ENVIRONMENTAL COMPLIANCE & AREA COMPLETION PROJECTS

Baseline Asbestos Inspection Report of Building 484-22D

Q-APG-D-00003
April 14, 2021

Savannah River
Nuclear Solutions, LLC
A Fluor Daniel Partnership

INTEROFFICE MEMORANDUM

Q-APG-D-00003
RSM Track Number 10755

April 14, 2021

TO: Kelsey Holcomb, 730-4B

FROM: Heath McGregor, 730-4B

BASELINE ASBESTOS INSPECTION REPORT OF BUILDING 484-22D

On February 10 and February 25, 2021, an inspection was performed to evaluate electrical wire insulation and other electrical components inaccessible during a September 2019 inspection. This report is a revision to the original report issued on September 16, 2019.

Constructed in circa 1953, the Coal Handling Crusher House (Building 484-22D) consists of a steel I-beam framework supported by a concrete foundation. The exterior is finished with raised-seam metal siding and roofing panels. The multi-level interior is constructed with steel plate floorings that are interconnected and accessed by a steel staircase. An electrical room is attached to the southwest portion of the building and is accessed by two (2) separate entry points. The Coal Handling Crusher House was formerly used to process coal received from the Coal Handler Shaker House (484-24D). The processed coal was then sent from the Crusher House to the Coal Handling Transfer House (484-21D). The coal was received and sent via a conveyer belt system (see Figure 1). The building was decommissioned in May 2013 with mechanical equipment abandoned in place.

Eight (8) homogenous types of material were evaluated during this inspection. Some of the materials evaluated during this inspection were sampled and/or evaluated during the previous asbestos inspection. Please see the attached Inspection Survey Table for descriptions, sample results, and location of the materials inspected. The analytical results from the previous report have been reproduced and are included in the Inspection Survey Table.

SUMMARY

All accessible, visible, suspect Asbestos Containing Material (ACM) was evaluated at the time of this inspection. Visible Thermal Systems Insulation (TSI) included elastomeric foam (Armaflex®) and polyisocyanurate. These types of TSI do not contain asbestos. The mastic applied to the polyisocyanurate elbow buildouts was sampled to determine asbestos content. Gaskets (if any) must be considered Presumed Asbestos Containing Material (PACM). Gaskets in unbroken flanges are determined to be encased in a hardened substance and therefore not subject to regulatory requirements if undisturbed.

Several components inside the electrical panel boxes (located in the electrical room) were determined to be suspect for containing asbestos. Therefore, all components inside the electrical panel boxes are considered Presumed Asbestos Containing Material (PACM). See Photographs 2 and 3 for details. In addition, one (1) wire, connecting an electrical panel box and the transformer in the electrical room, is insulated with a suspect braided insulation. This wire must be handled as PACM (see Photograph 4 and 5 for location of end points). No suspect materials (wire insulation and/or electrical components) were discovered during the inspection of the remaining electrical system and components. This evaluation was based on material knowledge, document review, and bulk sample laboratory analyses.

Savannah River Nuclear Solutions, LLC
A Fluor Daniel Partnership

INTEROFFICE MEMORANDUM

The removal of all identified ACM/PACM must be performed by asbestos trained personnel, with proper permitting, and waste disposal procedures.

All samples were analyzed by Polarized Light Microscopy (PLM). As required South Carolina Department of Health and Environmental Control (SC DHEC) Regulation 61-86.1, if the samples were organically bound, additional Transmission Electron Microscopy (TEM) was used to confirm negative results. All samples were analyzed by Bureau Veritas North America, Inc. The laboratory is located at 3380 Chastain Meadows Parkway, Suite 300 Kennesaw, GA 30144. Please see the attached laboratory report for a review of accreditations and certifications.

In accordance with 40CFR part 61.145 a **ten-day notification** must be filed with SC DHEC prior to demolition. If this report is used for contract bid or regulatory permit purposes, it is the obligation of the user to verify the actual quantities of the materials presented in the Inspection Survey Table.

ASBESTOS INSPECTOR	INSTITUTION	CERT. NO	STATE	EXP. DATE
Heath McGregor	Greenville Tech College	203-EVT502-093	SC	**07/28/2021**

Included on the SRS Long-term in-house Group license ABS 8021

ASBESTOS INSPECTOR	INSTITUTION	CERT. NO.	STATE	EXP. DATE
Mikell Autrey	Greenville Tech College	203-ETV502-089	SC	**07/28/2021**

Included on the SRS Long-term in-house Group license ABS 8021

C: C.R.F., 773-52A
Site D&D Correspondence File
J.K. Barrineau, 730-4B
Lance Cramer, 730-4B
William Griffin, 730-4B
John Blankenship, 730-4B

INSPECTION SURVEY TABLE OF BUILDING 484-22D

Homogeneous Number	Suspect/ Non-Suspect Material	Description and Sample Numbers of Material	Estimated Amount	Test Results	Friable/ Non-friable Condition
Asbestos Containing Material					
H01OB	Miscellaneous	**Description:** Black/silver colored coating brown colored mastic (layered sample) **Sample Numbers:** CHCH190904-01A, CHCH190904-01B, CHCH190904-01C, CHTH190904-01A, CHTH190904-01B, CHTH190904-01C **Sample Number:** CHCH190904-01B and CHTH190904-01C analyzed via TEM.	~1,300 Square Feet	**Positive See Note 1.**	Non-friable Good Condition
Location: Applied to the surface of the metal roof panels covering the conveyer belt system. See Figure 1 for location and Photograph 1 for detail.					
H02	Miscellaneous	**Description:** Electrical panel box components **Sample Numbers:** N/A, component materials are suspect for containing asbestos (gaskets, arc flash suppressors, etc.)	~40 Square Feet	**PACM**	Non-friable Good Condition
Location: Observed inside many of the electrical panel boxes located inside the electrical room. See Photographs 2 and 3 for location details.					
H03	Miscellaneous	**Description:** Braided cloth **Sample Numbers:** N/A, cloth insulator is suspect for containing asbestos.	~20 Linear Feet	**PACM**	Non-friable Good Condition
Location: Observed as an insulator for copper wire in conduit starting at light transfer disconnect box (CLI# ELNH-DISC-009) to lighting transformer disconnect. See Photographs 4 and 5 for end point locations of wire with braided cloth.					

1. Positive = calculated asbestos content greater than 1% in analyzed sample.

INSPECTION SURVEY TABLE OF BUILDING 484-22D

Homogeneous Number	Suspect/Non-Suspect Material	Description and Sample Numbers of Material	Test Results
Evaluated Homogenous Material			
H04OB	Miscellaneous	**Description:** Black colored mastic **Sample Numbers:** CHCH210210-01A, CHCH210210-01B, CHCH210210-01C **Sample Number:** CHCH210210-01A analyzed via TEM.	Negative **See Note 2.**
Location: Observed on the seams and joints of polyisocyanurate buildouts covering elbow joints of domestic water piping.			
H05OB	Miscellaneous	**Description:** Black colored conveyer belt **Sample Numbers:** CHCH210225-01A, CHCH210225-01B, CHCH210225-01C **Sample Number:** CHCH210225-01A analyzed via TEM.	Negative
Location: Observed as part of the coal conveyor system.			
H06OB	Miscellaneous	**Description:** Grey/white colored sealant **Sample Numbers:** CHCH210225-02A, CHCH210225-02B, CHCH210225-02C **Sample Number:** CHCH210225-02A analyzed via TEM.	Negative
Location: Applied to the seams of metal panel patch on exterior roof of electrical room.			
H07	Miscellaneous	**Description:** Black/white synthetic material (dampener) **Sample Numbers:** CHCH190904-02, CHCH190904-03, CHCH190904-04	Negative
Location: Observed interface between mechanical equipment and duct work (exterior west side of building).			
H08OB	Miscellaneous	**Description:** Various colored sealant (rubberized) **Sample Numbers:** N/A, not suspected to contain asbestos.	N/A **See Note 3.**
Location: Observed at various locations (exterior seams and penetrations, some electrical conduit joints, protective metal jacketing for TSI, etc.).			

