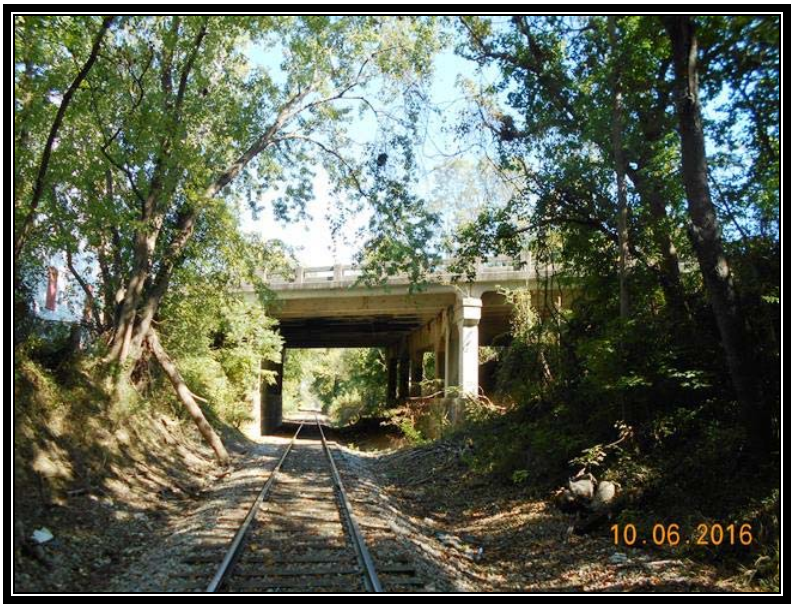
TENNESSEE DEPARTMENT OF TRANSPORTATION
ASBESTOS INSPECTION REPORT
SR-2 Bridge over CFW Railroad, LM 14.28
Bridge 16SR0020015 (16-SR002-14.28)
Manchester, Coffee County, Tennessee
TDOT Project No. 16003-4244-04, PIN 123696.00



Prepared by:

Amec Foster Wheeler
3800 Ezell Road, Suite 100
Nashville, Tennessee 37211

December 15, 2016
Amec Foster Wheeler Project No. 193416001

James K. Hampel, PE
Tennessee Asbestos Management Planner
Accreditation No: A-MP-46068-52865

Bradley K. Glisson, CHMM
Tennessee Asbestos Management Planner
Accreditation No: A-MP-50566-50812

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 3
1.1 TDOT Bridge Identification 3
1.2 General Description 3
2.0 INSPECTION 3
2.1 Personnel and Date(s) of Inspection 4
2.2 Visual Survey 4
2.3 Access to Bridge Components 5
2.3.1 Top of Bridge Deck 5
2.3.2 Underside of Bridge Deck 5
2.3.3 Beams and Diaphragms 5
2.3.4 Bridge Piers, Bents and Supports 6
2.3.5 Abutments 6
2.3.6 Side Rails and Curb 6
3.0 ANALYTICAL PROCEDURES 6
3.1 Asbestos Analysis Procedures 6
3.2 Laboratory Name and Accreditation 6
4.0 REGULATORY OVERVIEW 7
4.1 National Emission Standards for Hazardous Air Pollutants 7
4.1.1 Definitions 7
5.0 RESULTS 8
5.1 Results of Asbestos Bulk Sample Analysis 8
6.0 QUALIFICATIONS 9

Tables
Table 1 – Analytical Laboratory
Table 2 – Positive Bulk Asbestos Sample Results

Figures
Figure 1: Bridge Profile (Depicting Sample Locations)

Appendices
Appendix A: Asbestos Inspection Accreditations
Appendix B: Photographs
Appendix C: Asbestos Sample Laboratory Analysis Data
Appendix D: Site Specific Health & Safety Plan

1.0 INTRODUCTION

This report presents the findings of an inspection for asbestos containing materials (ACM) completed on the bridge identified in Section 1.1. The inspection was completed by Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) in accordance with the State of Tennessee, Department of Transportation Environmental Division, Social and Cultural Resources Office, Hazardous Materials Section requirements.

