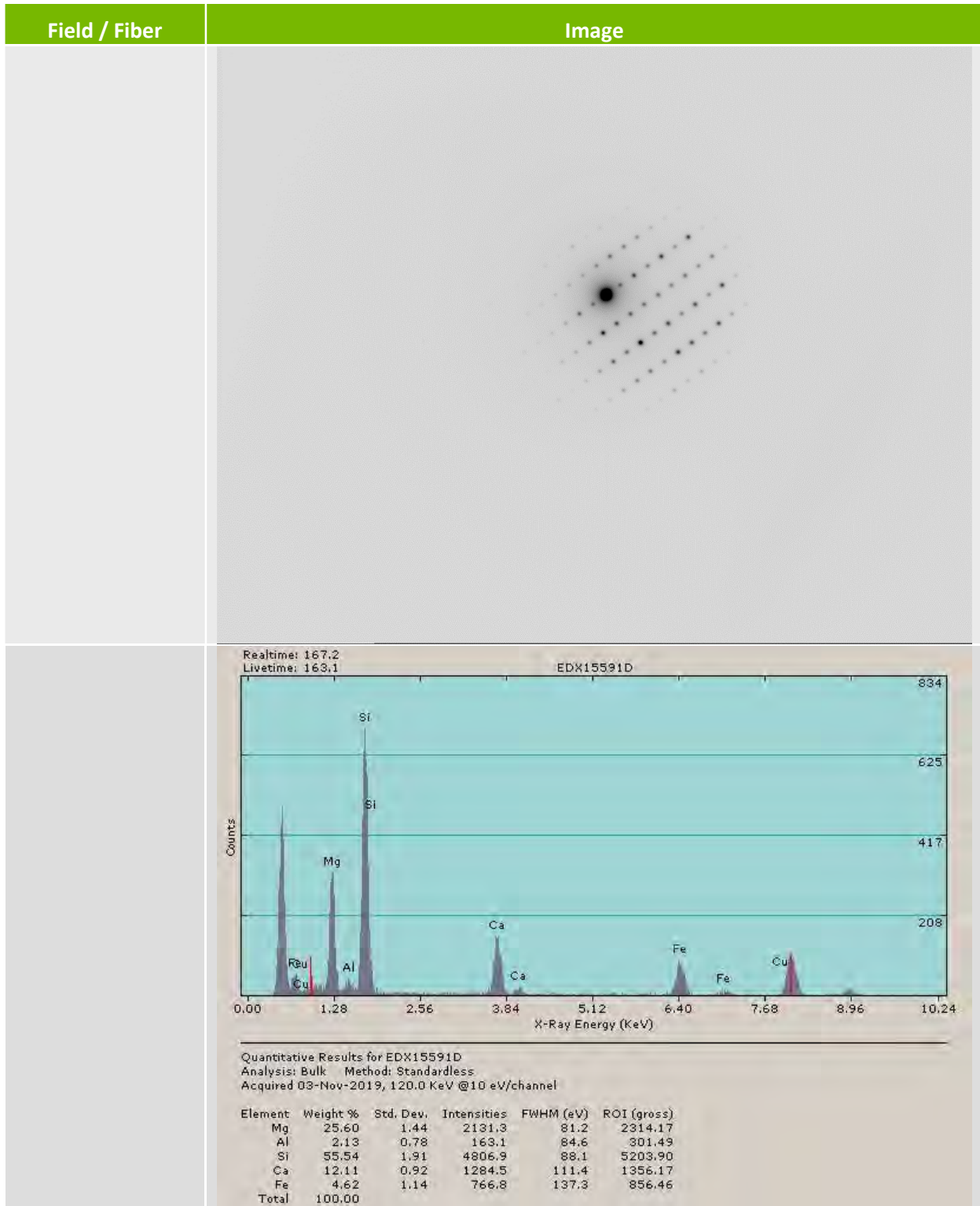


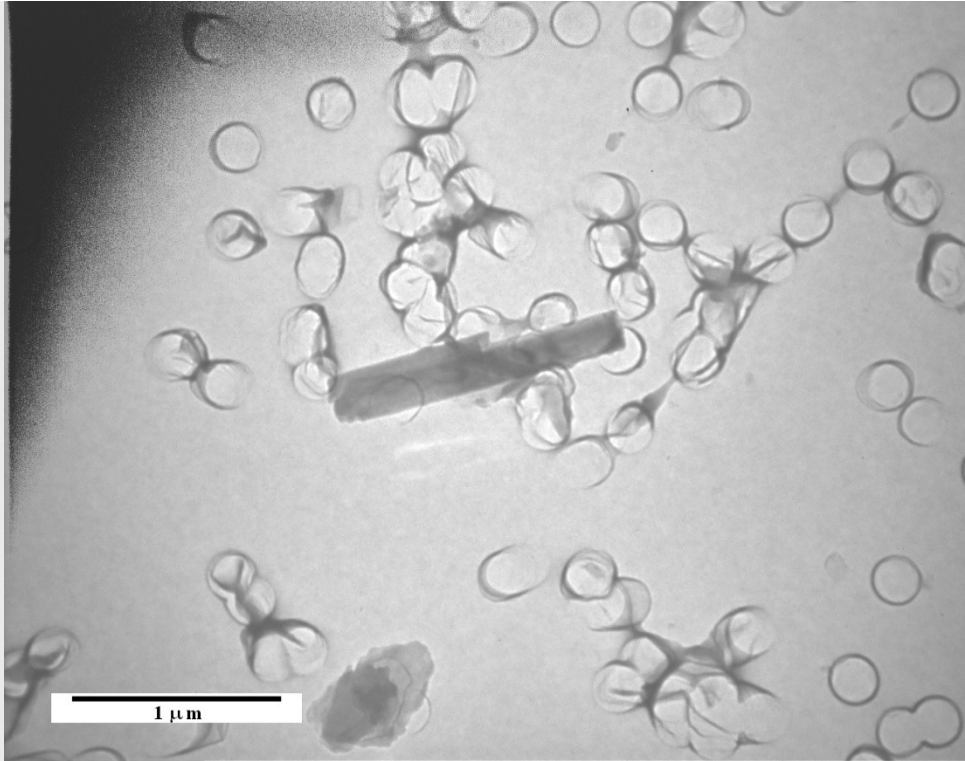
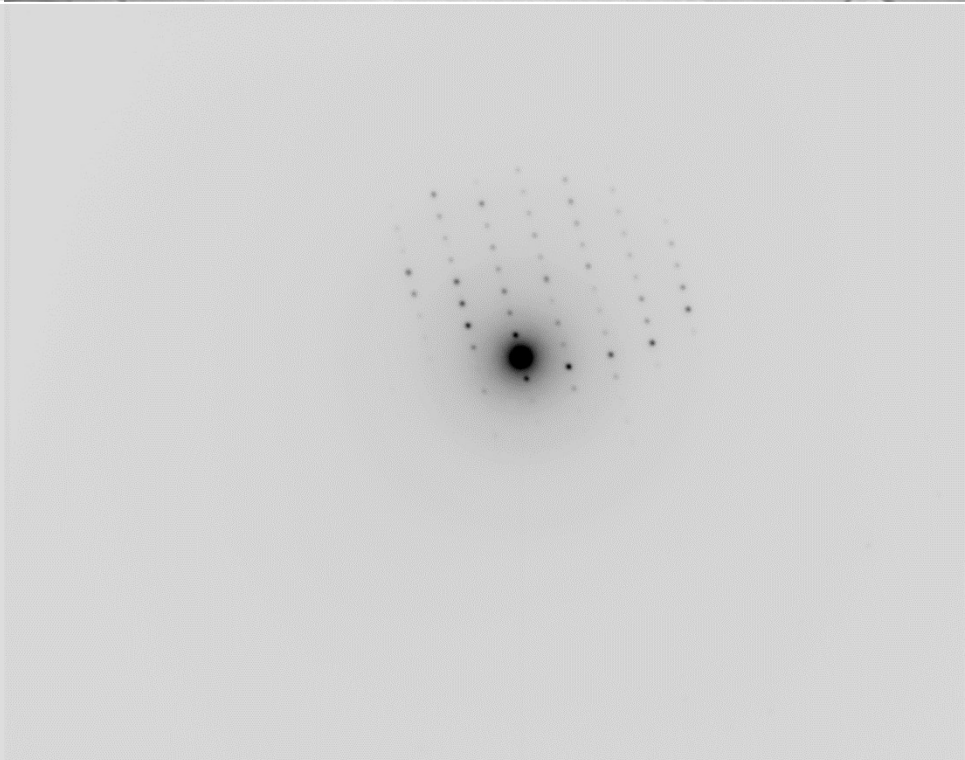
Field / Fiber	Image
8 / 1	 A transmission electron micrograph (TEM) showing a cross-section of a fiber. The central core is a dark, elongated structure. The surrounding cladding is composed of numerous small, circular, electron-dense particles arranged in a somewhat regular pattern. A scale bar in the bottom left corner indicates 1 μm.
	 An electron diffraction pattern showing a central spot and surrounding spots, indicating a crystalline structure. The spots are arranged in a somewhat regular pattern, suggesting a degree of order in the material.