2. Negative = no asbestos fibers were detected during laboratory sample analyses.
3. N/A = not applicable.

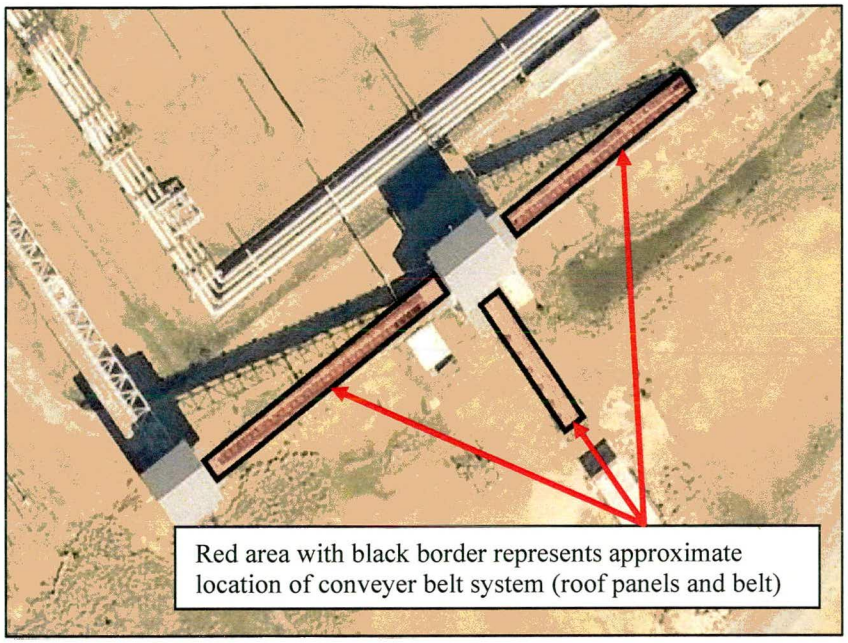
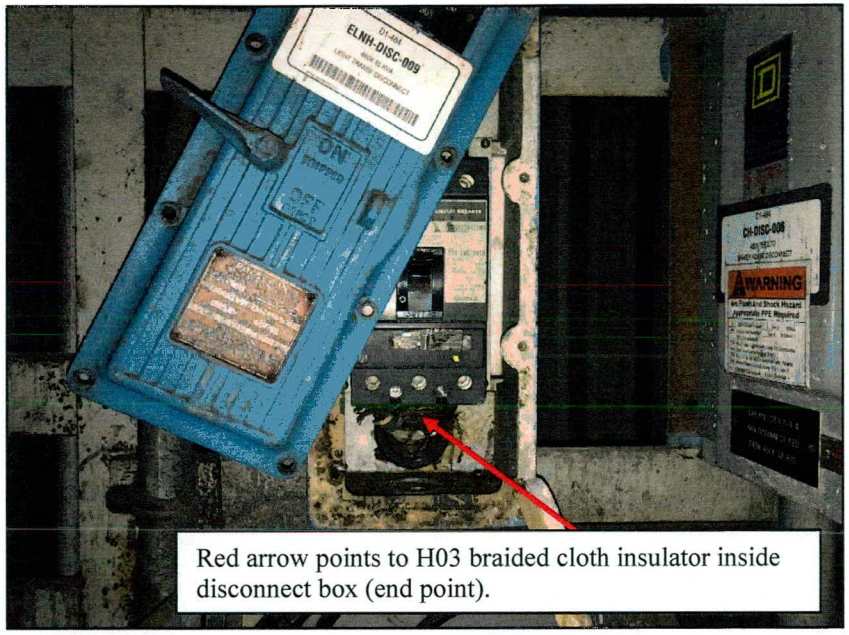


Figure 1. Aerial view of Coal Handling Crusher House.

Photograph 1. Roof panel coating H01OB. View facing southeast.

Photograph 2. View of panel boxes inside electrical room (H02 components inside).

Photograph 3. View of panel boxes inside electrical room (H02 components inside).



Photograph 4. View of end point of braided cloth insulated wire.

Photograph 5. View of transformer and conduit inside electrical room.

September 12, 2019

Kenny Barrineau
SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Building 730-4B, 2135
Aiken, SC 29808

Bureau Veritas Work Order No A1909059

Reference Activity Code: 05VSSTMOSO

Dear Kenny Barrineau:

Bureau Veritas North America, Inc. received 3 samples on September 06, 2019 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a sixty-day holding period, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,
Kuntal Parikh

Kuntal Parikh
Senior Microscopist
Electronic signature authorized through password protection

cc: Ken Padgett
Mike
Siobhan Kitchen

Bureau Veritas North America, Inc.

Industrial Hygiene Laboratory
3380 Chastain Meadows Parkway, Suite 300
Kennesaw, GA 30144

Main: (770) 499-7701
Fax: (770) 499-7511
www.bvlabs.com

CASE NARRATIVE

Date: *12-Sep-19*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: 05VSSTMOSO

Work Order No A1909059

ANALYTICAL METHOD FOR ASBESTOS IN BULK SAMPLES USING POLARIZED LIGHT MICROSCOPY (PLM)

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected unless otherwise noted.

Use of EPA/600/R-93/116 satisfies applicable requirements of the USEPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Sample", EPA-600/M4-82-020, December 1982, published as Appendix E to Subpart E of 40CFR763. Bulk samples analyzed by New York State methods follow stratified point counting methods (198.1) or Method 198.6 for PLM non-friable organically bound materials (NYSDOH Lab Code –11645). Percentages are visual estimations of asbestos >3:1 aspect ratio. The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed. NESHAP requires point counting of a bulk sample when the result is <10% by a method other than point counting. EPA, however states that if 3 mounts of the sample are analyzed and the asbestos percentage is <10% by visual estimation, the client may elect to assume the amount to be greater than 1% or require verification by point counting. If the result by point counting is different than the result obtained by visual estimation, the point count result will be used. Sample friability or non-friability noted on the report is a requirement for the State of California and refers only to the condition of the sample under macroscopic examination. It does not imply friability or non-friability for the sample as collected or observed in the field as determined by the person collecting the sample. The Kennesaw, Georgia lab is accredited by NVLAP –Lab Code 101125-0.

(a)Polarized- light microscopy is not consistently reliable in detecting asbestos in floor coverings, similar non-friable organically bound materials, soil and vermiculite. Quantitative 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. When analysis of such materials by PLM yields results negative for the presence of asbestos, Bureau Veritas recommends utilizing quantitative transmission electron microscopy (TEM). For more information, contact the laboratory.