1.1 TDOT Bridge Identification

The bridge over Wells Creek is identified in the TDOT Project System/Bridge Management System as:

TDOT PE Number: 16003-4244-04
TDOT PIN Number: 123696.00
Bridge Inventory Number: Bridge 16SR0020015 (16-SR002-14.28)
State Route (SR) Number: SR-2
Log Mile (LM) Number: 14.28

1.2 General Description

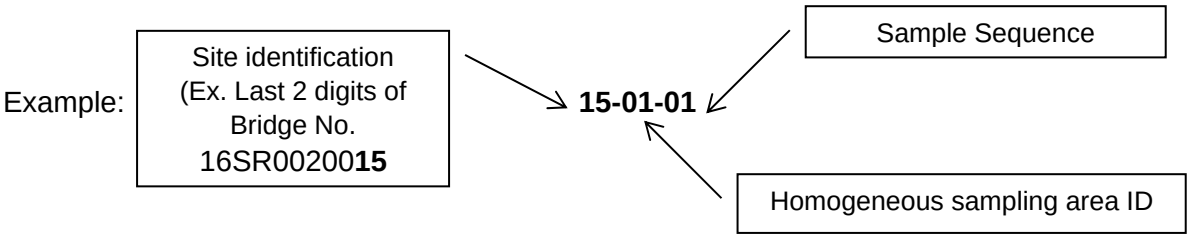
Bridge 16SR0020015 (16-SR002-14.28) SR-2 Bridge over CFW Railroad, is a four-lane bridge that crosses over the CFW track at Log Mile 14.28 in the City of Manchester, Coffee County, Tennessee. The bridge has 4 spans with a total length of 156 feet. The bridge was constructed in 1940, widened in 1956, and rehabilitated in 1997. The substructure consists of a 3 concrete pier bents, and two abutments. The bridge superstructure consists of cast in place deck and girders. The cast in place deck has an asphaltic concrete wearing surface between the sidewalks along both sides. The railing is post and rail construction. The bridge is scheduled for repair.

2.0 INSPECTION

The identification of ACM is performed by collecting bulk samples of suspect materials and having those samples analyzed by a laboratory. Asbestos-containing materials (ACM) are those materials found to contain greater than 1% asbestos by polarized light microscopy (PLM).

Bulk sampling is a procedure in which representative homogeneous sampling areas in a structure are identified and then sampled. A homogeneous sampling area is defined as an area that contains material of the same type (uniform in color and texture) and is applied during the same general time period. Once the homogeneous areas (HAs) are identified, bulk samples of suspect materials are obtained at the discretion of our inspectors, based on site conditions and past experience.

For asbestos samples collected during the survey, a unique identification is assigned that identifies the homogeneous sampling area or bridge location and a sampling sequence number for each sample collected.



Samples were collected by carefully removing small portions of the suspect material with a clean, sharp knife or other hand tool suitable for the material being sampled. Each sample was placed in a labeled plastic container immediately after collection. Sample containers were then placed in a large re-sealable plastic bag for transportation to the laboratory. The sampling instrument was wiped with a clean moist cloth to decontaminate the tool and minimize the potential release of asbestos fibers or cross-contamination of subsequent samples. Data pertinent to each sample (e.g., date, sample number, material description, and material category) was recorded on a field data sheet.

The survey was limited to an evaluation and confirmation of the presence of accessible asbestos-containing materials for the bridge. The survey did not include assessments for other regulated building materials such as lead paint and did not include destructive sampling to identify the potential presence of concealed ACMs.

2.1 Personnel and Date(s) of Inspection

The sampling and field activities were performed on 6th of October 2016, by James K. Hampel, P.E., an accredited State of Tennessee Asbestos Inspector/Management Planner, and Nicholas Smith, an accredited State of Tennessee Asbestos Inspector. A copy of the inspectors' accreditation and Amec Foster Wheeler's current accreditation from the State of Tennessee is included in **Appendix A**.

No assistance by the TDOT Bridge Maintenance Department was provided for mobilization, traffic control or access to this bridge.

2.2 Visual Survey

Amec Foster Wheeler's survey began with a walk-through and visual survey of the structure at this site. The visual survey consisted of:

- sketching the structure, photographing, and/or verifying the plans provided

- locating and identifying homogeneous areas of suspect materials that may contain asbestos minerals
- determining applicable sampling locations

2.3 Access to Bridge Components

Individual bridge components were accessed as described in the following subsections. Amec Foster Wheeler collected bulk samples of suspect materials in a random method with a focus on materials appearing homogeneous with like color and composition. Metal, fiberglass, and wood materials are not considered as suspect ACM and were not sampled.