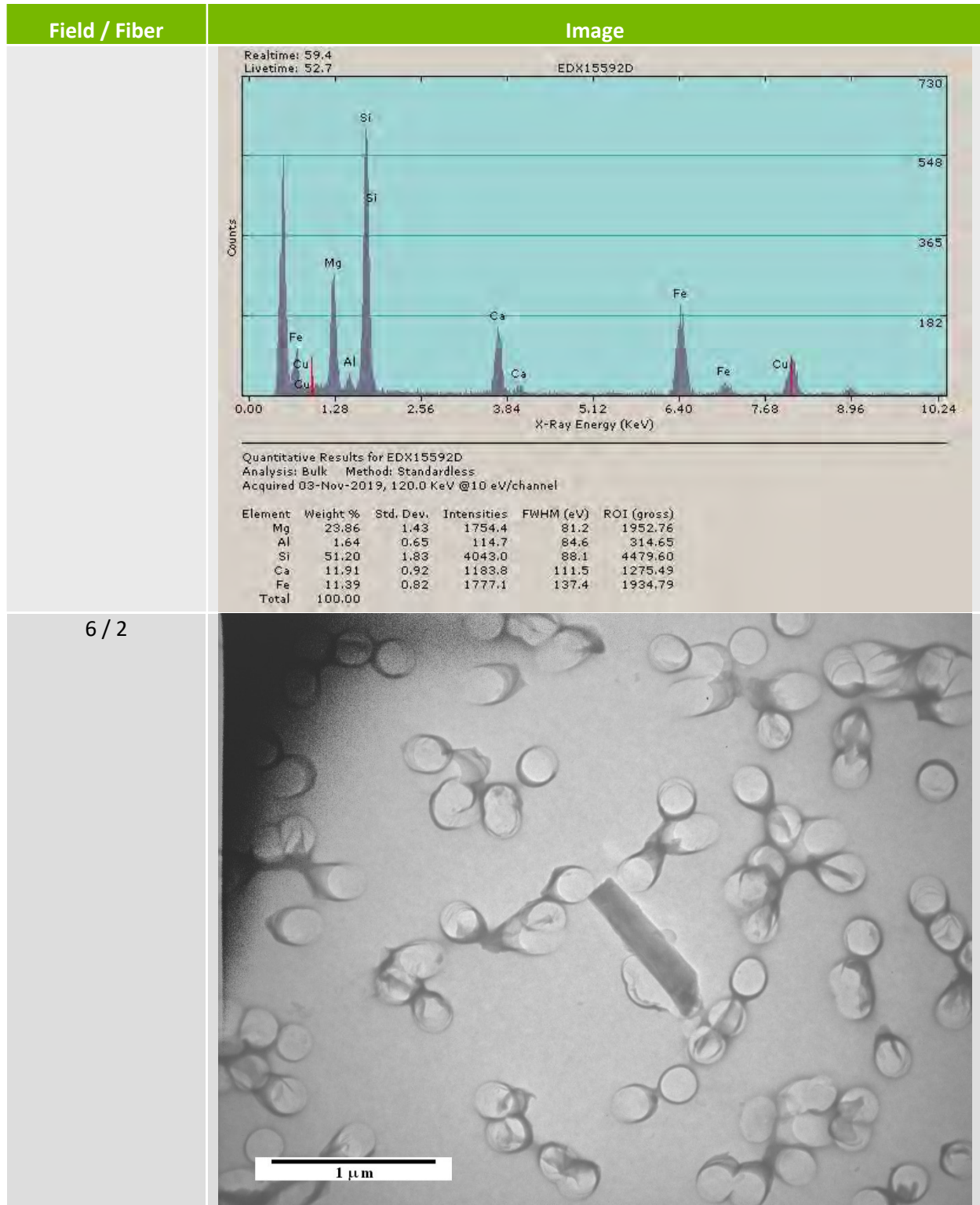




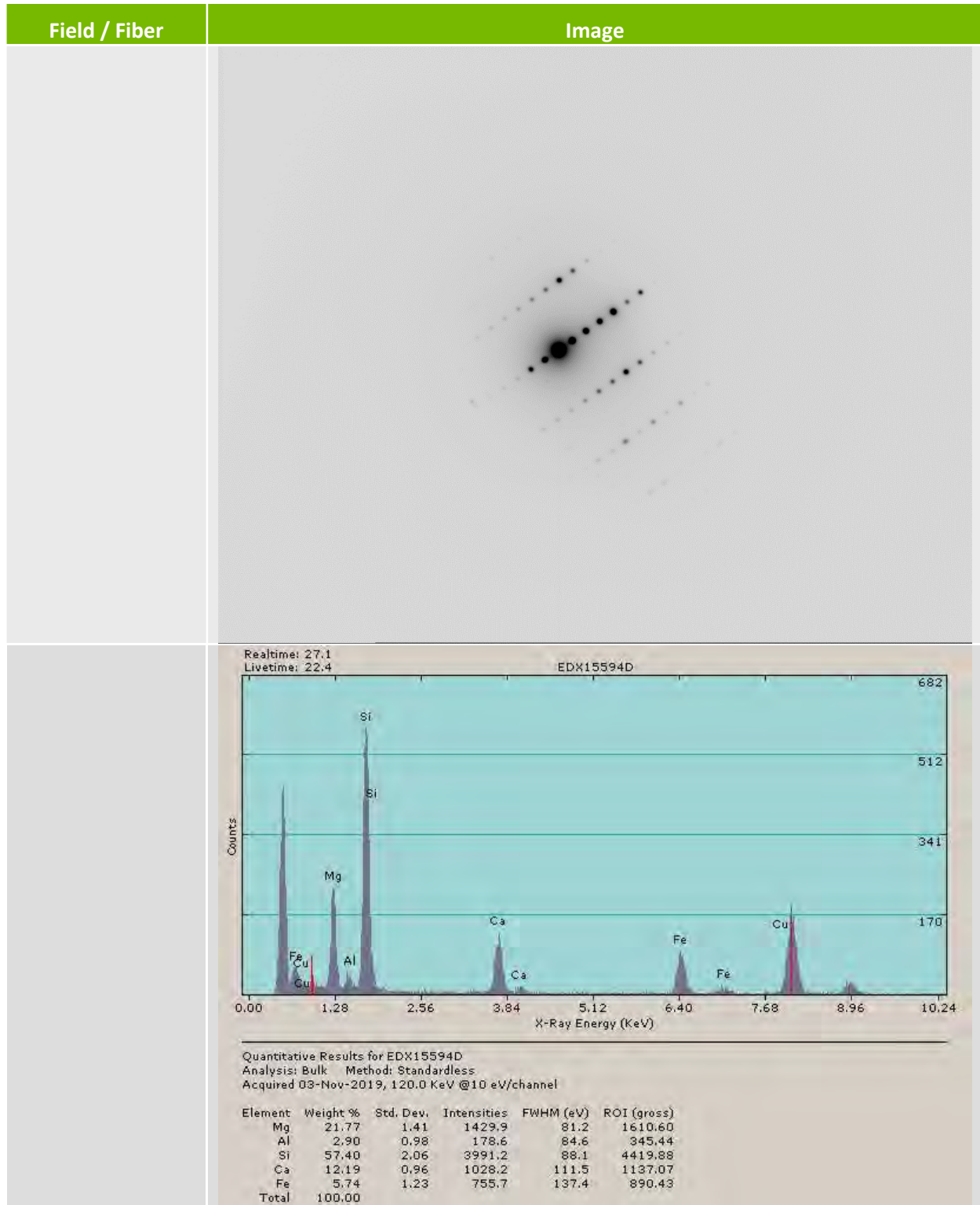




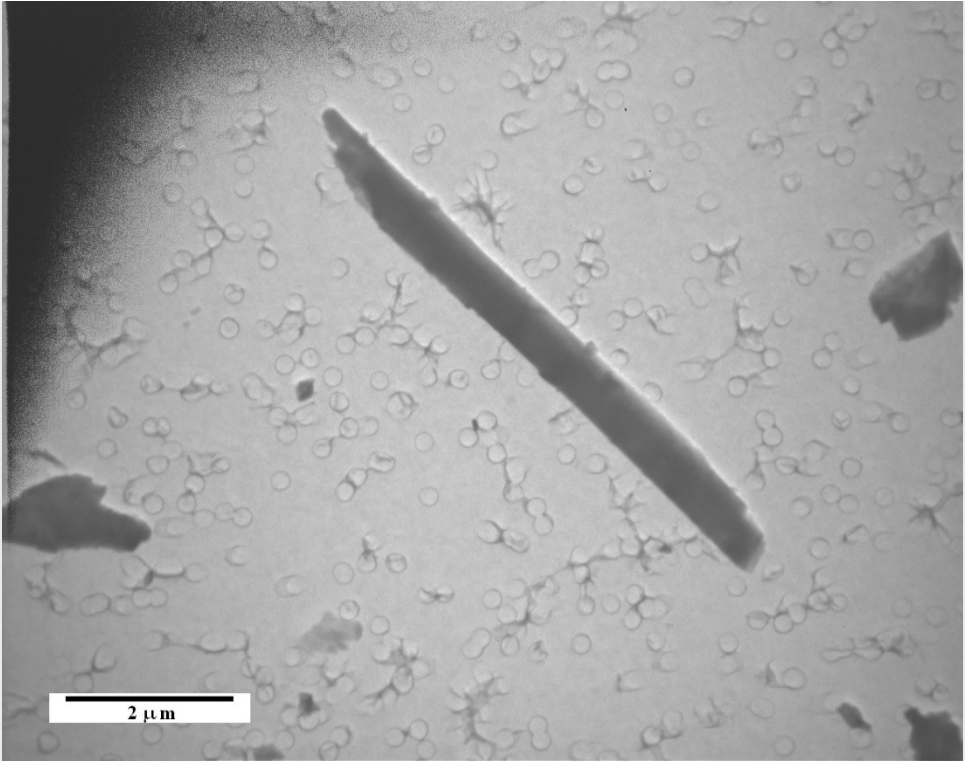
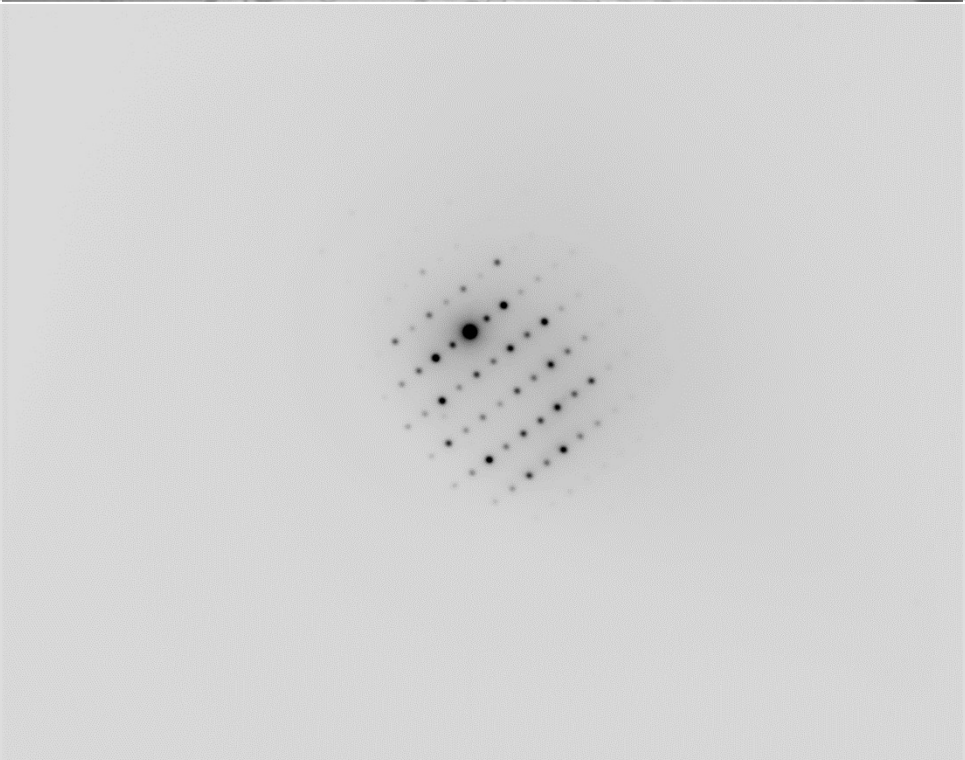
Field / Fiber	Image
3 / 4	 A transmission electron micrograph (TEM) showing a central cylindrical fiber with a textured surface. The fiber is surrounded by numerous circular cross-sections of similar fibers, some appearing as doublets or triplets. A scale bar in the lower-left corner indicates a length of 1 μm.
	 An electron diffraction pattern showing a central dark spot surrounded by a regular array of smaller, lighter spots, indicating a crystalline structure.

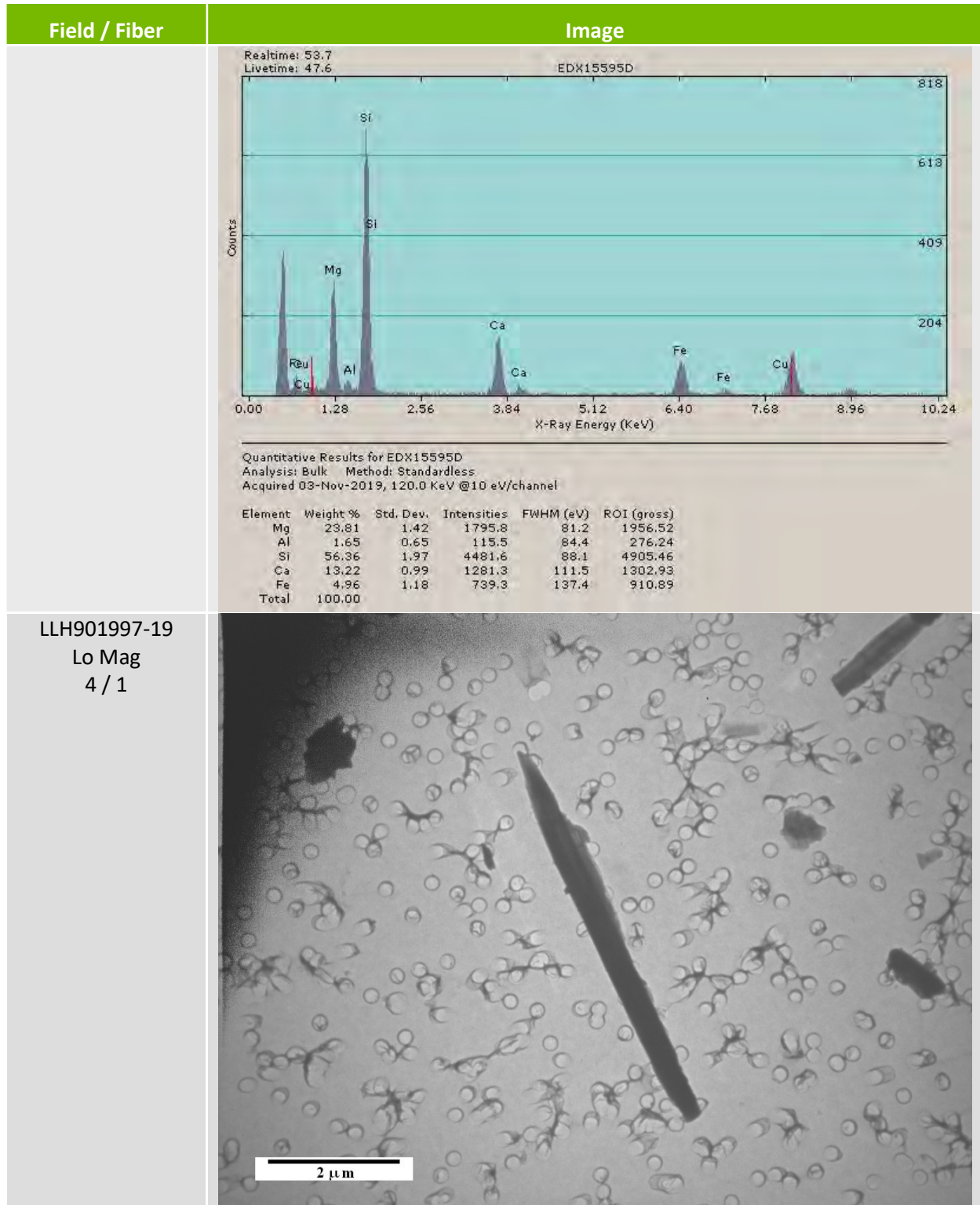


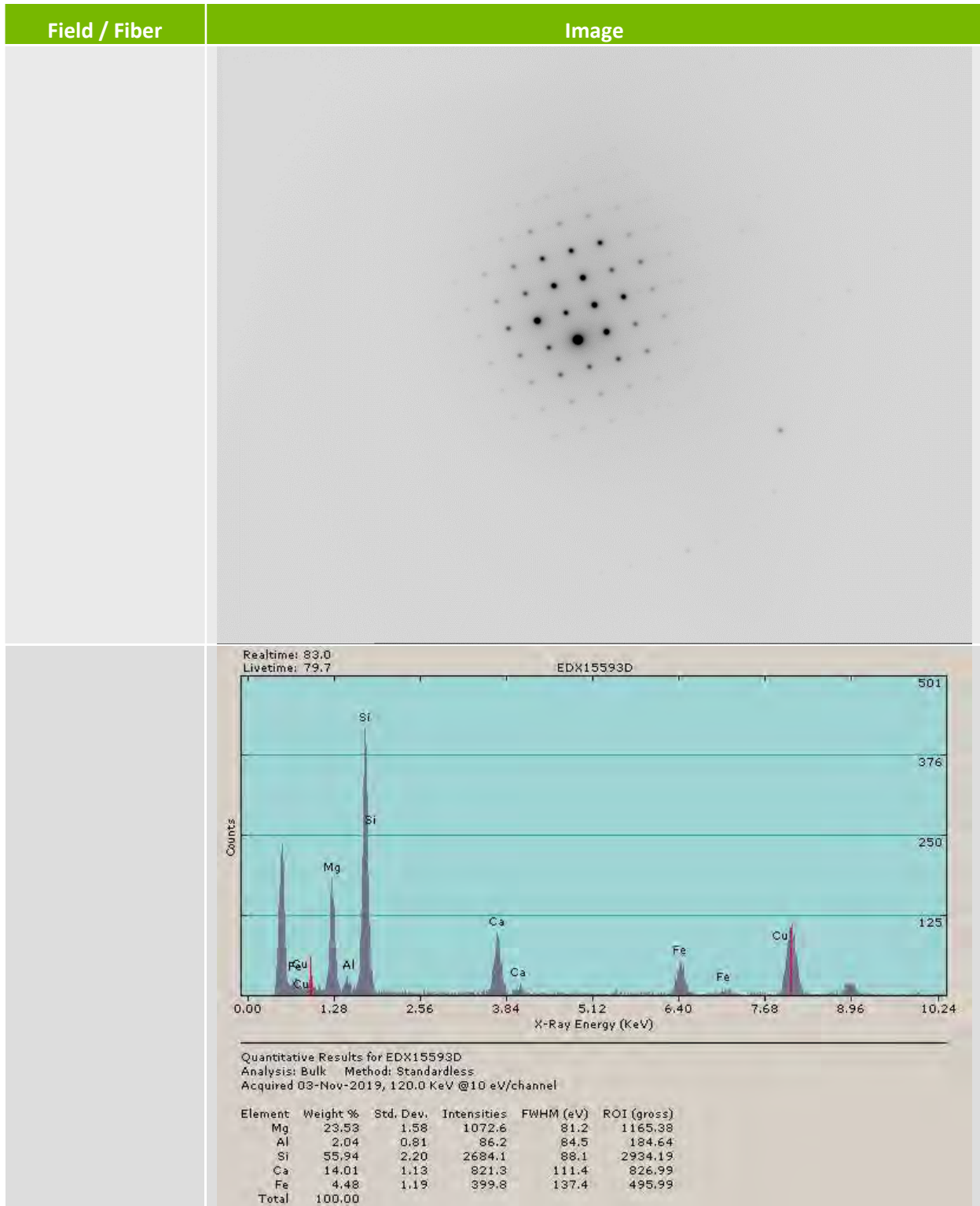






Field / Fiber	Image
10 / 3	 A transmission electron micrograph (TEM) showing a long, dark, cylindrical fiber oriented diagonally from the upper left to the lower right. The background is filled with numerous small, circular, ring-like structures, likely cross-sections of nanotubes or similar nanomaterials. A scale bar in the bottom left corner indicates a length of 2 μm.
	 An electron diffraction pattern showing a central bright spot surrounded by a regular array of smaller spots, indicating a crystalline structure. The spots are arranged in a roughly circular pattern, suggesting a hexagonal or similar lattice structure.