References

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: 05VSSTMOSO

Work Order No A1909059

McCrone, Walter C. 1980. The Asbestos Particle Atlas. Ann Arbor, MI: Ann Arbor Science Publishers, Inc.

United States Environmental Protection Agency. Environmental Monitoring Systems Laboratory. 1982. Interim Method for the Determination of Asbestos in Bulk Insulation Samples. EPA-600/M4-82-020. Washington: GPO, December.

United States Environmental Protection Agency. Method for the Determination of Asbestos in Bulk Building Materials. EPA-600/R-93/116, July 1993 (PLM)

Fed. Reg. Vol. 55, No.224, 11/20/90, p.48415 (NESHAP)
EPA Memorandum 5/8/1991 –NESHAP Clarifications

NYSDOH Methods 198.1/198.6

QUANTITATIVE ANALYSIS OF NON-FRIABLE ORGANICALLY BOUND BULK SAMPLES FOR ASBESTOS USING TRANSMISSION ELECTRON MICROSCOPY (TEM) (NY ELAP 198.4)

Approximately 100-500 mg of sample is weighed in a tared crucible. The sample is placed in a muffle furnace at a temperature of 480°C for at least 5 hours, or until the weight has stabilized. The sample is allowed to cool to room temperature and immediately weighed to calculate percent of organic loss.

The sample is placed in a tared crucible and ground to disaggregate the residue. Approximately 1 ml of non-dilute HCL acid is slowly added to remove calcite and dolomite from the remaining sample residue. After 15 minutes, the sample is immediately diluted with ultra-pure water. The sample is then dispersed in 50 ml of ultra-pure water and filtered onto a pre-weighed 47 mm, 0.4um pore size polycarbonate filter. The filter is dried on a slide warmer and weighed again. If the residue mass is <1% of the subsample's original mass, the analysis is terminated and the result is reported as non-ACM.

A one cm2 portion of the filter is cut and placed in a clean silica crucible. Approximately 5ml of ethanol are added and ultra-sonicated for 1 minute. Approximately 3 µl of the suspension is drop-mounted onto a carbon-coated TEM grid and allowed to dry.

Grids are examined at 3000X for suitability of the prep where >50% intact filter coverage and <25% particle loading is determined. Large bundles of asbestos may be noted during this phase of the analysis. At 10,000X to 20,000X, positive confirmation and further visual estimation of asbestos is determined. If there are no other particles on the filter, then the asbestos observed is 100% visual estimation. Otherwise, the estimate includes all sizes relative to other particles or fibers. Morphology, selected area

electron diffraction, and energy-dispersive x-ray spectroscopy are used to confirm asbestos fibers. From TEM examination as outlined above, the final visual area estimation is made of asbestos on the TEM grids and the percent asbestos in the residue is then extrapolated using gravimetric records to identify the percent asbestos in the total sample (NYS DOH Lab Code 11645).

SPECIAL NOTES

1)Material types analyzed by 198.1 method: a) Friable materials other than SM-V (Surfacing Material) with <10% vermiculite; b) Surfacing Material (SM) without vermiculite; and c) ceiling tile without cellulose.

2)Material types analyzed by 198.6/198.4 method: NOB material (other than SM-V) with <10% vermiculite; b) any material other than SM-V with >10% vermiculite; and c) Ceiling Tiles with cellulose.

3)Material types analyzed by 198.8 method: Surfacing Material containing vermiculite (SM-V).

REFERENCES

Chatfield Method for Quantitative Analysis of Bulk Samples for Asbestos Using Transmission Electron Microscopy (unpublished).

New York ELAP Method 198.4, May 2016.

NOTE: Some of the samples may have contained inseparable layers which were combined during preparation.

Note: The attached chain-of-custody form shows the sample data that was provided by the client.

ANALYTICAL RESULTS

Date: *12-Sep-19*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Sample Type: Bulk
Work Order No.: A1909059
Date Received: 9/6/2019
Client Reference: Activity Code: 05VSSTMOSO
Report Date: 12-Sep-19
Method Reference: EPA-600/M4-82-020/EPA/600/R-93/116/NYELAP 198.1

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
001A	***CHTH190904-01A***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/Silver Roof Coating	None Detected		Fibrous glass	1%	Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
002A	***CHTH190904-01B***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/Silver Roof Coating	None Detected		Fibrous glass	2%	Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
003A	***CHTH190904-01C***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/Silver Roof Coating	Chrysotile	< 1%	Fibrous glass	2%	Binder/Filler

Total <1%

Laboratory Limits

Laboratory

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 22.23
1-10	100	+/- 7.41
Trace	100	+/- 1.482

Susan Hannigan (SH)

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 26.676
1-10	100	+/- 5.928
Trace	100	+/- 1.482

The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed.

Analyst(s) Name/Date: _____ 9/12/2019

ANALYTICAL RESULTS

Client: **SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC**

Client Reference No.: **Activity Code: 05VSSTMOSO**

Work Order No.: **A1909059** **Date:** *12-Sep-19*

Analytical Method: NYELAP METHOD 198.4 by TEM
Sample Type: Bulk
Reporting Limit (% by Weight): 0.1

Date Received: 9/6/2019 10:10:15 AM
Report Date: 9/12/2019 4:15:54 PM
Grid Box Identification: 09-10-19B-1

Lab Sample No.	Client Sample Identification	Date Sampled	Analysis Date	Analyst	Sample Description (Morphology)	Asbestos Identification	(%)*	Total Asbestos (%)**
A1909059-003A	CHTH190904-01C	09/04/19 @12:00 am	09/12/19 @3:16 pm	KRP	Black/Silver Roof Coating	Chrysotile	--	< 0.1

TEM Microscope Documentation

Instrument	*Magnification	Accelerating Voltage	Calibration Date
TEM 1/D675	14502x	100 KeV	8/5/2019

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X

<: Result is less than the indicated limit of detection. --: Present but below the detection limit
*: The visual area estimation of asbestos content in the final residue.
**: The calculated total percent asbestos in the sample as received.

Analyst(s) Name/Date: Kuntal Parikh 9/12/2019

A1901059

SRS Chain of Custody / Laboratory Analysis Request

Requested TAT: ☐ Rush ☐ Routine ☒ Other 5 Day from rec.

Activity Code: 05VSSTMOSO

Samples received in good condition? ☐ Y ☐ N

Laboratory

Lab Name	Bureau Veritas (Atlanta)
Address 1	3380 Chastain Medows Pkwy, Suite 300
Address	Kennesaw, GA 30144
POC	Alan Segrave / 800-252-9919

Sample Comments

Use positive stop for all homogenous groups. TEM is required only as indicated for organically bound samples or analyst may choose another sample from that ABC group that was positive via PLM. P.O. # will sent to Kelly Smith via Email for services related to this task.