A total of 40 samples, from eleven (11) HAs, were collected on Thursday the 6th of October, 2016, and submitted for laboratory analysis upon return to the office. **Figure 1** is a side view or profile of the bridge with representative sample locations noted. Typical photographs of the bridge and various sampling locations are presented in **Appendix B**, and Chain-of-Custody forms and laboratory analytical data sheets are included in **Appendix C**. In addition, Amec Foster Wheeler prepared a site specific Health & Safety Plan for the project, which is included in **Appendix D**.

2.3.1 Top of Bridge Deck

The bridge deck was traversed on foot for the inspection and sampling. The bridge deck and sidewalk appeared to have been placed at the same time. The roadway surface material was asphaltic concrete over the cast in place concrete deck so concrete samples were collected from the sidewalk (HA-03). Striping samples were collected as HA-04.

2.3.2 Underside of Bridge Deck

The underside of both the original bridge deck and widened sections were cast in place and readily accessible at the abutments or the bents by ladder. The deck and beams appeared to have been placed at one time. The original deck was sampled as HA-11, and the expanded deck was sampled as HA-09. Scuppers were only visible from the underside of the deck. Scuppers were sampled as HA-10.

2.3.3 Beams and Diaphragms

Bridge beams and diaphragms appear to have been cast with the concrete deck. Beams were included in HAs 09 & 11. Black expansion material under diaphragms and around abutments was sampled as HA-06. In the SW corner of the bridge under the outside beams a thin Transite pad was observed. The thin bearing pads from under the beam was sampled as HA-05.The joint is present in the other corners, but the Transite was not present on the surface.

2.3.4 Bridge Piers, Bents and Supports

The bridge had three concrete pier bents. The concrete of the bents was accessed from the ground and by ladder. The piers were sampled as HA-08. The pier caps were sampled as substructure concrete (HA-07).

2.3.5 Abutments

The abutments on both ends of the bridge were readily accessible from the ground. The beam seats, diaphragms, wings, and abutment concrete was grouped as substructure concrete and included in HA-07.

2.3.6 Side Rails and Curb

The side rails were post and rail construction. Concrete from the rails and posts were sampled as HA-02. On the ends of the rails in the post sockets builders felt is present as a bond break. The felt was sampled as HA-01.

3.0 ANALYTICAL PROCEDURES

3.1 Asbestos Analysis Procedures

The bulk samples are analyzed in the laboratory using Polarized Light Microscopy (PLM) coupled with dispersion staining (EPA Method 600/R-93/116). PLM is an analytical method for asbestos identification, which identifies the specific asbestos minerals by their unique optical properties. The optical properties are a result of the mineral's chemical composition, physical atomic structure, and visual morphology. This is the U.S. Environmental Protection Agency (EPA) recommended method of analysis for asbestos identification in bulk samples.

In most instances, samples from each homogeneous area are analyzed on a “first positive stop” basis. “First positive stop” means that if one sample from a homogeneous area of material is found to contain greater than 1% asbestos, the remaining samples from that homogeneous area are not analyzed and the material is assumed to contain asbestos. Coatings and samples similar in appearance having different results, it is often beneficial to analyze the remainder of the samples to clarify the results and/or explore the possibility of different materials.

In addition, samples which contain multiple layers, or that have associated mastic or adhesive backing, are analyzed as two or more separate samples. Samples that are identified to contain 1% or less asbestos minerals are generally point counted by the laboratory for confirmation.

3.2 Laboratory Name and Accreditation

The bulk samples collected for this inspection were analyzed by a laboratory that has received accreditation from the National Institute of Standards and Technology (NIST) under the National

Voluntary Laboratory Accreditation Program (NVLAP). The name and accreditation number of the analytical laboratory that analyzed the samples for this inspection is indicated below in Table 1:

Table 1: Analytical Laboratory

Laboratory	**Amec Foster Wheeler, Atlanta**
NVLAP Number	**101066-0**

4.0 REGULATORY OVERVIEW

4.1 National Emission Standards for Hazardous Air Pollutants

The EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations (40 CFR 61, Subpart B) requires that all regulated asbestos-containing materials (RACM) be properly removed prior to any renovation or demolition activities that will disturb them. These regulations define RACM as:

- Friable ACM.
- Category I non-friable ACM that has become friable.
- Category I non-friable ACM that will be or has been subject to sanding, grinding, cutting, or abrading.
- Category II non-friable ACM that has a high probability of becoming, or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

4.1.1 Definitions

Significant definitions related to regulation of asbestos under NESHAP regulations include:

Friable asbestos-containing material (ACM), is defined by the Asbestos NESHAP, as any material containing more than one percent (1%) asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM), that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure (Sec. 61.141).