# **BOULDER FIELD ANALYTICAL RESULTS**





RJ Lee Group, Inc.

RJ Lee Group, Inc.

350 Hochberg Road, Monroeville, PA 15146

Tel: 724-325-1776 | Fax: 724-733-1799

### Laboratory Report

K & L Gates

17 North Second Street

18th Floor

Harrisburg, PA 17101

United States

Attention: Mr. David Raphael

Telephone: 717-231-4504

Report Date 06/26/2019

Sample Receipt Date 06/03/2019

RJ Lee Group Job No. LLH901997-9

Authorization/P.O. No.

Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count

Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158823.HPL	1 - RH #1	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description:	Gray Crushed Rock.							
Weight Loss: 0.0%	1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Tremolite Cleavage.							
3158824.HPL	2 - RH #2	Yes	1	<0.1 AC	0.50 OF	99.50	Q, AM, OP, M	WT-06/26/2019
Description:	Beige Crushed Rock.							
Weight Loss: 0.0%	1000 Point Count. Detection Limit=0.1%. 0.5% OF= 0.5% Actinolite Cleavage.							
3158825.HPL	3 - RH #3	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description:	Gray Crushed Rock.							
Weight Loss: 0.0%	1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.							



RJ Lee Group, Inc.

Laboratory Report (Cont)

Client Job No./Name: RJ Lee Group Job No: LLH901997-9

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158826.HPL	4 - RH #4	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158827.HPL	5 - RH #5	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158828.HPL	6 - RH #6	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158829.HPL	7 - RH #7	Yes	1	<0.1 TR	<0.1 OF	100.00	Q, CA, AM, OP, M	WT-06/26/2019
Description: Green Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158830.HPL	8 - RH #8	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP	WT-06/26/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158831.HPL	9 - RH #10	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								



RJ Lee Group, Inc.

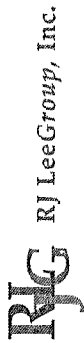
Laboratory Report (Cont)

Client Job No./Name:

RJ Lee Group Job No:

LLH901997-9

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158832.HPL	10 - RH #11	Yes	1	<0.1 AC	<0.1 OF	100.00	Q, AM, OP, M	WT-06/26/2019
Description: Beige Crushed Rock. 1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158833.HPL	11 - RH #12	Yes	1	<0.1 AC	0.30 OF	99.70	Q, AM, OP, M	WT-06/26/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%. 0.3% OF= 0.3% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158834.HPL	12 - RH #14	Yes	1	<0.1 AC	0.50 OF	99.50	Q, AM, OP, M	WT-06/26/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%. 0.5% OF= 0.5% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158835.HPL	13 - RH #18	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	DF-06/26/2019
Description: Gray Crushed Rock 1000 Point Count. Detection Limit=0.1% OF=<0.1% Actinolite/Tremolite Cleavage								
Weight Loss: 0.0%								



Laboratory Report (Cont)

Client Job No./Name: **RJ Lee Group Job No: LLH901997-9**

RJLG Sample Number: \_\_\_\_\_ Client Sample Number: \_\_\_\_\_ Homogeneous: \_\_\_\_\_ # of Layers: \_\_\_\_\_ Asbestos Detected(%): \_\_\_\_\_ Non-Asbestos Fibers(%): \_\_\_\_\_ Non-Fibrous Materials(%): \_\_\_\_\_ Matrix Material: \_\_\_\_\_ Analyst - Analysis Date: \_\_\_\_\_

Authorized Signature:

Donald Fike

**ASBESTOS**

- AM = Amosite
- AC = Actinolite
- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite

**NON-ASBESTOS**

- CE = Cellulose
- MW = Mineral Wool
- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
- OF = Other Fibers

**NON-FIBROUS MATERIALS**

- AM = Amphibole
- B = Binder
- CA = Carbonates
- CL = Clay
- F = Feldspar
- G = Gypsum
- HY = Hydromagnesite
- M = Miscellaneous
- MI = Mica
- OP = Opaque
- OR = Organic
- P = Perlite
- Q = Quartz
- T = Tar
- V = Vermiculite

**DISCLAIMER NOTES**

- "ND" indicates no asbestos was detected; the method detection limit is 0.25%.
- "Trace" or "<" indicates asbestos was identified in the sample, but the concentration is less than the method quantitation limit. PLM coefficients of variance range from approximately 1.8 at the quantitation limit of 0.25% to 0.32 at high fiber concentrations.
- Samples are archived for three months following analysis and are then properly discarded.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
- This test report relates to the items tested.
- This report is not valid unless it bears the name of a NVLAP Lab Code 101208-0 approved signatory.
- Any reproduction of this document must be in full in order for the report to be valid.
- This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0, any agency of the U.S. Government or any other laboratory accrediting agency.
- Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar nonfriable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as "non-asbestos-containing."
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364; NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory results are limited to the reported values.
- ((100-A)/B)\*C = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.



# Request for Environmental and IH Laboratory Analytical Services



LLH901997-9

<b>ATTENTION TO:</b>		Purchase Order No.:		Client Job No.: Rock Hill Quarry	
<b>Lab Use Only</b>	Project No.:	Client No.:	Rush Charges Authorized? <input type="checkbox"/> YES <input type="checkbox"/> NO		
	Date Logged In:	Logged In By:	Accreditation (please list below):		
<b>Report Results To</b>	Name: Andrew Gutshall		Sample Purpose: Information	<input type="checkbox"/> Regulatory	
	Company: Hanson Aggregates Pa, LLC		System ID #:	N/A	N/A
	Address: 7660 Imperial Way		DOH Source #:	N/A	N/A
	City, State, Zip: Allentown, PA 18195		Multiple Sources #s:	N/A	
	Phone: 610-366-4819	Fax:	Sample Purpose: A <input type="checkbox"/> B <input type="checkbox"/> Other <input type="checkbox"/> N/A		
	Email Results To:		Preservation:	SW=Surface Water	Container:
	Name:	If a hard copy of invoice is needed, check here <input type="checkbox"/>	Unpres H <sub>2</sub> SO <sub>4</sub>	DW=Drinking Water	P=Plastic
	Company:	Email:	4 °C	O=Oil	G=Glass
	Address:		HNO <sub>3</sub>	X=Other	W=Wipe
	City, State, Zip:		Other		A=Air (filter or tube)
<b>Special Instructions</b>	Invoice per project setup with Drew Van Orden				
	Client Sample ID	Sample Description	Sample Date	Sample Time	Wipe Area / Air Volume
	1	RH#1	5/8/19	1120 Grab	N/A
	2	RH#2	5/8/19	1130	N/A
	3	RH#3	5/8/19	1135	N/A
	4	RH#4	5/8/19	1145	N/A
	5	RH#5	5/8/19	1150	N/A
	6	RH#6	5/8/19	1200	N/A
	7	RH#7	5/8/19	1205	N/A
	8	RH#8	5/8/19	1110	N/A
	9	RH#10	5/8/19	0950	N/A
	10	RH#11	5/8/19	0940	N/A
	11	RH#12	5/8/19	0845 Grab	N/A
<b>Chain of Custody</b>	Relinquished By (Signature): <i>AKY</i>	Date: 5/23/19	Time: 1530	Received By (Signature): <i>Siz Vaidya</i> Date: 5/24/19 Time:	
	Relinquished By (Print Name): <i>Tobias Henschel</i>	Relinquished To:		Received By (Print Name): <i>Liz Vaidya</i> Relinquished To:	
	Company Name: <i>Earlures</i>	Method of Shipment: <i>FedEx</i>		Company Name: <i>RJ Lee</i> Method of Shipment:	
<b>Chain of Custody</b>	Relinquished By (Signature):	Date:	Time:	Received By (Signature): <i>Yvonne Prangus</i> Date: 06-03-19 Time: 12:00 PM	
	Relinquished By (Print Name):	Relinquished To:		Received By (Print Name): <i>Yvonne Prangus</i> Relinquished To:	
	Company Name:	Method of Shipment:		Company Name: <i>RJ Lee Group</i> Method of Shipment:	

**RJ LEE GROUP**  
 DELIVERING SCIENTIFIC RESOLUTION

Pennsylvania - HQ  
 350 Hochberg Road  
 Monroeville, PA 15146  
 724.325.1776 Phone

Washington  
 Columbia Basin Analytical Laboratories  
 2710 North 20th Avenue  
 Pasco, WA 99301  
 509.545.4989 Phone



# Request for Environmental and IH Laboratory Analytical Services

COPY

LCH901997-9

<b>ATTENTION TO:</b>		Project No.: _____		Client Job No.: Rock Hill Quarry	
<b>Lab Use Only</b>		Date Logged In: _____		Rush Charges Authorized? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Name: Andrew Gutshall		Logged In By: _____		Sample Purpose: Information <input type="checkbox"/> Regulatory <input type="checkbox"/> Accreditation (please list below):	
Company: Hanson Aggregates Pa, LLC		Address: 7660 Imperial Way		System ID #: N/A	
City, State, Zip: Allentown, PA 18195		Phone: 610-366-4819		DOH Source #: N/A	
Email Results To: _____		Fax: _____		Multiple Sources #: N/A	
Name: _____		Email: _____		Sample Purpose: A <input type="checkbox"/> B <input type="checkbox"/> Other <input type="checkbox"/> N/A	
Company: _____		Address: _____		Preservation: Unpres H <sub>2</sub> SO <sub>4</sub>	
City, State, Zip: _____		Phone: _____		4°C HCl	
Special Instructions: Invoice per project setup with Drew Van Orden		Wipe Area / Air Volume		Matrix: WW=Wastewater	
		Sample Time		SW=Surface Water	
		Start Stop		GW=Groundwater	
		Sample Date		S=Soil/Sludge	
		Sample Description		E=Extract	
		Client Sample ID		X=Other	
		12 RH#14		Container: P=Plastic	
		13 RH#18		G=Glass	
		14 RH#22		W=Wipe	
		15 RH#23		A=Air (filter or tube)	
		16 RH#24		Pres. Upon Receipt (Y/N)	
		17 RH#25		N/A N/A X	
		18 RH#26		N/A N/A X	
		19 RH#27		N/A N/A X	
		20 RH#28		N/A N/A X	
		21 RH#29		N/A N/A X	
		22 RH#30		N/A N/A X	
		Date: 5/23/19 Time: 1530		Date: 5/24/19 Time:	
<b>Chain of Custody</b>		Relinquished By (Signature): <i>Ray</i>		Relinquished To:	
		Relinquished By (Print Name): <i>Ray A. Yonchick</i>		Relinquished To:	
		Company Name: <i>Earthres</i>		Method of Shipment:	
<b>Chain of Custody</b>		Date: _____ Time: _____		Date: _____ Time: _____	
		Relinquished To: _____		Relinquished To: _____	
		Method of Shipment: _____		Method of Shipment: _____	





Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples

Date: 06/12/19 Analyst: MT Scope: 023-0115

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158823  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments /  
 # of Layers: 1000 Point Count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%	QC Analyst:
					⊥		⊥					
	<u>0%</u>	<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		<u>100%</u>	
			<u>WCS</u>					<u>L M</u>	<u>P N</u>			
			<u>WCS</u>					<u>L M</u>	<u>P N</u>			
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		
	<u>&lt;0.1%</u>	<u>Tremolite cleavage</u>		<u>R.I.</u>								

- Quartz
- Tar
- Perlite
- Talc
- Clay
- Misc Particles
- Carbonates
- Binder
- Amphibole
- Feldspar
- Organic Part.
- Foam
- Vermiculite
- Opagles
- Gypsum
- Mica
- Diatoms
- Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$





**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/13/19 Analyst: WT Scope: 023-0PT

Sample Description: Beige Crushed Rock.

RJ Lee Group  
 Sample Number: 3158824  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments / # of Layers: 1000 Point Count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%	QC Analyst:
					⊥		⊥					
	<u>&lt;0.1%</u>	<u>Actinolite</u>	<u>W C(S)</u>	<u>GR</u>	<u>N</u>	<u>1.638</u>	<u>1.628</u>	<u>L M</u>	<u>P N</u>	<u>PL</u>	<u>99.5%</u>	
			<u>W C S</u>					<u>L M</u>	<u>P N</u>			
			<u>W C S</u>					<u>L M</u>	<u>P N</u>			
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix		
	<u>0.5%</u>	<u>Actinolite cleavage</u>		<u>R&amp;L</u>								

- Quartz
- Carbonates
- Vermiculite
- Tar
- Binder
- Opagles
- Perlite
- Amphibole
- Gypsum
- Talc
- Feldspar
- Mica
- Clay
- Organic Part.
- Diatoms
- Misc Particles
- Foam
- Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	2	0	2	0	4
NAS	100	100	100	100	98	100	98	100	796
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$













**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/16/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock.  
1000 Point Count. Detection Limit = 0.1%

RJ Lee Group  
 Sample Number: 3158827  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments /  
 # of Layers:

Stereo-scope				# of Preps: <u>10</u>	Homogenous <input checked="" type="radio"/> Y <input type="radio"/> N	QC Y <input type="radio"/> N <input type="radio"/>	QC Analyst:				
%	%	Asbestos Type	Morphology	Color/Pleochroism    ⊥		Indices of Refraction    ⊥		Birefringence L M	Sign of Elongation P N	Extinction Angle	NFM% <u>100%</u>
	<u>0%</u>	<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		Quartz <input checked="" type="radio"/> Carbonates Vermiculite Tar <input type="radio"/> Binder <input type="radio"/> Opacities <input checked="" type="radio"/> Perlite <input type="radio"/> Amphibole <input checked="" type="radio"/> Gypsum Talc <input type="radio"/> Feldspar Mica Clay <input type="radio"/> Organic Part. Diatoms Misc. Particles <input checked="" type="radio"/> Foam Foil
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		
% Non-Asbestos Fibers			Optical Properties	Layered Results		Asbestos	Non-Asb.	Matrix			
	<u>&lt;0.1%</u>	<u>Actinolite Cleavage</u>	<u>R.I.</u>								

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/16/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158827 RJ Lee Group Project Number: LL1901997-9

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/16/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158828 RJ Lee Group Project Number: 417901997-9

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									







**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/20/19 Analyst: MT Scope: 023-DPT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158830  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments /  
 # of Layers: \_\_\_\_\_  
 # of Preps: (0) Homogenous (Y) N  
 QC Y N  
 QC Analyst:

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM% <u>100%</u>
					⊥		⊥				
	<u>0%</u>	<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>		Quartz Tar Perlite Talc Clay Misc. Particles Carbonates Binder Amphibole Feldspar Organic Part. Foam Vermiculite Opacites Gypsum Mica Diatoms Foli
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	<u>&lt;0.1%</u>	<u>Actinolite Cleavage</u>		<u>R.I.</u>							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
CLE	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
NAS	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/23/19 Analyst: WT Scope: 023-DPT

Sample Description: Gray Crushed Rock  
(100) Point Count. Detection Limit = 0.1%

RJ Lee Group  
 Sample Number: 3158831  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments /  
 # of Layers:

Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous		QC		QC Analyst:	
						⊥		⊥	Y	N	Y	N		
		<u>0%</u>	<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>				
			<u>W C S</u>						<u>L M</u>	<u>P N</u>				
			<u>W C S</u>						<u>L M</u>	<u>P N</u>				
			% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM% <u>100%</u>		
		<u>&lt;0.1%</u>	<u>Actinolite Cleavage</u>		<u>R.I.</u>							<u>Quartz</u>	Carbonates	Vermiculite
												<u>Tar</u>	Binder	<u>Opagus</u>
												<u>Perlite</u>	<u>Amphibole</u>	Gypsum
												<u>Talc</u>	Feldspar	Mica
												<u>Clay</u>	Organic Part.	Diatoms
												<u>Misc-Particles</u>	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>ASB</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>CLE</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$







Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/23/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158822 RJ Lee Group Project Number: LLH901997-9

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
<b>Total</b>	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/23/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158833  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments /  
 # of Layers: 1000 Point Count - Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
					⊥		⊥				
	<u>0.1%</u>	<u>Actinolite</u>	<u>WCS</u>	<u>GR</u>	<u>N</u>	<u>1.638</u>	<u>1.628</u>	<u>L M</u>	<u>N</u>	<u>PL</u>	<u>99.7%</u>
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		Quartz
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		Carbonates
											Vermiculite
											Tar
											Binder
											Quartz
											Perlite
											Amphibole
											Gypsum
											Talc
											Feldspar
											Mica
											Clay
											Organic Part.
											Diatoms
											Misc. Particles
											Foam
											Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>ASB</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>CLE</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>98</u>	<u>100</u>	<u>99</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>797</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$





Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples

Date: 06/25/19 Analyst: WT Scope: 02-2-04T

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158834  
 RJ Lee Group  
 Project Number: LHM 901997-9  
 Analysis Method:

Comments / # of Layers: 1000 Point Count. Detection Limit = 0.1 %

Stereo-scope		# of Preps: 10		Homogenous (Y) N		QC Y N		QC Analyst:			
%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥	L M	⊕ N	PL	99.5%
<0.1%		Actinolite	W C(S)	G/R	N	1.638	1.628	L M	⊕ N	PL	
			W C S					L M	P N		
			W C S					L M	P N		
% Non-Asbestos Fibers			Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Quartz Carbonates Vermiculite Tar Binder Opagles Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foll	
0.5%		Actinolite cleavage		N.I.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	2	0	0	0	0	0	0	1	3
NAS	98	100	100	100	100	100	100	99	797
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/24/19 Analyst: DF Scope: 036-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 315-8835  
 RJ Lee Group  
 Project Number: LLH901997-9  
 Analysis Method:

Comments /  
 # of Layers: 1000 pt count. Detection Limit = 0.1%

Stereo-scope	%	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
						⊥		⊥				
				W C S					L M	P N		Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
				W C S					L M	P N		
				W C S					L M	P N		
			% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
			Trem cleav		R. I.							
			Actin. cleav		R. I.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
NAS	100	100	100	100	100	100	100	100	800
cleav.	0	0	0	0	0	0	0	0	0
Asb	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	800



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/24/19 Analyst: DF Microscope: 036-0PT

RJ Lee Group Sample Number: 3158835 RJ Lee Group Project Number: LLH901997-9

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
NAS	100	100							200
cler	0	0							
Asb	0	0							
Total	100	100							1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

## Laboratory Report

K & L Gates  
 17 North Second Street  
 18th Floor  
 Harrisburg, PA 17101  
 United States  
 Attention: Mr. David Raphael  
 Telephone: 717-231-4504

Report Date 06/27/2019  
 Sample Receipt Date 06/03/2019  
 RJ Lee Group Job No. LLH901997-10  
 Authorization/P.O. No.  
 Client Job No./Name

Analysis: Asbestos in Bulk Samples by Point Count  
 Method: EPA/600/R-93/116

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158836.HPL	14 - RH #22	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/27/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158837.HPL	15 - RH #23	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/27/2019
Description: Beige Crushed Rock. 1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158838.HPL	16 - RH #24	Yes	1	ND		100.00	Q, OP, M	WT-06/25/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%.								
Weight Loss: 0.0%								

Client Job No./Name: RJ Lee Group Job No: LLH901997-10

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158839.HPL	17 - RH #25	Yes	1	ND	<0.1 OF	100.00	Q, AM, OP, M	WT-06/25/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%. <0.1% OF= <0.1% Actinolite Cleavage..								
Weight Loss: 0.0%								
3158840.HPL	18 - RH #26	Yes	1	<0.1 AC		100.00	Q, OP, M	WT-06/26/2019
Description: Beige Crushed Rock. 1000 Point Count. Detection Limit=0.1%.								
Weight Loss: 0.0%								
3158841.HPL	19 - RH #27	Yes	1	ND		100.00	Q, CA, OP, M	WT-06/26/2019
Description: Tan Crushed Rock. 1000 Point Count. Detection Limit=0.1%.								
Weight Loss: 0.0%								
3158842.HPL	20 - RH #28	Yes	1	ND		100.00	Q, CA, OP, M	WT-06/26/2019
Description: Tan Crushed Rock. 1000 Point Count. Detection Limit=0.1%.								
Weight Loss: 0.0%								
3158843.HPL	21 - RH #29	Yes	1	<0.1 AC	0.20 OF	99.80	Q, OP, M	WT-06/27/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%. 0.2% OF= 0.2% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158844.HPL	22 - RH #30	Yes	1	ND	0.20 OF	99.80	Q, AM, OP, M	WT-06/27/2019
Description: Gray Crushed Rock. 1000 Point Count. Detection Limit=0.1%. 0.2% OF= 0.2% Actinolite Cleavage.								
Weight Loss: 0.0%								

Client Job No./Name: RJ Lee Group Job No: LLH901997-10

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
3158845.HPL	23 - RH #31	Yes	1	ND	0.20 OF	99.80	Q, CA, AM, OP, M	WT-06/27/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. 0.2% OF= 0.2% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158846.HPL	24 - RH #32	Yes	1	ND	0.30 OF	99.70	Q, AM, OP, M	WT-06/27/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. 0.3% OF= 0.3% Actinolite Cleavage.								
Weight Loss: 0.0%								
3158847.HPL	25 - RH #33	Yes	1	ND	0.80 OF	99.20	Q, AM, OP, M	WT-06/27/2019
Description: Gray Crushed Rock.								
1000 Point Count. Detection Limit=0.1%. Total of Amphibole Cleavage=0.8%. 0.2% is Tremolite Cleavage, 0.8% is Actinolite Cleavage. 0.2% OF= 0.2% Tremolite Cleavage. 0.6% OF= 0.6% Actinolite Cleavage.								
Weight Loss: 0.0%								



Client Job No./Name: RJ Lee Group Job No: LLH901997-10

RJLG Sample Number	Client Sample Number	Homogeneous	# of Layers	Asbestos Detected(%)	Non-Asbestos Fibers(%)	Non-Fibrous Materials(%)	Matrix Material	Analyst - Analysis Date
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Authorized Signature:

Wei Tseng, Microscopist

**ASBESTOS**

- AM = Amosite
- AC = Actinolite
- AN = Anthophyllite
- CH = Chrysotile
- CR = Crocidolite
- TR = Tremolite

**NON-ASBESTOS**

- CE = Cellulose
- MW = Mineral Wool
- FG = Fibrous Glass
- SF = Synthetic Fibers
- H = Hair
- W = Wollastonite
- OF = Other Fibers

**NON-FIBROUS MATERIALS**

- |                 |                     |                 |
|-----------------|---------------------|-----------------|
| AM = Amphibole  | HY = Hydromagnesite | Q = Quartz      |
| B = Binder      | M = Miscellaneous   | T = Tar         |
| CA = Carbonates | MI = Mica           | V = Vermiculite |
| CL = Clay       | OP = Opaque         |                 |
| F = Feldspar    | OR = Organic        |                 |
| G = Gypsum      | P = Perlite         |                 |

**DISCLAIMER NOTES**

- "ND" indicates no asbestos was detected; the method detection limit is 0.1%.
- "Trace" or "<" indicates asbestos was identified in the sample, but the concentration is less than the method quantitation limit. PLM coefficients of variance range from approximately 1.8 at the quantitation limit of 0.25% to 0.32 at high fiber concentrations.
- Samples are archived for three months following analysis and are then properly discarded.
- These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
- This test report relates to the items tested.
- This report is not valid unless it bears the name of a NVLAP Lab Code 101208-0 approved signatory.
- Any reproduction of this document must be in full in order for the report to be valid.
- This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0, any agency of the U.S. Government or any other laboratory accrediting agency.
- Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar nonfriable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as "non-asbestos-containing."
- Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA #100364, NY ELAP #10884) facility.
- If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory results are limited to the reported values.
- ((100-A)/B)\*C = Asbestos Detected (%), where A=weight loss, B=total # of points counted, and C=total # of asbestos fibers counted.

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/25/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock -

RJ Lee Group  
 Sample Number: 3158836  
 RJ Lee Group  
 Project Number: LC11901997-10  
 Analysis Method:

Comments / # of Layers: 1000 Point Count. Detection Limit = 0.1%

Stereo-scope		Asbestos Type		Morphology		Color/Pleochroism		Indices of Refraction		Birefringence		Sign of Elongation		Extinction Angle		NFM% <u>100%</u>		
%	%				⊥		⊥	L	M	P	N					Quartz	Carbonates	Vermiculite
	<u>0%</u>	<u>ND</u>	<u>WCS</u>													<input checked="" type="checkbox"/>		
			<u>WCS</u>														<input checked="" type="checkbox"/>	
			<u>WCS</u>															
% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos		Non-Asb.		Matrix		Misc. Particles						
	<u>&lt;0.1%</u>		<u>Actinolite Cleavage</u>		<u>R.I.</u>											<input checked="" type="checkbox"/>		

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/25/19 Analyst: WT Microscope: 023-DPT

RJ Lee Group Sample Number: 3158836 RJ Lee Group Project Number: LLH 901997-10

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
<b>Total</b>	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/25/19 Analyst: WT Scope: 023-0PT

Sample Description: Beige Crushed Rock

RJ Lee Group  
 Sample Number: 3158837  
 RJ Lee Group  
 Project Number: LLH901997-10  
 Analysis Method:

Comments /  
 # of Layers:

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM% <u>100%</u>
					⊥		⊥				
	<u>0%</u>	<u>ND</u>	<u>W C S</u>					<u>L M</u>	<u>P N</u>		Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		
			<u>W C S</u>					<u>L M</u>	<u>P N</u>		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	<u>&lt;0.1%</u>	<u>Actinolite cleavage</u>		<u>R.F.</u>							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{800} \times 100\% = 0.1\%$





**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/25/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158838  
 RJ Lee Group  
 Project Number: LLH901997-10  
 Analysis Method:

Comments / # of Layers: (1000 Point Count. Detection Limit = 0.1%)

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM% (00°)
					⊥		⊥	L M	P N		
	0%	ND	WCS					L M	P N		Quartz Carbonates Vermiculite Tar Binder Opacities Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Dlatoms Misc Particles Foam Foil
			WCS					L M	P N		
			WCS					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/25/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158839  
 RJ Lee Group  
 Project Number: LL1-1901997-10  
 Analysis Method:

Comments / # of Layers: 1000 Point Count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM% <u>100%</u>
					⊥		⊥				
	<u>0%</u>	<u>ND</u>	<u>WCS</u>					<u>L M</u>	<u>P N</u>		Quartz Carbonates Vermiculite Binder Opacities Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc. Particles Foam Foli
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		
			<u>WCS</u>					<u>L M</u>	<u>P N</u>		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
	<u>&lt;0.1%</u>	<u>Actinolite cleavage</u>		<u>R.F.</u>							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>ASB</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>CLE</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>NAS</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>800</u>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$





Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples

Date: 06/25/19 Analyst: WT Scope: 023-0PT

Sample Description: Beige Crushed Rock

RJ Lee Group  
 Sample Number: 3158840  
 RJ Lee Group  
 Project Number: LLH901997-10  
 Analysis Method:

1000 Point Count. Detection Limit = 0.1%

Comments /  
 # of Layers:

Stereo-scope		Asbestos Type		Morphology		Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
%	%				⊥		⊥	L	M	(P) N	PL	NFM%	
<0.1%		Actinolite	WCS	GR	N	1.638	1.628	L M		(P) N	PL	100%	Quartz
			WCS					L M		P N			Carbonates
			WCS					L M		P N			Vermiculite
													Opales
													Perlite
													Amphibole
													Gypsum
													Talc
													Feldspar
													Mica
													Clay
													Organic Part.
													Diatoms
													Foam
													Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	100
Total	100	100	100	100	100	100	100	100	100

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/25/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158840 RJ Lee Group Project Number: LLH901997-10

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/26/19 Analyst: WT Scope: 023-0PT

Sample Description: Tan Crushed Rock

RJ Lee Group  
 Sample Number: 3158841  
 RJ Lee Group  
 Project Number: LLH 901997-10  
 Analysis Method:

Comments /  
 # of Layers: 1000 Point Count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
					⊥		⊥				
	0%	ND	W C S					L M	P N		NFM% <u>100%</u>
			W C S					L M	P N		
			W C S					L M	P N		
		Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
											Quartz Tar Perlite Talc Clay Misc Particles
											Carbonates Binder Amphibole Feldspar Organic Part. Foam
											Vermiculite Opaques Gypsum Mica Diatoms Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/26/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158841 RJ Lee Group Project Number: LLH901997-10

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CLE	0	0							0
NAS	100	100							200
Total	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
Total									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/26/19 Analyst: WT Scope: 023-0PT

Sample Description: Tan Crushed Rock.