Peer Reviewed / Self Check by

Name (Print): James Moore

Return Results / Electronic Report To

Name (CTF)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov/ (803) 952-5650
Name (STR)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov (803) 952-5650
Name (Req by)	Ken Padgett
Email / Phone	william03.padgett@srs.gov (803) 646-1831
Organization	SRNS / EC&ACP
Address	Savannah River Site Aiker, SC 29802

This Line Laboratory use ONLY	Laboratory ID#:	Results attached (date):	Results Pages (Total)

No	Field ID	Matrix	Sample Date / Time	Requested Analysis	Sample Mecia / Size	Time (min)	Vol / Area	Sample Comments
	CHTH190904-01A		09/04/2019	PLM	< 1 Gram	N/A	N/A	H01OB - Black/silver roof coating
	CHTH190904-01B		09/04/2019	PLM	< 1 Gram	N/A	N/A	H01OB - Black/silver roof coating
	CHTH190904-01C		09/04/2019	PLM/TEM	< 1 Gram	N/A	N/A	H01OB - Black/silver roof coating

Relinquished by

Name	Signature	Date and Time
Ken Padgett		9/4/19 1420
Kane Bice		9-4-19 1441
735-B Rm 401	735-B Rm 401	9-5-19 0650
Kane Bice		9-5-19 1100

Received by

Name	Signature	Date and Time
Kane Bice		9-4-19 1440
735-B Rm 401	735-B Rm 401	9-4-19 1441
Kane Bice		9-5-19 0650
C/S shipping	C/S shipping	9-5-19 1130

K. Smith K. Smith 9/6/19 100

Page 1 of 1

September 12, 2019

Kenny Barrineau
SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Building 730-4B, 2135
Aiken, SC 29808

Bureau Veritas Work Order No A1909060

Reference Activity Code: 05VSSTMOSO

Dear Kenny Barrineau:

Bureau Veritas North America, Inc. received 6 samples on September 06, 2019 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a sixty-day holding period, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,
Kuntal Parikh

Kuntal Parikh
Senior Microscopist
Electronic signature authorized through password protection

cc: Ken Padgett
Mike
Siobhan Kitchen

Bureau Veritas North America, Inc.

Industrial Hygiene Laboratory
3380 Chastain Meadows Parkway, Suite 300
Kennesaw, GA 30144

Main: (770) 499-7701
Fax: (770) 499-7511
www.bvlabs.com

CASE NARRATIVE

Date: *12-Sep-19*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: 05VSSTMOSO

Work Order No A1909060

ANALYTICAL METHOD FOR ASBESTOS IN BULK SAMPLES USING POLARIZED LIGHT MICROSCOPY (PLM)

The results of this report relate only to the samples listed in the body of this report.

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References

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: 05VSSTMOSO

Work Order No A1909060

McCrone, Walter C. 1980. The Asbestos Particle Atlas. Ann Arbor, MI: Ann Arbor Science Publishers, Inc.

United States Environmental Protection Agency. Environmental Monitoring Systems Laboratory. 1982. Interim Method for the Determination of Asbestos in Bulk Insulation Samples. EPA-600/M4-82-020. Washington: GPO, December.

United States Environmental Protection Agency. Method for the Determination of Asbestos in Bulk Building Materials. EPA-600/R-93/116, July 1993 (PLM)

Fed. Reg. Vol. 55, No.224, 11/20/90, p.48415 (NESHAP)
EPA Memorandum 5/8/1991 –NESHAP Clarifications

NYSDOH Methods 198.1/198.6

QUANTITATIVE ANALYSIS OF NON-FRIABLE ORGANICALLY BOUND BULK SAMPLES FOR ASBESTOS USING TRANSMISSION ELECTRON MICROSCOPY (TEM) (NY ELAP 198.4)

Approximately 100-500 mg of sample is weighed in a tared crucible. The sample is placed in a muffle furnace at a temperature of 480°C for at least 5 hours, or until the weight has stabilized. The sample is allowed to cool to room temperature and immediately weighed to calculate percent of organic loss.

The sample is placed in a tared crucible and ground to disaggregate the residue. Approximately 1 ml of non-dilute HCL acid is slowly added to remove calcite and dolomite from the remaining sample residue. After 15 minutes, the sample is immediately diluted with ultra-pure water. The sample is then dispersed in 50 ml of ultra-pure water and filtered onto a pre-weighed 47 mm, 0.4um pore size polycarbonate filter. The filter is dried on a slide warmer and weighed again. If the residue mass is <1% of the subsample's original mass, the analysis is terminated and the result is reported as non-ACM.

A one cm2 portion of the filter is cut and placed in a clean silica crucible. Approximately 5ml of ethanol are added and ultra-sonicated for 1 minute. Approximately 3 µl of the suspension is drop-mounted onto a carbon-coated TEM grid and allowed to dry.

Grids are examined at 3000X for suitability of the prep where >50% intact filter coverage and <25% particle loading is determined. Large bundles of asbestos may be noted during this phase of the analysis. At 10,000X to 20,000X, positive confirmation and further visual estimation of asbestos is determined. If there are no other particles on the filter, then the asbestos observed is 100% visual estimation. Otherwise, the estimate includes all sizes relative to other particles or fibers. Morphology, selected area

electron diffraction, and energy-dispersive x-ray spectroscopy are used to confirm asbestos fibers. From TEM examination as outlined above, the final visual area estimation is made of asbestos on the TEM grids and the percent asbestos in the residue is then extrapolated using gravimetric records to identify the percent asbestos in the total sample (NYS DOH Lab Code 11645).

SPECIAL NOTES

1)Material types analyzed by 198.1 method: a) Friable materials other than SM-V (Surfacing Material) with <10% vermiculite; b) Surfacing Material (SM) without vermiculite; and c) ceiling tile without cellulose.

2)Material types analyzed by 198.6/198.4 method: NOB material (other than SM-V) with <10% vermiculite; b) any material other than SM-V with >10% vermiculite; and c) Ceiling Tiles with cellulose.

3)Material types analyzed by 198.8 method: Surfacing Material containing vermiculite (SM-V).

REFERENCES

Chatfield Method for Quantitative Analysis of Bulk Samples for Asbestos Using Transmission Electron Microscopy (unpublished).

New York ELAP Method 198.4, May 2016.

NOTE: Some of the samples may have contained inseparable layers which were combined during preparation.

Note: The attached chain-of-custody form shows the sample data that was provided by the client.

ANALYTICAL RESULTS

Date: *12-Sep-19*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Sample Type: Bulk
Work Order No.: A1909060
Date Received: 9/6/2019
Client Reference: Activity Code: 05VSSTMOSO
Report Date: 12-Sep-19
Method Reference: EPA-600/M4-82-020/EPA/600/R-93/116/NYELAP 198.1

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
001A	***CHCH190904-01A***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	95	Non-homogeneous Black/Silver Roof Coating	None Detected		Fibrous glass	3%	Binder/Filler
(2)	5	Homogeneous Tan Mastic	Chrysotile	< 1%	Non-Detected		Binder/Filler
			Total	<1%			

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
002A	***CHCH190904-01B***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	80	Non-homogeneous Black/Silver Roof Coating	None Detected		Fibrous glass	5%	Binder/Filler
(2)	20	Homogeneous Tan Mastic	Chrysotile	< 1%	Non-Detected		Binder/Filler
			Total	<1%			

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
003A	***CHCH190904-01C***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	97	Non-homogeneous Black/Silver Roof Coating	None Detected		Fibrous glass	2%	Binder/Filler
(2)	3	Homogeneous Tan Mastic	Chrysotile	< 1%	Non-Detected		Binder/Filler
			Total	<1%			

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
004A	***CHCH190904-02***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/White Flex Connector	None Detected		Fibrous glass	75%	Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
005A	***CHCH190904-03***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Gray/White Flex Connector	None Detected		Fibrous glass	80%	Binder/Filler

The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed.