Non-friable ACM is any material containing more than one percent (1%) asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM), that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. EPA also defines two categories of non-friable ACM, Category I and Category II non-friable ACM, which are described as follows:

Category I non-friable ACM is any asbestos-containing packing, gasket, resilient floor covering or asphalt roofing product which contains more than one percent (1%) asbestos as determined using polarized light microscopy (PLM) according to the method specified in Appendix A, Subpart F, 40 CFR Part 763 (Sec. 61.141).

Category II non-friable ACM is any material, excluding Category I non-friable ACM, containing more than one percent (1%) asbestos as determined using polarized light microscopy according to the methods specified in Appendix A, Subpart F, 40 CFR Part 763 that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure (Sec.61.141).

"Regulated Asbestos-Containing Material" (RACM) is (a) friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

Friable materials are defined as those which can be crumbled, pulverized, or reduced to powder by hand pressure when dry. The NESHAP regulations also establish specific notification and control requirements for renovation and demolition work.

5.0 RESULTS

The results of the asbestos inspection are presented in the following section.

5.1 Results of Asbestos Bulk Sample Analysis

A total of 40 samples were collected from the bridge. Multiple samples of each homogeneous material were collected in accordance with State of Tennessee, Department of Transportation Environmental Division, Social and Cultural Resources Office, Hazardous Materials Section requirements and delivered to the laboratory for visual observation and microscopic analysis. The samples were selected based on homogeneous areas of suspect materials, as described in Section 2.3. Positive samples collected from the bridge with regulated asbestos are included in Table 2 on the following page.

Table 2: Positive Bulk Asbestos Sample Results

Sample Number	Description	Type	Sample Location	Percent Asbestos	Estimated Quantity
15-05-01	Bearing Pad, Thin Transite	Misc./ NF	Abutment 1, Addition	30% Chrysotile (Point Count)	16 SF
15-10-01	Scupper, Transite Pipe	Misc./ NF	Underside Deck Span 1	10% Chrysotile, 2% Crocidolite	36

Since the positive samples were asbestos cement materials with greater than 10% asbestos, samples were analyzed with a positive stop protocol.