RJ Lee Group  
 Sample Number: 3158842  
 RJ Lee Group  
 Project Number: LUH 901997-10  
 Analysis Method:

Comments /  
 # of Layers: 1000 Point Count - Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Homogenous (Y) N		QC	QC Analyst:
					⊥		⊥	Birefringence	Sign of Elongation	Extinction Angle	
	0%	ND	WCS					L M	P N		NFM% <u>100%</u> Quartz Carbonates Vermiculite Tar Binder Opaques Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Mica Particles Foam Foll
			WCS					L M	P N		
			WCS					L M	P N		
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	0	0	0	0	0	0	0
NAS	100	100	100	100	100	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$

Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/26/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158842 RJ Lee Group Project Number: CLH901997-10

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
ASB	0	0							0
CVE	0	0							0
NKS	100	100							200
<b>Total</b>	100	100							200

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									







**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/27/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock,

RJ Lee Group  
 Sample Number: 3158844  
 RJ Lee Group  
 Project Number: LLH901997-10  
 Analysis Method:

1000 Point Count. Detection Limit = 0.1%  
 Comments / # of Layers:

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Analyst:
					⊥		⊥				
	0%	ND	W C S					L M	P N		NFM% <u>99.8%</u> Quartz Carbonates Vermiculite Tar Binder Opalines Perlite Amphibole Gypsum Talc Feldspar Mica Clay Organic Part. Diatoms Misc Particles Foam Foil
			W C S					L M	P N		
			W C S					L M	P N		
	0.2%	Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	
		Actinolite Cleavage		R.I.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLF	0	0	0	0	2	0	0	0	2
NAS	100	100	100	100	98	100	100	100	800
Total	100	100	100	100	100	100	100	100	800

WT06/27/19  
 WT06/27/19

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/27/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158845  
 RJ Lee Group  
 Project Number: LLH901997-10  
 Analysis Method:

Comments / # of Layers: 1000 Point Count - Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%
					⊥		⊥				
	0%	ND	WCS					L M	P N		Quartz Tar Perlite Talc Clay Misc Particles
			WCS					L M	P N		
			WCS					L M	P N		
	0.2%	Actinolite Cleavage		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	Carbonates Binder Amphibole Feldspar Organic Part. Foam
				P.E.							

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE	0	0	2	0	0	0	0	0	2
NAS	100	100	98	100	100	100	100	100	798
Total	100	100	100	100	100	100	100	100	800

$$\text{Detection Limit} = \frac{1}{1000} \times 100\% = 0.1\%$$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/27/17 Analyst: WA Microscope: 023-0PT

RJ Lee Group Sample Number: 3158845 RJ Lee Group Project Number: LLM/901997-10

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total	
ASB	0	0							0	0
CLE	0	0							0	2
NAS	100	100							200	998
<b>Total</b>	100	100							200	1000

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/27/19 Analyst: WT Scope: 023-015

Sample Description: Gray Crushed Rock.

RJ Lee Group  
 Sample Number: 3158846  
 RJ Lee Group  
 Project Number: LLH 901997-10  
 Analysis Method:

Comments / # of Layers: 1000 Point Count. Detection Limit = 0.1%

Stereo-scope		Asbestos Type		Morphology		Color/Pleochroism		Indices of Refraction		Birefringence		Sign of Elongation		Extinction Angle		NFM% <u>99.7%</u>		
%	%				⊥		⊥	L	M	P	N	Y	N			Quartz	Carbonates	Vermiculite
	<u>0%</u>	<u>ND</u>	<u>WCS</u>															
			<u>WCS</u>															
			<u>WCS</u>															
% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos		Non-Asb.		Matrix		Misc Particles						
	<u>0.3%</u>	<u>Actinolite Cleavage</u>	<u>R.I.</u>															

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
<u>ASB</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>CCE</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>
<u>NAS</u>	<u>99</u>	<u>100</u>	<u>100</u>	<u>98</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>797</u>
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>800</b>

Detection Limit =  $\frac{1}{1000} \times 100\% = 0.1\%$



**Polarized Light Microscopy Point Count Worksheet for Asbestos Analysis of Bulk Samples**

Date: 06/27/19 Analyst: WT Scope: 023-0PT

Sample Description: Gray Crushed Rock

RJ Lee Group  
 Sample Number: 3158847  
 RJ Lee Group  
 Project Number: LLH901997-10  
 Analysis Method:

Comments / # of Layers: 1000 point count. Detection Limit = 0.1%

Stereo-scope	%	Asbestos Type	Morphology	Color/Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	QC Y N	QC Analyst:	
					⊥		⊥						
	0%	ND	WCS					L M	P N				
			WCS					L M	P N				
			WCS					L M	P N				
		% Non-Asbestos Fibers		Optical Properties		Layered Results		Asbestos	Non-Asb.	Matrix	NFM% <u>99.2%</u>		
	0.2%	Tremolite cleavage		R.I.							Quartz	Carbonates	Vermiculite
	0.6%	Actinolite cleavage		R.I.							Tar	Binder	Opal
											Perlite	Amphibole	Gypsum
											Talc	Feldspar	Mica
											Clay	Organic Part.	Diatoms
											Misc Particles	Foam	Foil

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
ASB	0	0	0	0	0	0	0	0	0
CLE (re)	2	0	0	0	1	0	0	0	2
NAS	98	99	100	100	97	99	99	100	792
CLE (act)	1	1	0	0	2	1	1	0	6
Total	100	100	100	100	100	100	100	100	800

$$\text{Detection Limit} = \frac{1}{1000} \times 100\% = 0.1\%$$



Effective Date: March 2019  
Form F OPT.001

**PLM Point Count Additional Slides Worksheet**

Date: 06/27/19 Analyst: WT Microscope: 023-0PT

RJ Lee Group Sample Number: 3158847 RJ Lee Group Project Number: LLH901997-10

Type	Slide <u>9</u>	Slide <u>10</u>	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total	
ASB	0	0							0	0
CLE(Pre)	0	0							0	2
NAS	100	100							200	992
CLE(Act)	0	0							0	6
<b>Total</b>	<b>100</b>	<b>100</b>							<b>200</b>	<b>1000</b>

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

Type	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Slide ____	Total
<b>Total</b>									

## **Appendix G - 2019 Site and Sampling Photographs**

Photograph 1: Surface water collection at Sediment Trap #2 on 4/18/2019.



Photograph 2: 2B aggregate pile sampled on 4/18/2019.





## Site Photographs

Photograph 3: AASHTO sampling method of creating quadrants, take an increment from each to reduce.



Photograph 4: AASHTO method, mix the four increments (one from each quadrant).





Photograph 5: AASHTO reduction, cone and quarter the sample.



Photograph 6: One quarter retained, one quarter split with PA DEP, and two quarters discarded.

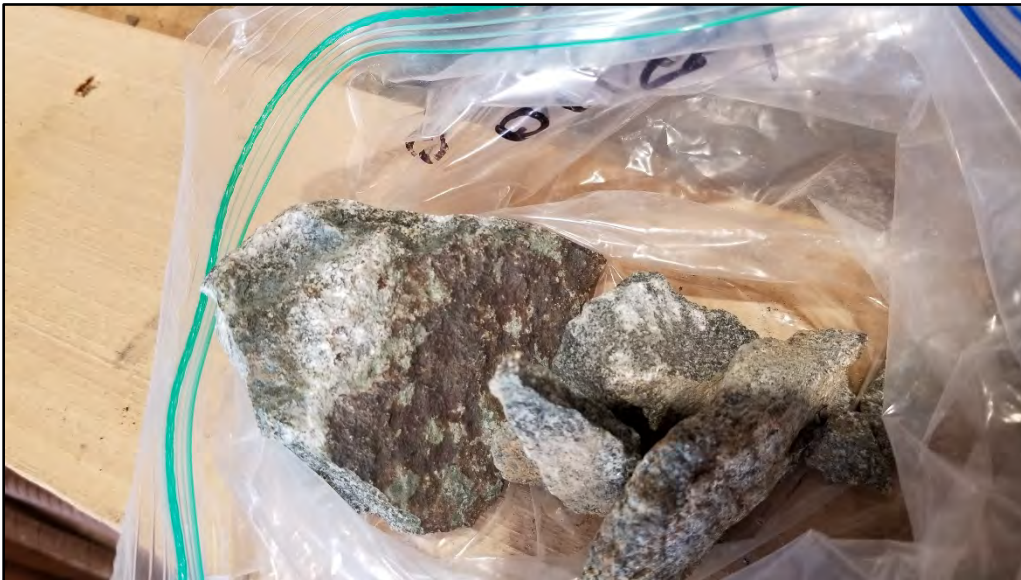




Photograph 7: Boulder #18 sampled on 5/7/2019



Photograph 8: Boulder #18 sample.





Photograph 9: Boulder #22 sampled on 5/7/2019



Photograph 10: Boulder #22 sample.





Photograph 11: Boulder #23 sampled on 5/7/2019



Photograph 12: Boulder #23 sample.





Photograph 13: Boulder #24 sampled on 5/7/2019



Photograph 14: Boulder #24 sample.





Photograph 15: Boulder #25 sampled on 5/7/2019



Photograph 16: Boulder #25 sample.

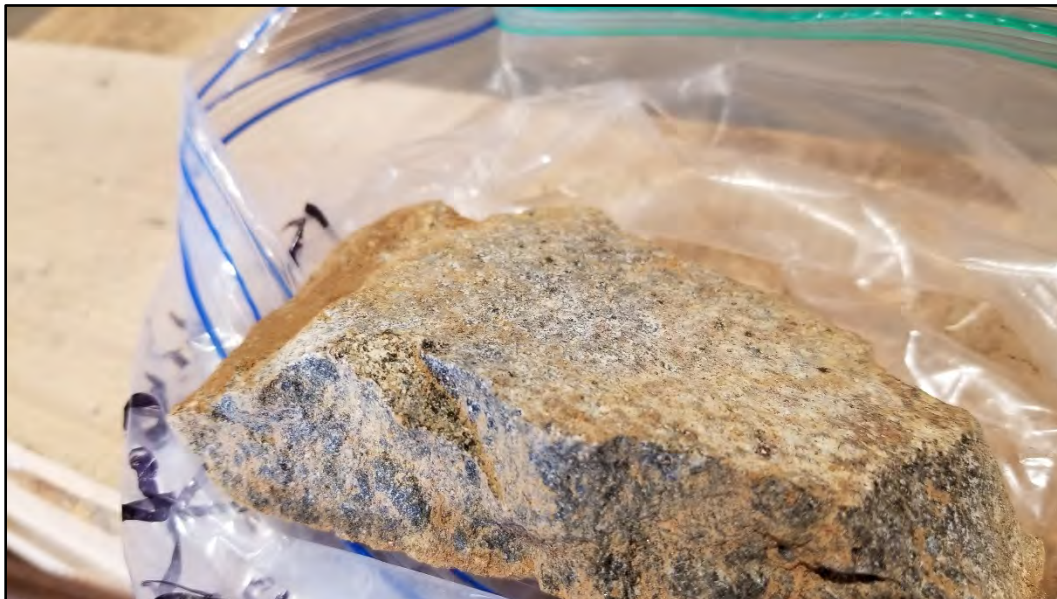




Photograph 17: Boulder #26 sampled on 5/7/2019



Photograph 18: Boulder #26 sample.





Photograph 19: Boulder #27 sampled on 5/7/2019



Photograph 20: Boulder #27 sample.





Photograph 21: Boulder #12 sampled on 5/8/2019



Photograph 22: Boulder #12 sample.





Photograph 23: Boulder #14 sampled on 5/8/2019



Photograph 24: Boulder #14 sample.





Photograph 25: Boulder #11 sampled on 5/8/2019



Photograph 26: Boulder #11 sample.





Photograph 27: Boulder #10 sampled on 5/8/2019



Photograph 28: Boulder #10 sample.





Photograph 29: Boulder #29 sampled on 5/8/2019



Photograph 30: Boulder #29 sample.





Photograph 31: Boulder #30 sampled on 5/8/2019



Photograph 32: Boulder #30 sample.





Photograph 33: Boulder #8 sampled on 5/8/2019



Photograph 34: Boulder #8 sample.





Photograph 35: Boulder #1 sampled on 5/8/2019



Photograph 36: Boulder #1 sample.





Photograph 37: Boulder #2 sampled on 5/8/2019



Photograph 38: Boulder #2 sample.





Photograph 39: Boulder #3 sampled on 5/8/2019



Photograph 40: Boulder #3 sample.





Photograph 41: Boulder #4 sampled on 5/8/2019



Photograph 42: Boulder #4 sample.





Photograph 43: Boulder #5 sampled on 5/8/2019



Photograph 44: Boulder #5 sample.





Photograph 45: Boulder #6 sampled on 5/8/2019



Photograph 46: Boulder #6 sample.

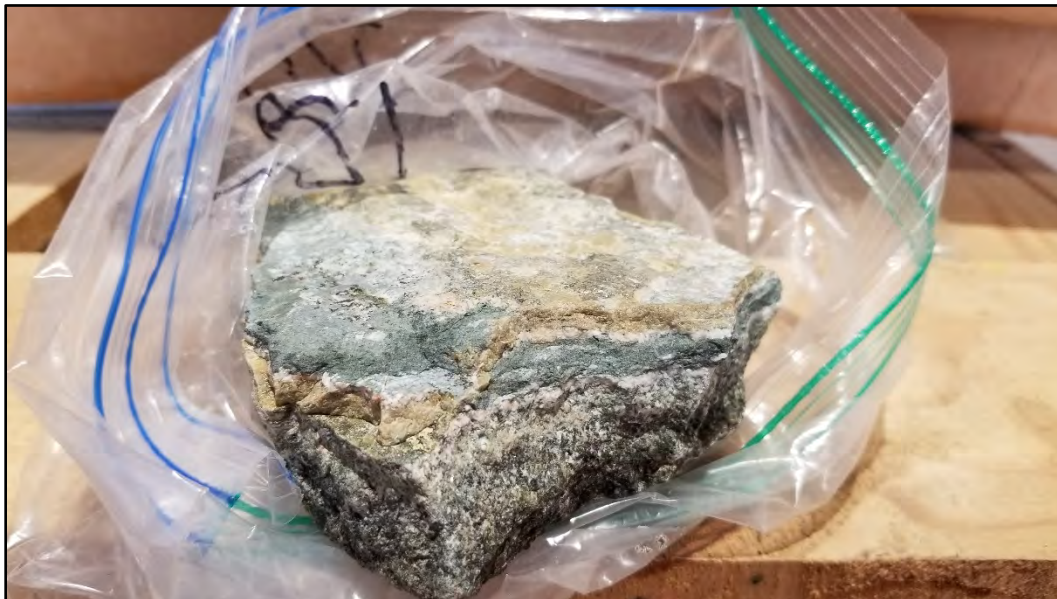




Photograph 47: Boulder #7 sampled on 5/8/2019



Photograph 48: Boulder #7 sample.





Photograph 49: Boulder #31 sampled on 5/7/2019



Photograph 50: Boulder #31 sample.