Analyst(s) Name/Date: _____ 9/12/2019

ANALYTICAL RESULTS

Date: *12-Sep-19*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Sample Type: Bulk
Work Order No.: A1909060
Date Received: 9/6/2019
Client Reference: Activity Code: 05VSSTMOSO
Report Date: 12-Sep-19
Method Reference: EPA-600/M4-82-020/EPA/600/R-93/116/NYELAP 198.1

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
006A	***CHCH190904-04***	SH	09/04/2019	09/10/2019

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/White Flex Connector	None Detected		Fibrous glass	75%	Binder/Filler

Laboratory Limits

Laboratory

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 22.23
1-10	100	+/- 7.41
Trace	100	+/- 1.482

Susan Hannigan (SH)

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 26.676
1-10	100	+/- 5.928
Trace	100	+/- 1.482

The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed.

Analyst(s) Name/Date: _____ 9/12/2019

ANALYTICAL RESULTS

Client: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Client Reference No.: Activity Code: 05VSSTMOSO

Work Order No.: A1909060 **Date:** *12-Sep-19*

Analytical Method: NYELAP METHOD 198.4 by TEM
Sample Type: Bulk
Reporting Limit (% by Weight): 0.1

Date Received: 9/6/2019 10:29:56 AM
Report Date: 9/12/2019 4:08:07 PM
Grid Box Identification: 09-10-19B-1

Lab Sample No.	Client Sample Identification	Date Sampled	Analysis Date	Analyst	Sample Description (Morphology)	Asbestos Identification	(%)*	Total Asbestos (%)**
A1909060-002A	CHCH190904-01B	09/04/19 @12:00 am	09/12/19 @3:16 pm	KRP	Black/Silver Roof Coating	Chrysotile	--	< 0.1
A1909060-002B	CHCH190904-01B	09/04/19 @12:00 am	09/12/19 @3:16 pm	KRP	Tan Mastic	Chrysotile	2	1.2

TEM Microscope Documentation

Instrument	*Magnification	Accelerating Voltage	Calibration Date
TEM 1/D675	14502x	100 KeV	8/5/2019

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X

<: Result is less than the indicated limit of detection. --: Present but below the detection limit
*: The visual area estimation of asbestos content in the final residue.
**: The calculated total percent asbestos in the sample as received.

Analyst(s) Name/Date: Kunal Parikh 9/12/2019

A190606D

SRS Chain of Custody / Laboratory Analysis Request

Requested TAT: ☐ Rush ☐ Routine ☒ Other 5 Day from rec.

Activity Code: 05VSSTMOSO

Samples received in good condition? ☐ Y ☐ N

Laboratory

Lab Name	Bureau Veritas (Atlanta)
Address 1	3380 Chastain Medows Pkwy, Suite 300
Address	Kennesaw, GA 30144
POC	Alan Segrave / 800-252-9919

Sample Comments

Use positive stop for all homogenous groups. TEM is required only as indicated for organically bound samples or analyst may choose another sample from that ABC group that was positive via PLM. P.O. # will sent to Kelly Smith via Email for services related to this task.

Peer Reviewed / Self Check by

Name (Print): James Moore

Return Results / Electronic Report To

Name (CTF)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov/ (803) 952-5650
Name (STR)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov (803) 952-5650
Name (Req by)	Ken Padgett
Email / Phone	william03.padgett@srs.gov (803) 646-1831
Organization	SRNS / EC&ACP
Address	Savannah River Site Aiken, SC 29802

This Line Laboratory use ONLY	Laboratory ID#:	Results attached (date):	Results Pages (Total)

No	Field ID	Matrix	Sample Date / Time	Requested Analysis	Sample Media / Size	Time (min)	Vol / Area	Sample Comments
	CHCH190904-01A		09/04/2019	PLM	< 1 Gram	N/A	N/A	H01OB - Black/silver roof coating
	CHCH190904-01B		09/04/2019	PLM	< 1 Gram	N/A	N/A	H01OB - Black/silver roof coating
	CHCH190904-01C		09/04/2019	PLM/TEM	< 1 Gram	N/A	N/A	H01OB - Black/silver roof coating
	CHCH190904-02		09/04/2019	PLM	< 1 Gram	N/A	N/A	H02 - Flex connector
	CHCH190904-03		09/04/2019	PLM	< 1 Gram	N/A	N/A	H02 - Flex connector
	CHCH190904-04		09/04/2019	PLM	< 1 Gram	N/A	N/A	H02 - Flex connector

Relinquished by		
Name	Signature	Date and Time
Ken Padgett		9/4/19 1420
Kane Bice		9-4-19 1437
735-B Rm 401	735-B Rm 401	9-5-19 0650
Kane Bice		9-5-19 1100

Received by		
Name	Signature:	Date and Time
Kane Bice		9-4-19 1436
735-B Rm 401	735-B Rm 401	9-4-19 1437
Kane Bice		9-5-19 0650
C/S Shipping	C/S Shipping	9-5-19 1130

K. Smith K. Smith 9/6/19 100

Page 1 of 1

March 11, 2021

Kenny Barrineau
SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Building 730-4B, 2135
Aiken, SC 29808

Bureau Veritas Work Order No. A2103015

Reference Activity Code: OCHZDACEDS

Dear Kenny Barrineau:

Bureau Veritas North America, Inc. received 3 samples on March 01, 2021 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a sixty-day holding period, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,

Lejla Blagojevic
Manager
Electronic signature authorized through password protection

cc: Heath McGregor
Siobhan Kitchen

Bureau Veritas North America, Inc.

Industrial Hygiene Laboratory
3380 Chastain Meadows Parkway, Suite 300
Kennesaw, GA 30144

Main: (770) 499-7701
Fax: (770) 499-7511
www.bvlabs.com

CASE NARRATIVE

Date: *11-Mar-21*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: OCHZDACEDS

Work Order No A2103015

ANALYTICAL METHOD FOR ASBESTOS IN BULK SAMPLES USING POLARIZED LIGHT MICROSCOPY (PLM)

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected unless otherwise noted.

Use of EPA/600/R-93/116 satisfies applicable requirements of the USEPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Sample", EPA-600/M4-82-020, December 1982, published as Appendix E to Subpart E of 40CFR763. Bulk samples analyzed by New York State methods follow stratified point counting methods (198.1) or Method 198.6 for PLM non-friable organically bound materials (NYSDOH Lab Code –11645). Percentages are visual estimations of asbestos >10:1 aspect ratio. The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed. NESHAP requires point counting of a bulk sample when the result is <10% by a method other than point counting. EPA, however states that if 3 mounts of the sample are analyzed and the asbestos percentage is <10% by visual estimation, the client may elect to assume the amount to be greater than 1% or require verification by point counting. If the result by point counting is different than the result obtained by visual estimation, the point count result will be used. Sample friability or non-friability noted on the report is a requirement for the State of California and refers only to the condition of the sample under macroscopic examination. It does not imply friability or non-friability for the sample as collected or observed in the field as determined by the person collecting the sample. The Kennesaw, Georgia lab is accredited by NVLAP –Lab Code 101125-0.

(a)Polarized- light microscopy is not consistently reliable in detecting asbestos in floor coverings, similar non-friable organically bound materials, soil and vermiculite. Quantitative 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. When analysis of such materials by PLM yields results negative for the presence of asbestos, Bureau Veritas recommends utilizing quantitative transmission electron microscopy (TEM). For more information, contact the laboratory.

References

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Project: Activity Code: OCHZDACEDS
Work Order No A2103015

McCrone, Walter C. 1980. The Asbestos Particle Atlas. Ann Arbor, MI: Ann Arbor Science Publishers, Inc.

United States Environmental Protection Agency. Environmental Monitoring Systems Laboratory. 1982. Interim Method for the Determination of Asbestos in Bulk Insulation Samples. EPA-600/M4-82-020. Washington: GPO, December.

United States Environmental Protection Agency. Method for the Determination of Asbestos in Bulk Building Materials. EPA-600/R-93/116, July 1993 (PLM)

Fed. Reg. Vol. 55, No.224, 11/20/90, p.48415 (NESHAP)
EPA Memorandum 5/8/1991 –NESHAP Clarifications

NYSDOH Methods 198.1/198.6

QUANTITATIVE ANALYSIS OF NON-FRIABLE ORGANICALLY BOUND BULK SAMPLES FOR ASBESTOS USING TRANSMISSION ELECTRON MICROSCOPY (TEM) (NY ELAP 198.4)

Approximately 100-500 mg of sample is weighed in a tared crucible. The sample is placed in a muffle furnace at a temperature of 480°C for at least 5 hours, or until the weight has stabilized. The sample is allowed to cool to room temperature and immediately weighed to calculate percent of organic loss.

The sample is placed in a tared crucible and ground to disaggregate the residue. Approximately 1 ml of non-dilute HCL acid is slowly added to remove calcite and dolomite from the remaining sample residue. After 15 minutes, the sample is immediately diluted with ultra-pure water. The sample is then dispersed in 50 ml of ultra-pure water and filtered onto a pre-weighed 47 mm, 0.4um pore size polycarbonate filter. The filter is dried on a slide warmer and weighed again. If the residue mass is <1% of the subsample's original mass, the analysis is terminated and the result is reported as non-ACM.

A one cm2 portion of the filter is cut and placed in a clean silica crucible. Approximately 5ml of ethanol are added and ultra-sonicated for 1 minute. Approximately 3 µl of the suspension is drop-mounted onto a carbon-coated TEM grid and allowed to dry.

Grids are examined at 3000X for suitability of the prep where >50% intact filter coverage and <25% particle loading is determined. Large bundles of asbestos may be noted during this phase of the analysis. At 10,000X to 20,000X, positive confirmation and further visual estimation of asbestos is

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Project: Activity Code: OCHZDACEDS
Work Order No A2103015

determined. If there are no other particles on the filter, then the asbestos observed is 100% visual estimation. Otherwise, the estimate includes all sizes relative to other particles or fibers. Morphology, selected area electron diffraction, and energy-dispersive x-ray spectroscopy are used to confirm asbestos fibers. From TEM examination as outlined above, the final visual area estimation is made of asbestos on the TEM grids and the percent asbestos in the residue is then extrapolated using gravimetric records to identify the percent asbestos in the total sample (NYS DOH Lab Code 11645).

SPECIAL NOTES

1)Material types analyzed by 198.1 method: a) Friable materials other than SM-V (Surfacing Material) with <10% vermiculite; b) Surfacing Material (SM) without vermiculite; and c) ceiling tile without cellulose.

2)Material types analyzed by 198.6/198.4 method: NOB material (other than SM-V) with <10% vermiculite; b) any material other than SM-V with >10% vermiculite; and c) Ceiling Tiles with cellulose.

3)Material types analyzed by 198.8 method: Surfacing Material containing vermiculite (SM-V).

REFERENCES

Chatfield Method for Quantitative Analysis of Bulk Samples for Asbestos Using Transmission Electron Microscopy (unpublished).

New York ELAP Method 198.4, May 2016.

NOTE: Some of the samples may have contained inseparable layers which were combined during preparation.

Note: The attached chain-of-custody form shows the sample data that was provided by the client.

ANALYTICAL RESULTS

Date: *11-Mar-21*

CLIENT:	SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC	**Sample Type:**	Bulk
Work Order No.:	A2103015	**Date Received:**	3/1/2021
Client Reference:	Activity Code: OCHZDACEDS	**Report Date:**	11-Mar-21
Method Reference:	EPA-600/M4-82-020/EPA/600/R-93/116/NYELAP 198.1		

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
001A	***CHCH210210-01A***	SH	02/10/2021	03/04/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/Tan Mastic on Foam	None Detected		Non-Detected		Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
002A	***CHCH210210-01B***	SH	02/10/2021	03/04/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/Tan Mastic on Foam	None Detected		Non-Detected		Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
003A	***CHCH210210-01C***	SH	02/10/2021	03/04/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black/Tan Mastic on Foam	None Detected		Non-Detected		Binder/Filler

Laboratory Limits

Laboratory

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 22.23
1-10	100	+/- 7.41
Trace	100	+/- 1.482

Susan Hannigan (SH)

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 26.676
1-10	100	+/- 5.928
Trace	100	+/- 1.482

The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed.

Analyst(s) Name/Date: _____ 3/11/2021

ANALYTICAL RESULTS

Client: **SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC**

Client Reference No.: **Activity Code: OCHZDACEDS**

Work Order No.: **A2103015** **Date:** *11-Mar-21*

Analytical Method: NYELAP METHOD 198.4 by TEM
Sample Type: Bulk
Reporting Limit (% by Weight): 0.1

Date Received: 3/1/2021 1:59:18 PM
Report Date: 3/11/2021 12:28:37 PM
Grid Box Identification: 03-04-21C-1

Lab Sample No.	Client Sample Identification	Date Sampled	Analysis Date	Analyst	Sample Description (Morphology)	Asbestos Identification	(%)*	Total Asbestos (%)**
A2103015-001A	CHCH210210-01A	02/10/21 @12:00 am	03/11/21 @9:30 am	NG	Black Mastic on Foam	None Detected	--	< 0.1

TEM Microscope Documentation

Instrument	*Magnification	Accelerating Voltage	Calibration Date
TEM 2/D686	15003x	100 KeV	3/5/2021

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X

<: Result is less than the indicated limit of detection. --: Present but below the detection limit
*: The visual area estimation of asbestos content in the final residue.
**: The calculated total percent asbestos in the sample as received.

Analyst(s) Name/Date: N. Gapra 3/11/2021

A2103015

SRS Chain of Custody / Laboratory Analysis Request

Requested TAT: ☐ Rush ☐ Routine ☒ Other 5 Day from rec. | Activity Code 0CHZDACEDS

Samples received in good condition? ☐ Y ☐ N

Laboratory

Lab Name	Bureau Veritas (Atlanta)
Address 1	3380 Chastain Meadows Pkwy, Suite 300
Address	Kennesaw, GA 30144
POC	Alan Segrave / 800-252-9919

Sample Comments

Use positive stop for all homogenous groups. TEM is required only as indicated for organically bound samples or analyst may choose another sample from that ABC group that was positive via PLM. P.O. # will sent to Kelly Smith via Email for services related to this task.