Photograph 51: Boulder #32 sampled on 5/7/2019



Photograph 52: Boulder #32 sample.





Photograph 53: Boulder #33 sampled on 5/13/2019



Photograph 54: Boulder #33 sample.





Photograph 55: Boulder #28 sampled on 5/8/2019



Photograph 56: Boulder #28 sample.





Photograph 57: Coring setup at CB-1 on 5/1/2019



Photograph 58: CB-1 4.0' to 20.9' B.G.





Photograph 59: Core sample CB-1 #1 at 19.9' B.G.



Photograph 60: CB-1 20.9' to 35.6' B.G.





**Photograph 61: CB-1 35.6' to 50.3' B.G.**

**Photograph 62: CB-1 50.3' to 64.9' B.G.**




Photograph 63: CB-1 64.9' to 79.4' B.G.



Photograph 64: CB-1 79.4' to 91.0' B.G.





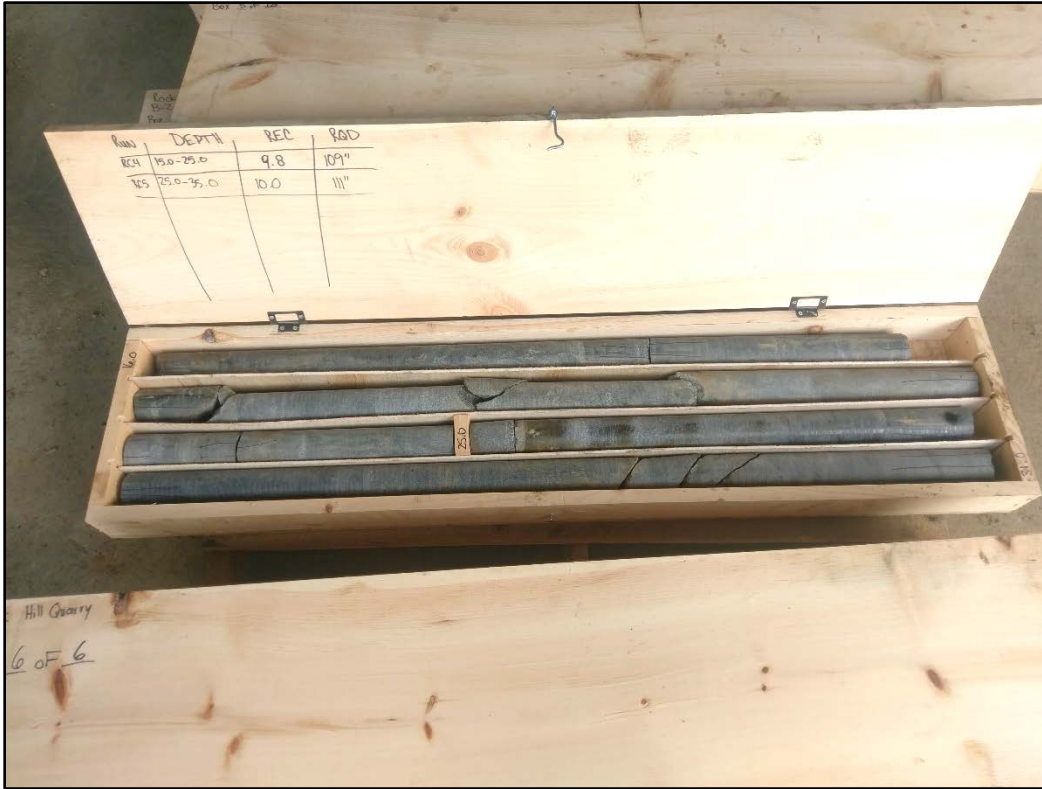
Photograph 65: CB-1 vein near bottom of core, sample CB-1 #3 at 90.4' B.G.



Photograph 66: CB-2 2.0' to 16.0' B.G.



Photograph 67: CB-2 16.0' to 31.0' B.G.



Photograph 68: CB-2 31.0' to 46.1' B.G.





**Photograph 69: CB-2 46.1' to 60.5' B.G.**

**Photograph 70: CB-2 60.5' to 75.6' B.G.**




Photograph 71: CB-2 75.6' to 90.0' B.G.



Photograph 72: CB-2 sample CB-2 #4 at 84.3' B.G.



Photograph 73: CB-2 sample CB-2 #5 at 85.2' B.G.



Photograph 74: CB-2 sample CB-2 #6 at 86.0' B.G.





Photograph 75: CB-3 1.0' to 18.6' B.G.



Photograph 76: CB-3 sample CB-3 #7 at 17.8' B.G.



Photograph 77: CB-3 18.6' to 33.5' B.G.



Photograph 78: CB-3 33.5' to 48.7' B.G.





Photograph 79: CB-3 48.7' to 64.2' B.G.



Photograph 80: CB-3 64.2' to 79.4' B.G.





Photograph 81: CB-3 79.4' to 94.3' B.G.



Photograph 82: CB-3 94.3' to 109.1' B.G.





Photograph 83: CB-3 109.1' to 123.9' B.G.



Photograph 84: CB-3 123.9' to 139.0' B.G.





Photograph 85: CB-3 139.0' to 154.6' B.G.



Photograph 86: CB-3 sample CB-3 #8 at 146.2' B.G.





Photograph 87: CB-3 sample CB-3 #9 at 154.6' B.G.



Photograph 88: CB-3 154.6' to 160.5' B.G.





Photograph 89: CB-4 0.0' to 18.4' B.G.



Photograph 90: CB-4 18.4' to 35.6' B.G.





Photograph 91: CB-4 35.6' to 50.0' B.G.



Photograph 92: CB-4 50.0' to 64.2' B.G.





Photograph 93: CB-4 64.2' to 79.5' B.G.



Photograph 94: CB-4 79.5' to 94.9' B.G.





Photograph 95: CB-4 94.9' to 110.0' B.G.



Photograph 96: CB-4 110.0' to 139.9' B.G.





Photograph 97: CB-4 139.2' to 155.4' B.G.



Photograph 98: CB-4 sample CB-4 #10 at 147.5' B.G.



Photograph 99: CB-4 155.4' to 160.0' B.G.



Photograph 100: Hand Sample #1.

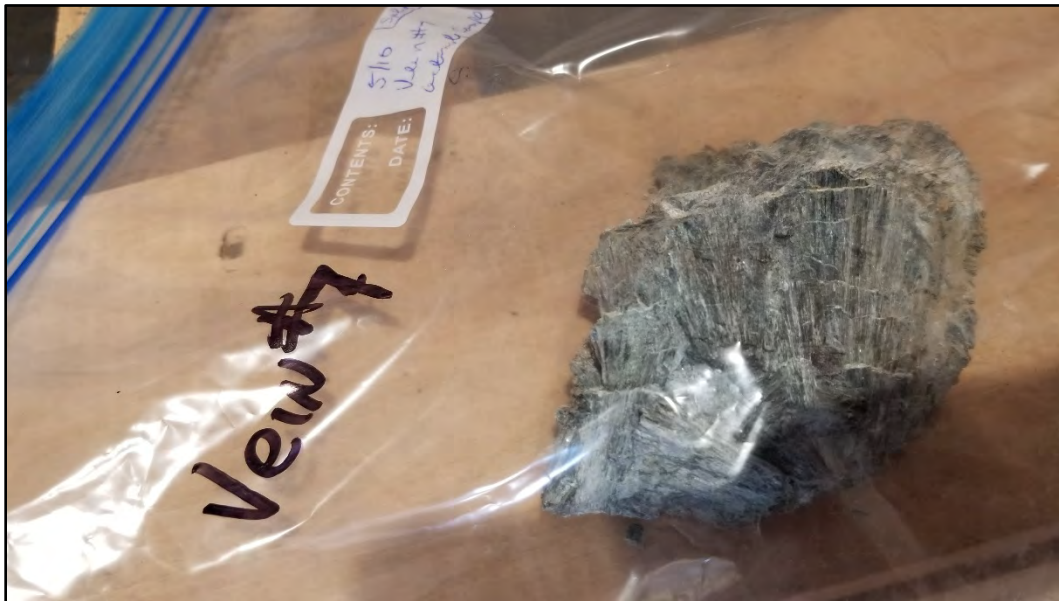




Photograph 101: Hand Sample #2.



Photograph 102: Vein #7 sample (i.e. Hand Sample #3).





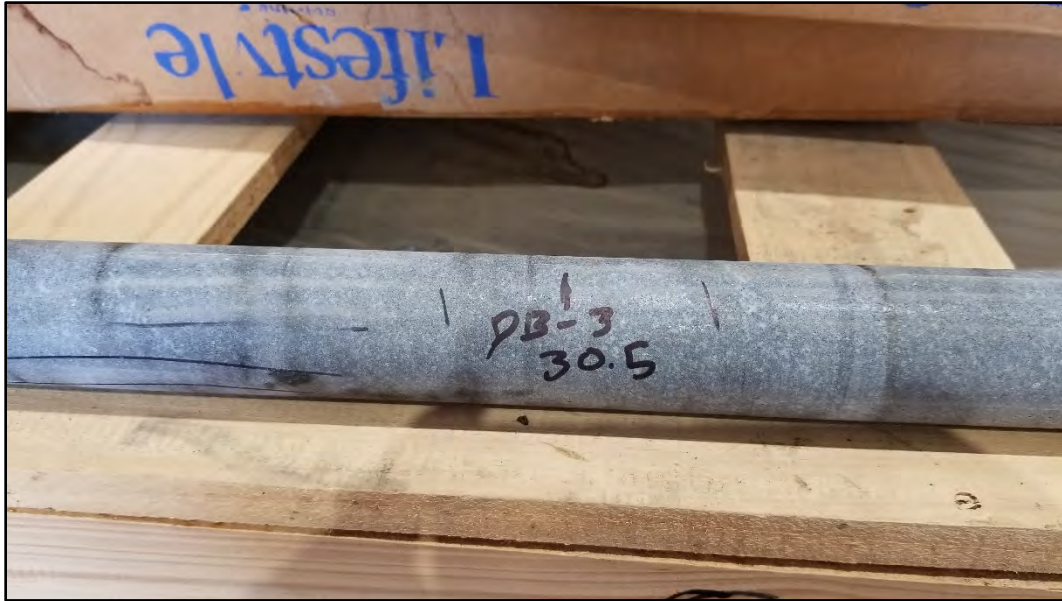
Photograph 103: Diabase sample DB-1 from CB-1 core at 78' B.G.



Photograph 104: Diabase sample DB-2 from CB-2 core at 72' B.G.



Photograph 105: Diabase sample DB-3 from CB-3 core at 30.5' B.G.



Photograph 106: Four diabase samples, one each from CB-1, CB-2, CB-3 and CB-4.





Photograph 107: CB-1, DB-1 Sample interval and identified mineral vein



**DB-1 Vein and  
Sample Interval**

**DB-1 Vein from  
74 ft. to 79.6 ft.  
See Tables in  
Appendix E.**



Photograph 108: CB-1, DB-1 Sample interval (retained fraction) and identified mineral vein



DB-1 Sample Interval Showing Retained Core Fraction.



## **Appendix H - 2019 Core Boring Logs**



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**APPALACHIAN  
REGIONAL OFFICE**

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-1  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 660  
 Lat./Long.: N40°24'12.20", W75°17'49.73"  
 Total Depth: 91.0'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 5/01/19 - 5/02/19 Page 1 of 2

Depth (ft)	Run Number	Recovery (%)	RDD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
0					0.0'-4.0' FILL & BROKEN ROCK; NO RECOVERY. CASING SET TO 4'	NA	NA	NA	NA	0
	RC-1 (4.0-6.5)	32	0		4.0'-6.5' F-M GRAY DIABASE; VERY BROKEN	F	VH	VC	HIGH ∠ JOINTING	
	RC-2 (6.5-7.5)	70	0		6.5'-7.5' F-M GRAY DIABASE; VERY BROKEN	F	VH	VC	HIGH ∠ JOINTING	
	RC-3 (7.5-13.5)	100	67		7.5'-13.5' F-M GRAY DIABASE -WEATHERED GREEN PREHNITE/ALBITE AND MUSCOVITE MICA VEIN AT 13.5'	F/WS	VH	CS	HIGH ∠ JOINTING	10
	RC-4 (13.5-17.0)	100	21		13.5'-17.0' F-M GRAY DIABASE; BROKEN -QUARTZ VEIN AT 14.0' -CLOSED JOINT AT 14.7' -ORANGE-BROWN MUD SEAM AT 16.5'	F/WS	VH	CS	HIGH ∠ JOINTING	
	RC-5 (17.0-22.2)	100	34		17.0'-18.8' F-M GRAY DIABASE; BROKEN 18.8'-19.5' M-C GRAY DIABASE; BROKEN 19.5'-20.9' M-C GRAY DIABASE -GREEN PREHNITE/ALBITE, CHLORITE, WHITE ALBITE ON JOINT SURFACES; NEEDLE-LIKE ACTINOLITE IN ROCK VOID AT 19.9'; CORE SAMPLE #1 (CB-1#1) AT 19.9' 20.9'-21.1' F-M GRAY DIABASE WITH GREEN PREHNITE/ALBITE 21.1'-22.2' F-M GRAY DIABASE	F/WS	VH/H	CS	HIGH ∠ JOINTING	20
	RC-6 (22.2-26.0)	100	59		22.2'-26.0' F-M GRAY DIABASE; BROKEN -GREEN CHLORITE ON JOINT SURFACE AT 23.2'	F/WS	VH	CS	HIGH ∠ JOINTING	
	RC-7 (26.0-29.0)	100	44		26.0'-29.0' F-M GRAY DIABASE; BROKEN -GREEN PREHNITE/ALBITE ON JOINT SURFACES AT 27.8'-28.0'	F	VH	CS	HIGH ∠ JOINTING	
	RC-8 (29.0-30.8)	83	0		29.0'-29.7' M-C GRAY DIABASE; HIGH-ANGLED FRACTURE 29.7'-30.8' F-M GRAY DIABASE; BROKEN	WS/WM	H	CS	HIGH ∠ JOINTING	30
	RC-9 (30.8-38.0)	100	73		30.8'-38.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE VEINS AT 32.4' AND 33.4'; CORE SAMPLE #2 (CB-1 #2) AT 33.0'	F	VH	CS	HIGH ∠ JOINTING	
	RC-10 (38.0-46.0)	95	74		38.0'-46.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AND QUARTZ VEINS WITH MUSCOVITE MICA AT 39.3' AND 43.0' -HIGH-ANGLED DIABASE FRACTURE AT 44.0' -GREEN PREHNITE/ALBITE VEINS WITH MUSCOVITE MICA FROM 44.7'-46.0'	F/WS	VH	CS	HIGH ∠ JOINTING	40
	RC-11 (46.0-54.0)	99	85		46.0'-48.7' GREEN PREHNITE/ALBITE AND QUARTZ VEINS WITH MUSCOVITE MICA 48.7'-50.3' F-C GRAY DIABASE WITH GREEN PREHNITE/ALBITE AND WHITE ALBITE 50.3'-54.0' F-M GRAY DIABASE	F	VH	CS	HIGH ∠ JOINTING	50

<sup>1</sup> Fresh (F) - No visible sign of decomposition or discoloration.  
 Weathered Slightly (WS) - Slight discoloration inward from open fractures in rock.  
 Weathered Moderately (WM) - Discoloration throughout core, texture preserved. Strength somewhat less than fresh rock, can't be broken by hand or scraped by knife.  
 Highly Weathered (WH) - Minerals somewhat decomposed, but core stones present in rock mass. Texture becoming indistinct, but fabric preserved. Rock can be broken by hand or shaved with knife.  
 Completely Weathered (WC) - Minerals decomposed to soil, but fabric and structure preserved (saprolite). Material easily crumbled.  
 Residual Soil (RS) - Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed.