Peer Reviewed / Self Check by

Name (Print) M. Arter

Return Results / Electronic Report To

Name (CTF)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov/ (803) 952-5650
Name (STR)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov (803) 952-5650
Name (Req by)	Heath McGregor
Email / Phone	heath.mcgregor@srs.gov (803) 952-6029
Organization	SRNS / EC&ACP
Address	Savannah River Site Aiken, SC 29802

This Line Laboratory use ONLY	Laboratory ID#:	Results attached (date):	Results Pages (Total)

No	Field ID	Matrix	Sample Date / Time	Requested Analysis	Sample Media / Size	Time (min)	Vol / Area	Sample Comments
	CHCH210210-01A		2/10/21	PLM/TEM	< 1 Gram	N/A	N/A	H01OB- Black colored mastic (poly)
	CHCH210210-01B		2/10/21	PLM	< 1 Gram	N/A	N/A	H01OB- Black colored mastic (poly)
	CHCH210210-01C		2/10/21	PLM	< 1 Gram	N/A	N/A	H01OB- Black colored mastic (poly)

Relinquished by		
Name	Signature	Date and Time
Heath McGregor		2/23/21 1220
735 B RM. 401	735-B RM. 401	2/23/21 1520
J. Durden		2/25/21 1525
735-B Rm 401	735-B Rm 401	2-25-21 0645
Kane Bice		2-25-21 0900

Received by		
Name	Signature:	Date and Time
735-B RM 401	735-B - RM 401	2/23/21
J. Durden		2/23/21 1520
735-B RM. 401	735-B RM. 401	2/23/21 1525
Kane Bice		2-25-21 0645
C/S Shipping	C/S Shipping	2-25-21 0900

Page 1 of 1

K. Smith 3/1/2021

March 17, 2021

Kenny Barrineau
SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Building 730-4B, 2135
Aiken, SC 29808

Bureau Veritas Work Order No. A2103066

Reference Activity Code: 0CHZDACEDS

Dear Kenny Barrineau:

Bureau Veritas North America, Inc. received 6 samples on March 08, 2021 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a sixty-day holding period, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,

Lejla Blagojevic
Manager
Electronic signature authorized through password protection

cc: Heath McGregor
Siobhan Kitchen

Bureau Veritas North America, Inc.

Industrial Hygiene Laboratory
3380 Chastain Meadows Parkway, Suite 300
Kennesaw, GA 30144

Main: (770) 499-7701
Fax: (770) 499-7511
www.bvlabs.com

CASE NARRATIVE

Date: *17-Mar-21*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: 0CHZDACEDS

Work Order No A2103066

ANALYTICAL METHOD FOR ASBESTOS IN BULK SAMPLES USING POLARIZED LIGHT MICROSCOPY (PLM)

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected unless otherwise noted.

Use of EPA/600/R-93/116 satisfies applicable requirements of the USEPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Sample", EPA-600/M4-82-020, December 1982, published as Appendix E to Subpart E of 40CFR763. Bulk samples analyzed by New York State methods follow stratified point counting methods (198.1) or Method 198.6 for PLM non-friable organically bound materials (NYSDOH Lab Code –11645). Percentages are visual estimations of asbestos >3:1 aspect ratio. The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed. NESHAP requires point counting of a bulk sample when the result is <10% by a method other than point counting. EPA, however states that if 3 mounts of the sample are analyzed and the asbestos percentage is <10% by visual estimation, the client may elect to assume the amount to be greater than 1% or require verification by point counting. If the result by point counting is different than the result obtained by visual estimation, the point count result will be used. Sample friability or non-friability noted on the report is a requirement for the State of California and refers only to the condition of the sample under macroscopic examination. It does not imply friability or non-friability for the sample as collected or observed in the field as determined by the person collecting the sample. The Kennesaw, Georgia lab is accredited by NVLAP –Lab Code 101125-0.

(a)Polarized- light microscopy is not consistently reliable in detecting asbestos in floor coverings, similar non-friable organically bound materials, soil and vermiculite. Quantitative 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. When analysis of such materials by PLM yields results negative for the presence of asbestos, Bureau Veritas recommends utilizing quantitative transmission electron microscopy (TEM). For more information, contact the laboratory.

References

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Project: Activity Code: 0CHZDACEDS

Work Order No A2103066

McCrone, Walter C. 1980. The Asbestos Particle Atlas. Ann Arbor, MI: Ann Arbor Science Publishers, Inc.

United States Environmental Protection Agency. Environmental Monitoring Systems Laboratory. 1982. Interim Method for the Determination of Asbestos in Bulk Insulation Samples. EPA-600/M4-82-020. Washington: GPO, December.

United States Environmental Protection Agency. Method for the Determination of Asbestos in Bulk Building Materials. EPA-600/R-93/116, July 1993 (PLM)

Fed. Reg. Vol. 55, No.224, 11/20/90, p.48415 (NESHAP)
EPA Memorandum 5/8/1991 –NESHAP Clarifications

NYSDOH Methods 198.1/198.6

QUANTITATIVE ANALYSIS OF NON-FRIABLE ORGANICALLY BOUND BULK SAMPLES FOR ASBESTOS USING TRANSMISSION ELECTRON MICROSCOPY (TEM) (NY ELAP 198.4)

Approximately 100-500 mg of sample is weighed in a tared crucible. The sample is placed in a muffle furnace at a temperature of 480°C for at least 5 hours, or until the weight has stabilized. The sample is allowed to cool to room temperature and immediately weighed to calculate percent of organic loss.

The sample is placed in a tared crucible and ground to disaggregate the residue. Approximately 1 ml of non-dilute HCL acid is slowly added to remove calcite and dolomite from the remaining sample residue. After 15 minutes, the sample is immediately diluted with ultra-pure water. The sample is then dispersed in 50 ml of ultra-pure water and filtered onto a pre-weighed 47 mm, 0.4um pore size polycarbonate filter. The filter is dried on a slide warmer and weighed again. If the residue mass is <1% of the subsample's original mass, the analysis is terminated and the result is reported as non-ACM.

A one cm2 portion of the filter is cut and placed in a clean silica crucible. Approximately 5ml of ethanol are added and ultra-sonicated for 1 minute. Approximately 3 µl of the suspension is drop-mounted onto a carbon-coated TEM grid and allowed to dry.

Grids are examined at 3000X for suitability of the prep where >50% intact filter coverage and <25% particle loading is determined. Large bundles of asbestos may be noted during this phase of the analysis. At 10,000X to 20,000X, positive confirmation and further visual estimation of asbestos is determined. If there are no other particles on the filter, then the asbestos observed is 100% visual estimation. Otherwise, the estimate includes all sizes relative to other particles or fibers. Morphology, selected area

electron diffraction, and energy-dispersive x-ray spectroscopy are used to confirm asbestos fibers. From TEM examination as outlined above, the final visual area estimation is made of asbestos on the TEM grids and the percent asbestos in the residue is then extrapolated using gravimetric records to identify the percent asbestos in the total sample (NYS DOH Lab Code 11645).

SPECIAL NOTES

1)Material types analyzed by 198.1 method: a) Friable materials other than SM-V (Surfacing Material) with <10% vermiculite; b) Surfacing Material (SM) without vermiculite; and c) ceiling tile without cellulose.

2)Material types analyzed by 198.6/198.4 method: NOB material (other than SM-V) with <10% vermiculite; b) any material other than SM-V with >10% vermiculite; and c) Ceiling Tiles with cellulose.

3)Material types analyzed by 198.8 method: Surfacing Material containing vermiculite (SM-V).

REFERENCES

Chatfield Method for Quantitative Analysis of Bulk Samples for Asbestos Using Transmission Electron Microscopy (unpublished).

New York ELAP Method 198.4, May 2016.

NOTE: Some of the samples may have contained inseparable layers which were combined during preparation.

Note: The attached chain-of-custody form shows the sample data that was provided by the client.

ANALYTICAL RESULTS

Date: *17-Mar-21*

CLIENT: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC
Sample Type: Bulk
Work Order No.: A2103066
Date Received: 3/8/2021
Client Reference: Activity Code: 0CHZDACEDS
Report Date: 17-Mar-21
Method Reference: EPA-600/M4-82-020/EPA/600/R-93/116/NYELAP 198.1

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
001A	CHCH210225-01A	HA	02/25/2021	03/10/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black Belt	None Detected		Synthetic fiber	50%	Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
002A	CHCH210225-01B	HA	02/25/2021	03/10/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black Belt	None Detected		Synthetic fiber	35%	Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
003A	CHCH210225-01C	HA	02/25/2021	03/10/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous Black Belt	None Detected		Synthetic fiber	25%	Binder/Filler

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
004A	CHCH210225-02A	HA	02/25/2021	03/10/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous White/Gray Sealant	None Detected		Non-Detected		Binder/Filler Paint

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
005A	CHCH210225-02B	HA	02/25/2021	03/10/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Non-homogeneous White/Gray Sealant	None Detected		Non-Detected		Binder/Filler Paint

Lab ID	Client Sample ID	Analyst	Date Sampled	Date Analyzed
006A	CHCH210225-02C	HA	02/25/2021	03/10/2021

Layer	POB	Sample Morphology	Asbestos	%	Other Fibers	%	Particulate
(1)	100	Homogeneous Gray Sealant	None Detected		Non-Detected		Binder/Filler

The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed.

Analyst(s) Name/Date: _____ 3/17/2021

Laboratory Limits

Heather Alley (HA)

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 26.676
1-10	100	+/- 5.928
Trace	100	+/- 1.482

Laboratory

Range	R Limit	Quartile Limit
0.1-1	100	+/- 1.482
10-100	100	+/- 22.23
1-10	100	+/- 7.41
Trace	100	+/- 1.482

The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as trace, "<1%". "None Detected" indicates that no asbestos fibers were observed.

Analyst(s) Name/Date: H Alley 3/17/2021

ANALYTICAL RESULTS

Client: SAVANNAH RIVER NUCLEAR SOLUTIONS, LLC

Client Reference No.: Activity Code: 0CHZDACEDS

Work Order No.: A2103066 **Date:** *17-Mar-21*

Analytical Method: NYELAP METHOD 198.4 by TEM
Sample Type: Bulk
Reporting Limit (% by Weight): 0.1

Date Received: 3/8/2021 9:29:17 AM
Report Date: 3/17/2021 11:15:43 AM
Grid Box Identification: 03-11-21A-1

Lab Sample No.	Client Sample Identification	Date Sampled	Analysis Date	Analyst	Sample Description (Morphology)	Asbestos Identification	(%)*	Total Asbestos (%)**
A2103066-001A	CHCH210225-01A	02/25/21 @12:00 am	03/16/21 @5:42 pm	TM	Black Belt	None Detected	--	< 0.1
A2103066-004A	CHCH210225-02A	02/25/21 @12:00 am	03/16/21 @5:42 pm	TM	White/Gray Sealant	None Detected	--	< 0.1

TEM Microscope Documentation

Instrument	*Magnification	Accelerating Voltage	Calibration Date
TEM 2/D686	15003x	100 KeV	3/5/2021

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X

<: Result is less than the indicated limit of detection. --: Present but below the detection limit
*: The visual area estimation of asbestos content in the final residue.
**: The calculated total percent asbestos in the sample as received.

Analyst(s) Name/Date: Bhimaraj Mandal 3/17/2021

A2103066

SRS Chain of Custody / Laboratory Analysis Request

Requested TAT: ☐ Rush ☐ Routine ☒ Other 5 Day from rec.

Activity Code 0CHZDACEDS

Samples received in good condition? ☐ Y ☐ N

Laboratory

Lab Name	Bureau Veritas (Atlanta)
Address 1	3380 Chastain Medows Pkwy, Suite 300
Address	Kennesaw, GA 30144
POC	Alan Segrave / 800-252-9919

Sample Comments

Use positive stop for all homogenous groups. TEM is required only as indicated for organically bound samples or analyst may choose another sample from that ABC group that was positive via PLM. P.O. # will sent to Kelly Smith via Email for services related to this task.

Peer Reviewed / Self Check by

Name (Print) M. Autrey

Return Results / Electronic Report To

Name (CTF)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov/ (803) 952-5650
Name (STR)	Kenny Barrineau
Email / Phone	kenny.barrineau@srs.gov (803) 952-5650
Name (Req by)	Heath McGregor
Email / Phone	heath.mcgregor@srs.gov (803) 952-6029
Organization	SRNS / EC&ACP
Address	Savannah River Site Aiken, SC 29802

This Line Laboratory use ONLY	Laboratory ID#:	Results attached (date):	Results Pages (Total)

No	Field ID	Matrix	Sample Date / Time	Requested Analysis	Sample Media / Size	Time (min)	Vol / Area	Sample Comments
	CHCH210225-01A		2/25/21	PLM/TEM	< 1 Gram	N/A	N/A	H01OB- Black colored belt
	CHCH210225-01B		2/25/21	PLM	< 1 Gram	N/A	N/A	H01OB- Black colored belt
	CHCH210225-01C		2/25/21	PLM	< 1 Gram	N/A	N/A	H01OB- Black colored belt
	CHCH210225-02A		2/25/21	PLM/TEM	< 1 Gram	N/A	N/A	H02OB-Grey/white colored sealant
	CHCH210225-02B		2/25/21	PLM	< 1 Gram	N/A	N/A	H02OB-Grey/white colored sealant
	CHCH210225-02C		2/25/21	PLM	< 1 Gram	N/A	N/A	H02OB-Grey/white colored sealant

Relinquished by

Name	Signature	Date and Time
Heath McGregor		3/2/2021 0630
Hoac Bui		3-2-21 0645
735-B Rm 401	735-B Rm 401	3-4-21 0645
Hoac Bui		3-4-21 0900

Received by

Name	Signature:	Date and Time
Hoac Bui		3-2-21 0635
735-B Rm 401	735-B Rm 401	3-2-21 0645
Hoac Bui		3-4-21 0645
C/S Shipping	C/S Shipping	3-4-21 0930

K. Smith 3/8/2021

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