<sup>2</sup> Extremely Soft (ES) - Can be dented by thumb nail.  
 Very Soft (VS) - Can be peeled with a knife.  
 Soft (S) - Can be easily gauged or carved with a knife.  
 Medium Soft (MS) - Can be readily scratched with a knife blade.  
 Moderately Hard (MH) - Requires one hammer blow to fracture.  
 Hard (H) - Can be scratched with a knife with difficulty. Hard hammer blows required to detach hand specimens.  
 Very Hard (VH) - Cannot be scratched with a knife or can barely be scratched with a knife. Breaking specimens requires several hard blows of the pick.

<sup>3</sup> Very Widely Spaced (VW) - >10'  
 Widely Spaced (WS) - 3' to 10'  
 Moderately Spaced (MS) - 2' to 3'  
 Closely Spaced (CS) - 2" to 2'  
 Very Closely Spaced (VC) - <2"  
 Fine Grained (F) - <1mm  
 Medium Grained (M) - 1-5mm  
 Coarse Grained (C) - 5mm-3cm



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**APPALACHIAN  
REGIONAL OFFICE**

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-1  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 660  
 Lat./Long.: N40°24'12.20", W75°17'49.73"  
 Total Depth: 91.0'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 5/01/19 - 5/02/19 Page 2 of 2

Depth (ft)	Run Number	Recovery (%)	ROD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
50	RC-12 (54.0-64.0)	100	80		54.0'-64.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AND CHLORITE ON JOINT SURFACES AT 54.2', 59.3', 63.0' -GREEN PREHNITE/ALBITE AND QUARTZ VEIN AT 56.5' -CHLORITE OF JOINT SURFACE AT 58.0'	F/WS	VH	CS	HIGH ∠ JOINTING	50
60	RC-13 (64.0-74.0)	98	80		64.0'-64.1' F-M GRAY DIABASE 64.1'-64.6' M-C GREEN PREHNITE/ALBITE AND QUARTZ VEIN 64.6'-74.0' F-M GRAY DIABASE -CHLORITE ON JOINT SURFACE AT 64.9' -GREEN PREHNITE/ALBITE ON JOINT SURFACES AT 72.6'	F/WS	VH	CS	HIGH ∠ JOINTING	60
70	RC-14 (74.0-84.0)	100	88		74.0'-79.6' M-C GRAY DIABASE WITH HIGH-ANGLED BLACK HORNBLENDE/PYROXENE VEINING; DIABASE CORE #1 (DB-1) SAMPLED AT 78' 79.6'-84.0' F-M GRAY DIABASE -CLOSED JOINT AT 81.8' -GREEN CHLORITE ON JOINT SURFACES FROM 82.9'-83.2'	F	VH	CS	HIGH ∠ JOINTING	70
80	RC-15 (84.0-91.0)	98	63		84.0'-90.0' F-M GRAY DIABASE 90.0'-90.4' M-C GRAY DIABASE 90.4'-90.8' M-C GREEN/WHITE ACTINOLITE VEIN; CORE SAMPLE #3 (CB-1 #3) AT 90.4' 90.8'-91.0' GREEN PREHNITE/ALBITE AND CHLORITE WITH GRAY DIABASE	F/WS	VH	CS	HIGH ∠ JOINTING	80
90					END OF BORING AT 91'					90
100					CB-1 ROCK CORE REVIEWED BY EARTHRES AND PADEP. ALL SELECTED CORE SAMPLE INTERVALS FOR LABORATORY ANALYSIS WERE AGREED TO BY EARTHRES AND PADEP PRIOR TO CORE SAMPLING AND ANALYSIS.					100

<sup>1</sup> Fresh (F) - No visible sign of decomposition or discoloration.  
 Weathered Slightly (WS) - Slight discoloration inward from open fractures in rock.  
 Weathered Moderately (WM) - Discoloration throughout core, texture preserved. Strength somewhat less than fresh rock, can't be broken by hand or scraped by knife.  
 Highly Weathered (WH) - Minerals somewhat decomposed, but core stones present in rock mass. Texture becoming indistinct, but fabric preserved. Rock can be broken by hand or shaved with knife.  
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 Residual Soil (RS) - Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed.

<sup>2</sup> Extremely Soft (ES) - Can be dented by thumb nail.  
 Very Soft (VS) - Can be peeled with a knife.  
 Soft (S) - Can be easily gauged or carved with a knife.  
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<sup>3</sup> Very Widely Spaced (VW) - >10'  
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**APPALACHIAN  
REGIONAL OFFICE**

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-2  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 660  
 Lat./Long.: N40°24'12.95", W75°17'49.47"  
 Total Depth: 90.0'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 5/02/19 - 5/03/19 Page 1 of 2

Depth (ft)	Run Number	Recovery (%)	RDD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
0					0.0'-2.0' FILL & BROKEN ROCK; NO RECOVERY. CASING SET TO 2'					0
	RC-1 (2.0-3.0)	100	75		2.0'-3.0' F-M GRAY DIABASE; BROKEN	F	VH	CS	HIGH ∟ JOINTING	
	RC-2 (3.0-6.0)	97	69		3.0'-6.0' F-M GRAY DIABASE	F	VH	CS	HIGH ∟ JOINTING	
	RC-3 (6.0-15.0)	98	79		6.0'-15.0' F-M GRAY DIABASE -QUARTZ VEIN WITH M-C DIABASE AT 12.0'	F/WS	VH	CS	HIGH ∟ JOINTING	
10										10
	RC-4 (15.0-25.0)	98	91		15.0'-25.0' F-M GRAY DIABASE -QUARTZ VEIN AT 15.5' -GREEN PREHNITE/ALBITE, CHLORITE AND QUARTZ ON JOINT SURFACE AT 21.0'	F/WS	VH	CS	HIGH ∟ JOINTING	
20										20
	RC-5 (25.0-35.0)	100	93		25.0'-35.0' F-M GRAY DIABASE	F/WS	VH	CS	HIGH ∟ JOINTING	
30										30
	RC-6 (35.0-42.0)	96	77		35.0'-42.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AND CHLORITE ON JOINT SURFACE 39.6' -HEAVILY JOINTED WITH MINOR CHLORITE ON JOINT SURFACES FROM 39.6'-41.3'	F	VH	CS	HIGH ∟ JOINTING	
40										40
	RC-7 (42.0-50.0)	100	73		42.0'-50.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AND CHLORITE ON JOINT SURFACES AT 42.6' AND 47.1' -HIGH-ANGLED FRACTURED DIABASE FROM 47.1'-48.7' -VERY BROKEN DIABASE FROM 49.5'-49.8'	F	VH	CS	HIGH ∟ JOINTING	
50										50

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6912 Old Easton Road  
Pipersville, PA 18947

**APPALACHIAN  
REGIONAL OFFICE**

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-2  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 660  
 Lat./Long.: N40°24'12.95", W75°17'49.47"  
 Total Depth: 90.0'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 05/02/19 - 5/03/19 Page 2 of 2

Depth (ft)	Run Number	Recovery (%)	ROD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
50	RC-8 (50.0-55.7)	98	75		50.0'-55.7' F-M GRAY DIABASE -BROKEN DIABASE FROM 55.4'-55.7' -OPEN AND CLOSED JOINTS FROM 50.3', 54.3'-55.2'	F/WS	VH	CS	HIGH ∟ JOINTING	50
55.7	RC-9 (55.7-65.0)	100	27		55.7'-65.0' F-M GRAY DIABASE -HEAVILY JOINTED DIABASE FROM 55.7'-59.0' -GREEN CHLORITE ON JOINT SURFACE AT 59.0' -VERY BROKEN DIABASE FROM 60.5'-64.8' (DIFFICULTY EXITING CORE BARREL)	F/WS	VH	CS	HIGH ∟ JOINTING	60
65.0	RC-10 (65.0-75.0)	99	86		65.0'-75.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 73.0' AND 74.1'; <u>DIABASE CORE #2 (DB-2) SAMPLED AT 72'</u>	F	VH	CS	HIGH ∟ JOINTING	70
75.0	RC-11 (75.0-85.0)	95	70		75.0'-85.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 76.9', 80.0', 81.5', 82.7' AND 83.0' -BROKEN M-C GRAY DIABASE WITH MUSCOVITE MICA AND QUARTZ VEINING FROM 83.7'-84.3' -GREEN PREHNITE/ALBITE, MUSCOVITE MICA AND GREEN NEEDLE-LIKE ACTINOLITE VEINING AT 84.3'-84.5'; <u>CORE SAMPLE #4 (CB-2 #4) AT 84.3'</u> -GREEN PREHNITE/ALBITE AND QUARTZ VEINING AT 85.0'	F	VH	CS	HIGH ∟ JOINTING	80
85.0	RC-12 (85.0-90.0)	100	62		85.0'-86.3' GREEN PREHNITE/ALBITE, MUSCOVITE MICA, QUARTZ AND GREEN NEEDLE-LIKE ACTINOLITE VEINING; <u>CORE SAMPLE #5 (CB-2 #5) AT 85.2' AND CORE SAMPLE #6 (CB-2 #6) AT 86.0'</u> 86.3'-90.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACE AT 86.9' -QUARTZ VEIN AT 89.1'	F/WS	VH	CS	HIGH ∟ JOINTING	90
90	END OF BORING AT 90'									
CB-2 ROCK CORE REVIEWED BY EARTHRES AND PADEP. ALL SELECTED CORE SAMPLE INTERVALS FOR LABORATORY ANALYSIS WERE AGREED TO BY EARTHRES AND PADEP PRIOR TO CORE SAMPLING AND ANALYSIS.										

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Pipersville, PA 18947

APPALACHIAN  
REGIONAL OFFICE

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-3  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 720  
 Lat./Long.: N40°24'13.64", W75°17'47.77"  
 Total Depth: 160.5'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 5/06/19 - 5/07/19 Page 1 of 4

Depth (ft)	Run Number	Recovery (%)	RDD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
0					0.0'-1.0' FILL & BROKEN ROCK; NO RECOVERY. CASING SET TO 1.0'					0
	RC-1 (1.0-3.0)	100	83		1.0'-3.0' F-M GRAY DIABASE	F	VH	CS	HIGH ∟ JOINTING	
	RC-2 (3.0-5.0)	65	29		3.0'-5.0' F-M GRAY DIABASE	F	VH	VC	HIGH ∟ JOINTING	
	RC-3 (5.0-15.0)	77	50		5.0'-15.0' F-M GRAY DIABASE -CLOSED JOINTS WITH M-C WHITE ALBITE FROM 9.5'-9.9'	F	VH	CS	HIGH ∟ JOINTING	
10										10
	RC-4 (15.0-19.0)	98	42		15.0'-19.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AT JOINT SURFACES FROM 15.6'-15.9' AND 18.0'-18.2'; CORE SAMPLE #7 (CB-3 #7) AT 17.8'	F/WS	VH	CS	HIGH ∟ JOINTING	
	RC-5 (19.0-25.0)	100	58		19.0'-25.0' F-M GRAY DIABASE -M-C GREEN PREHNITE/ALBITE AND QUARTZ VEIN AT 20.0' -GREEN CHLORITE ON JOINT SURFACE AT 23.8'	F/WS	VH	CS	HIGH ∟ JOINTING	
20										20
	RC-6 (25.0-35.0)	100	95		25.0'-35.0' F-M GRAY DIABASE; DIABASE CORE #3 (DB-3) SAMPLED AT 30.5'	F	VH	WS	HIGH ∟ JOINTING	
30										30
	RC-7 (35.0-45.0)	95	89		35.0'-45.0' F-M GRAY DIABASE -QUARTZ VEINS AT 36.4', 36.7', 43.0', 43.1' -WEATHERED JOINT SURFACES WITH BROWN SANDY SILT AT 38.8' AND 39.1'	F/WS	VH	MS	HIGH ∟ JOINTING	
40										40
	RC-8 (45.0-55.0)	85	68		45.0'-55.0' F-M GRAY DIABASE -WEATHERED WHITE ALBITE ON JOINT SURFACES AT 45.0', 45.4', 49.4', 50.1', 51.0' -TRACE MUD SEAM AT 51.3' THAT REDUCED CORE RECOVERY	F/WS	VH	CS	HIGH ∟ JOINTING	
50										50

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**APPALACHIAN  
REGIONAL OFFICE**

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-3  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 720  
 Lat./Long.: N40°24'13.64", W75°17'47.77"  
 Total Depth: 160.5'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
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 Date: 5/06/19 - 5/07/19 Page 2 of 4

Depth (ft)	Run Number	Recovery (%)	ROD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
50	RC-9 (55.0-60.0)	100	100		55.0'-60.0' F-M GRAY DIABASE -QUARTZ VEINS AT 55.3' AND 56.9'	F	VH	MS	HIGH ∟ JOINTING	50
60	RC-10 (60.0-70.0)	100	100		60.0'-70.0' F-M GRAY DIABASE -WEATHERED DIABASE JOINT SURFACES AT 61.1' AND 61.8' -GREEN PREHNITE/ALBITE AND QUARTZ VEINING AT 62.0' AND 69.0' -QUARTZ VEINS AT 63.4' AND 63.8'	F/WS	VH	CS	HIGH ∟ JOINTING	60
70	RC-11 (70.0-80.0)	99	83		70.0'-80.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE, QUARTZ AND AUGITE VEINING AT 73.3' AND 74.2' -SLIGHTLY WEATHERED JOINT SURFACE FROM 76.7'-77.1' -HIGH-ANGLED FRACTURE FROM 77.7'-78.1'	F/WS	VH	CS	HIGH ∟ JOINTING	70
80	RC-12 (80.0-90.0)	95	72		80.0'-90.0' F-M GRAY DIABASE -MODERATELY WEATHERED F-M DIABASE FROM 80.8'-81.8' -HIGH-ANGLED FRACTURES FROM 81.7'-82.2' AND 84.1'-84.3'	F/WS	VH	CS	HIGH ∟ JOINTING	80
90	RC-13 (90.0-98.0)	100	74		90.0'-98.0' F-M GRAY DIABASE -BROWN SILTY SAND ON JOINT SURFACES AT 91.0' AND 93.9' -QUARTZ VEINS AT 94.8', 96.0', 96.7'	F	VH	CS	HIGH ∟ JOINTING	90
100	RC-14 (98.0-105)	100	100		98.0'-105.0' F-M GRAY DIABASE -JOINT SURFACE WITH MINOR GREEN PREHNITE/ALBITE, QUARTZ AND PHLOGOPITE AT 102.9'	F	VH	MS	HIGH ∟ JOINTING	100

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P. O. Box 794  
3000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-3  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 720  
 Lat./Long.: N40°24'13.64", W75°17'47.77"  
 Total Depth: 160.5'  
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 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 5/06/19 - 5/07/19 Page 3 of 4

Depth (ft)	Run Number	Recovery (%)	RQD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
100	RC-15 (105-115)	98	88		105.0'-115.0' F-M GRAY DIABASE -SLIGHTLY WEATHERED JOINT SURFACES AT 105.9', 106.1', 106.8', 109.1'-109.5' -HIGH-ANGLED FRACTURE FROM 108.5'-109.1'	F/WS	VH	CS	HIGH ∠ JOINTING	100
110	RC-16 (115-125)	99	75		115.0'-125.0' F-M GRAY DIABASE -SLIGHTLY WEATHERED JOINT SURFACES AT 118.0', 119.2', 119.7', 120.2', 120.5', 120.6', 120.9', 121.3', 121.7', 124.4', 124.5'	F/WS	VH	CS	HIGH ∠ JOINTING	110
120	RC-17 (125-135)	100	100		125.0'-135.0' F-M GRAY DIABASE	F	VH	VW	HIGH ∠ JOINTING	120
130	RC-18 (135-145)	100	86		135.0'-145.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 141.7' AND 143.7' -BROWN SILT ON JOINT SURFACES AT 142.6', 142.9', 143.0', 144.2'	F/WS	VH	CS	HIGH ∠ JOINTING	130
140	RC-19 (145-150)	72	38		145.0'-145.3' MODERATELY WEATHERED GRAY DIABASE WITH GREEN PREHNITE/ALBITE, QUARTZ AND WHITE ALBITE VEINING 145.3'-146.2' F-M GRAY DIABASE WITH CHLORITE ON JOINT SURFACE AT 146.2' 146.2'-146.8' SLIGHTLY TO MODERATELY WEATHERED QUARTZ, GREEN NEEDLE-LIKE ACTINOLITE, AUGITE VEINING; CORE SAMPLE #8 (CB-3 #8) AT 146.2' 146.8'-150.0' F-M GRAY DIABASE -CLOSED JOINTS FROM 146.9'-147.2'	WS/WM	VH	CS	HIGH ∠ JOINTING	140
150										150

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 Date: 5/06/19 - 5/07/19 Page 4 of 4

Depth (ft)	Run Number	Recovery (%)	RQD (%)	Core	Lithologic Description <sup>1</sup> & Drilling Observation	Weathering <sup>2</sup> Classification	Hardness <sup>2</sup>	Fracture <sup>3</sup> Spacing	Orientation	Depth (ft)
150	RC-20 (150-160.5)	100	90		150.0'-160.5' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE VEINING AT 150.0' -SLIGHTLY WEATHERED JOINT SURFACE AT 150.3' -PHLOGOPITE ON JOINT SURFACES AT 152.2', 154.6', 155.2', AND 156.4'; <u>CORE SAMPLE #9 (CB-3 #9) AT 154.6'</u>	F/WS	VH	CS	HIGH $\angle$ JOINTING	150
160					END OF BORING AT 160.5'					160
170										170
180										180
190										190
200										200

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 Coarse Grained (C) - 5mm-3cm



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**HEADQUARTERS  
PHILADELPHIA REGION**

P. O. Box 468  
6912 Old Easton Road  
Pipersville, PA 18947

**APPALACHIAN  
REGIONAL OFFICE**

P. O. Box 794  
8000 Coombs Farm Drive  
Morgantown, WV 26505

Boring Number: CB-4  
 Site Description: HANSON ROCK HILL QUARRY  
 Surface Elevation (Ft/MSL): 720  
 Lat./Long.: N40°24'14.25", W75°17'47.48"  
 Total Depth: 160.0'  
 Boring Angle: 30° FROM VERTICAL; HEADING OF 315°  
 Munic.: EAST ROCKHILL County; BUCKS State; PA  
 Drilled By: EICHELBERGERS  
 Logged By: LOUIS F. VITTORIO / JOHN A. YENCHIK  
 Date: 5/08/19 - 5/15/19 Page 1 of 4

Depth (ft)	Run Number	Recovery (%)	RDD (%)	Core	Lithologic Description <sup>4</sup> & Drilling Observation	Weathering Classification	Hardness <sup>5</sup>	Fracture <sup>3</sup> Spacing	Orientation	Depth (Ft)
0	RC-1 (0.0-5.0)	32	0		0.0'-5.0' F-M GRAY DIABASE; BROKEN	F/WS	VH	VC	N/A	0
	RC-2 (5.0-6.7)	59	0		5.0'-6.7' F-M GRAY DIABASE; VERY BROKEN	F/WS	VH	VC	HIGH ∟ JOINTING	
	RC-3 (6.7-10.5)	100	29		6.7'-10.5' F-M GRAY DIABASE; VERY BROKEN	F/WS	VH	CS	HIGH ∟ JOINTING	
10	RC-4 (10.5-15.5)	100	20		10.5'-15.5' F-M GRAY DIABASE	F/WS	VH	CS	HIGH ∟ JOINTING	10
	RC-5 (15.5-25.0)	89	62		15.5'-25.0' F-M GRAY DIABASE -WEATHERED JOINT SURFACES AT 19.1' AND 20.8' WITH GREEN CHLORITE AND WHITE ALBITE	F	VH	CS	HIGH ∟ JOINTING	
20	RC-6 (25.0-35.0)	84	62		25.0'-35.0' F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AND CHLORITE ON JOINT SURFACE AT 27.0' -BROWN SAND WITH GREEN PREHNITE/ALBITE ON JOINT SURFACE FROM 28.4-35.0'	F/WS	VH	CS	HIGH ∟ JOINTING	
30	RC-7 (35.0-42.0)	100	51		35.0'-42.0' F-M GRAY DIABASE -BROWN SAND WITH GREEN PREHNITE/ALBITE ON JOINT SURFACE AT 39.0'	F/WS	VH	CS	HIGH ∟ JOINTING	
40	RC-8 (42.0-50.0)	94	70		F-M GRAY DIABASE -GREEN PREHNITE/ALBITE AND CHLORITE ON JOINT SURFACE AT 42.1' -BROWN SAND ON JOINT SURFACE AT 42.3' -SLIGHTLY WEATHERED HIGH-ANGLED FRACTURE FROM 46.3'-47.1'	F/WS	VH	CS	HIGH ∟ JOINTING	
50										50

<sup>1</sup> Fresh (F) - No visible sign of decomposition or discoloration.  
<sup>2</sup> Weathered Slightly (WS) - Slight discoloration inward from open fractures in rock.  
<sup>3</sup> Weathered Moderately (WM) - Discoloration throughout core, texture preserved. Strength somewhat less than fresh rock, can't be broken by hand or scraped by knife.  
<sup>4</sup> Highly Weathered (WH) - Minerals somewhat decomposed, but core stones present in rock mass. Texture becoming indistinct, but fabric preserved. Rock can be broken by hand or shaved with knife.  
<sup>5</sup> Completely Weathered (WC) - Minerals decomposed to soil, but fabric and structure preserved (saprolite). Material easily crumbled.  
 Residual Soil (RS) - Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed.

<sup>6</sup> Extremely Soft (ES) - Can be dented by thumb nail.  
 Very Soft (VS) - Can be peeled with a knife.  
 Soft (S) - Can be easily gauged or carved with a knife.  
 Moderately Soft (MS) - Can be readily scratched with a knife blade.  
 Moderately Hard (MH) - Requires one hammer blow to fracture.  
 Hard (H) - Can be scratched with a knife with difficulty. Hard hammer blows required to detach hand specimens.  
 Very Hard (VH) - Cannot be scratched with a knife or can barely be scratched with a knife. Breaking specimens requires several hard blows of the pick.

<sup>7</sup> Very Widely Spaced (VW) - >10'  
 Widely Spaced (WS) - 3' to 10'  
 Moderately Spaced (MS) - 2' to 3'  
 Closely Spaced (CS) - 2" to 2'  
 Very Closely Spaced (VC) - <2"  
<sup>8</sup> Fine Grained (F) - <1mm  
 Medium Grained (M) - 1-5mm  
 Coarse Grained (C) - 5mm-3cm



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 Date: 5/08/19 - 5/15/19 Page 2 of 4

Depth (ft)	Run Number	Recovery (%)	ROD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>3</sup>	Fracture Spacing	Orientation	Depth (Ft)
50	RC-9 (50.0-58)	99	74		50.0'-58.0' F-M GRAY DIABASE -GREEN CHLORITE AND PREHNITE/ALBITE ON JOINT SURFACE AT 50.0' -HEAVILY JOINTED FROM 55.5-56.1' -QUARTZ VEIN AT 57.2'	F/WS	VH	CS	HIGH ∠ JOINTING	50
60	RC-10 (58-63.7)	95	60		58.0'-63.7' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACE AT 60.5' -BROKEN DIABASE FROM 63.0'-63.7' -QUARTZ VEIN WITH LOW-ANGLED HEALED JOINT AT 62.0'	F/WS	VH	CS	HIGH ∠ JOINTING	60
70	RC-11 (63.7-70)	100	97		63.7'-70.0' F-M GRAY DIABASE; <u>DIABASE CORE #4 (DR-4) SAMPLED AT 69.0'</u> -QUARTZ VEINS AT 64.5', 64.7', 65.4', 66.8', 68.7' -COARSE GRAIN QUARTZ & DIABASE AT 66.1'-66.6'	F	VH	MS	HIGH ∠ JOINTING	70
80	RC-12 (70-80)	100	100		70.0'-80.0' F-M GRAY DIABASE -QUARTZ VEINS AT 70.3', 70.6', 71.2', 71.9', 72.1'	F	VH	VW	HIGH ∠ JOINTING	80
90	RC-13 (80-90)	96	91		80.0'-90.0' F-M GRAY DIABASE -QUARTZ VEINS AT 85.0', 85.2', 86.3', 87.5' -M-C DIABASE AND QUARTZ AT 85.6'-85.8' -GREEN CHLORITE ON JOINT SURFACE AT 89.5' -SLIGHTLY WEATHERED JOINT SURFACES AT 83.9', 84.4', 88.6'	F/WS	VH	MS	HIGH ∠ JOINTING	90
100	RC-14 (90.0-100)	91	73		90.0'-100.0' F-M DIABASE -GREEN PREHNITE/ALBITE AND CHLORITE ON JOINT SURFACES AT 90.7', 90.9', 91.0', 94.9' 96.7' -SLIGHTLY WEATHERED JOINT SURFACE AT 92.7' -M-C DIABASE WITH HIGH ANGLED FRACTURE FROM 93.7'-94.2'	F/WS	VH	CS	HIGH ∠ JOINTING	100

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**Highly Weathered (WH)** - Minerals somewhat decomposed, but core stones present in rock mass. Texture becoming indistinct, but fabric preserved. Rock can be broken by hand or shaved with knife.  
**Completely Weathered (WC)** - Minerals decomposed to soil, but fabric and structure preserved (saprolite). Material easily crumbled.  
**Residual Soil (RS)** - Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed.

<sup>2</sup> **Extremely Soft (ES)** - Can be dented by thumb nail.  
**Very Soft (VS)** - Can be peeled with a knife.  
**Soft (S)** - Can be easily gauged or carved with a knife.  
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**Widely Spaced (WS)** - 3' to 10'  
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Depth (ft)	Run Number	Recovery (%)	RQD (%)	Core	Lithologic Description & Drilling Observation	Weathering Classification	Hardness <sup>2</sup>	Fracture Spacing	Orientation	Depth (Ft)
100	RC-15 (100-110)	100	97		100.0'-110.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 100.6' AND 108.9'	F	VH	MS	HIGH $\angle$ JOINTING	100
110	RC-16 (110-120)	100	97		110.0'-120.0' F-M GRAY DIABASE -QUARTZ VEIN AT 115.4' -GREEN CHLORITE ON JOINT SURFACE AT 118.3'	F	VH	VW	HIGH $\angle$ JOINTING	110
120	RC-17 (120-130)	100	84		120.0'-130.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 121.0', 121.4', 121.6', 126.1', 128.1' -GREEN PREHNITE/ALBITE AND QUARTZ VEINS AT 126.9' AND 127.4' -SLIGHTLY WEATHERED DIABASE JOINT SURFACES AT 120.6' AND 129.2'	F	VH	CS	HIGH $\angle$ JOINTING	120
130	RC-18 (130-140)	100	95		130.0'-140.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 134.7', 136.0', 138.8', 139.8'	F	VH	CS	HIGH $\angle$ JOINTING	130
140	RC-19 (140-146)	80	42		140.0'-146.0' F-M GRAY DIABASE -FRACTURED DIABASE WITH GREEN PREHNITE/ALBITE, CHLORITE AND MINOR MUSCOVITE MICA IN VEINS FROM 142.6'-143.4' -GREEN CHLORITE ON JOINT SURFACE AT 144.0' -SLIGHTLY WEATHERED JOINT SURFACES AT 140.1', 140.9', 145.6'	F	VH	CS	HIGH $\angle$ JOINTING	140
150	RC-20 (146-153)	94	57		146.0'-153.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 148.9', 149.1', 149.2', 151.4', 151.5', 151.7', 153.0' -SLIGHTLY WEATHERED JOINTED SURFACES AT 146.2', 150.6' -M-C GREEN PREHNITE/ALBITE, NEEDLE-LIKE ACTINOLITE AND CHLORITE VEINING FROM 147.5'-148.0'; CORE SAMPLE #10 (CB-4 #10) AT 147.5'	F	VH	CS	HIGH $\angle$ JOINTING	150

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150	RC-21 (153-160)	100	88		153.0'-160.0' F-M GRAY DIABASE -GREEN CHLORITE ON JOINT SURFACES AT 153.0', 153.7', 155.7', 156.5'	F	VH	CS	HIGH $\angle$ JOINTING	150
160					END OF BORING AT 160'					
170										170
180										180
190										190
200										200

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