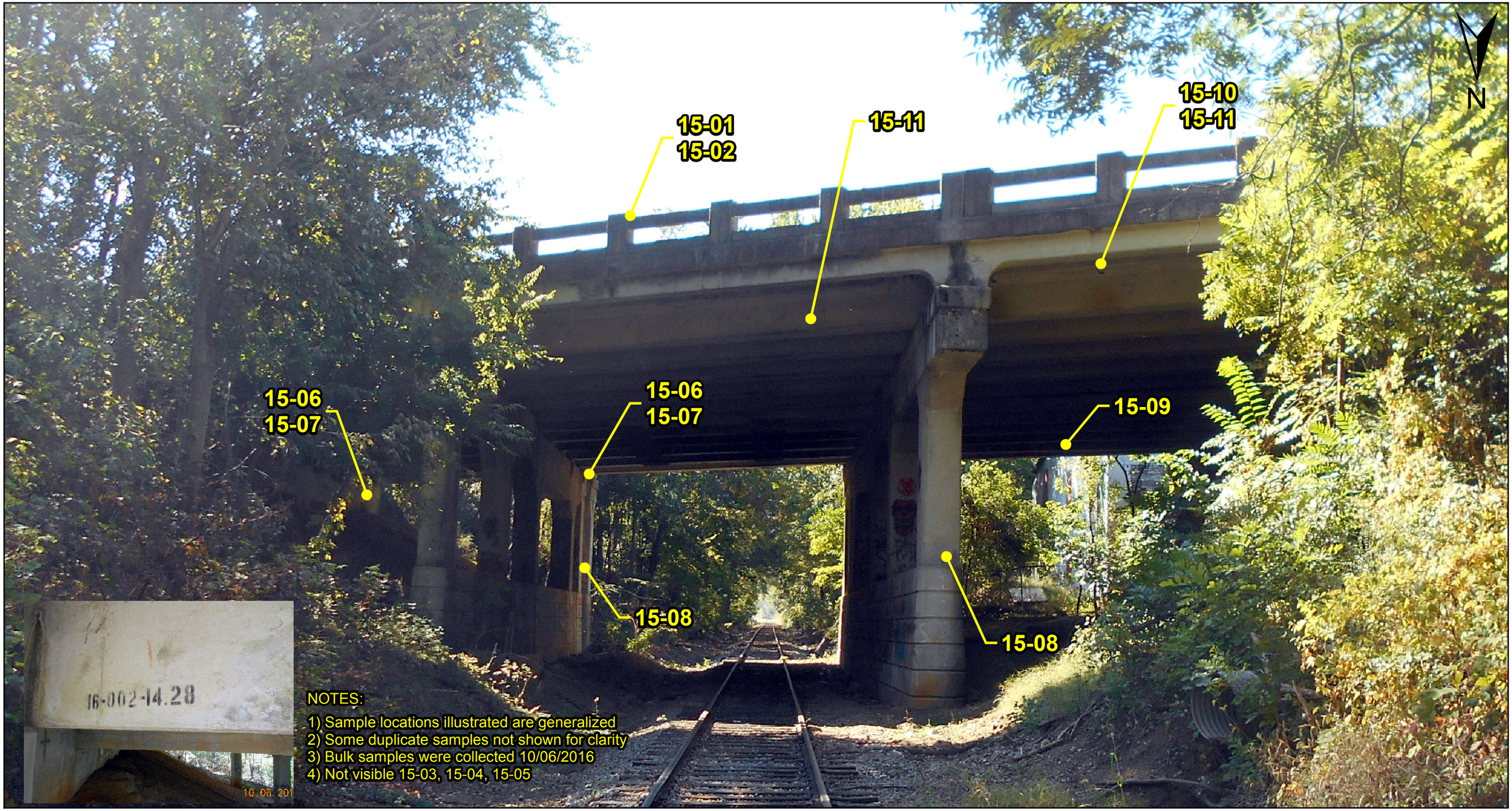
Sample 15-05-01 was identified in a joint in the SW corner of the bridge where the bridge was widened. The joint is visible in all four corners of the bridge, but material could only be sampled at that location. The material is assumed to be present in all four corners.

6.0 QUALIFICATIONS

The information presented herein is based on information obtained during the site visit(s) and from previous experience. If additional information becomes available which might impact our conclusions or recommendations, Amec Foster Wheeler requests the opportunity to review the information, reassess the potential concerns, and modify opinions, if warranted.

This report has been prepared on behalf of the Tennessee Department of Transportation. This document is not a Bid Document or a Contract Document. Use of this report or reliance upon information contained in this report by any other party implies an agreement by that party to the same terms and conditions under which service was provided. Furthermore, any party, other than our Client, relying on this document is cautioned that all conclusions made or decisions arrived at based on their review of this document are those solely of the third party, without warranty, guarantee or promise by the author. These findings are relevant to the dates of our services and should not be relied upon to represent conditions at substantially earlier or later dates.

Figure 1: Bridge Profile
(Depicting Sample Locations)



TN TDOT Department of Transportation

CLIENT:
TDOT - TENNESSEE DEPARTMENT OF TRANSPORTATION
TDOT Const. No. 16003-4244-04, PIN 123696.00

Amec Foster Wheeler Environment & Infrastructure, Inc.
3800 Ezell Road, Suite 100 Nashville, Tennessee 37211
Phone: 615-333-0630 Fax: 615-781-0655

amec foster wheeler

DRAWN BY: DGA
CHECKED BY: JKH
REVIEWED BY: BKG
SCALE: NOT TO SCALE

PROJECT:
Asbestos Survey
Bridge 16SR0020015 (16-SR002-14.28)
SR-2 Bridge over CFW Railroad, LM 14.28
Manchester, Coffee County, Tennessee

TITLE:
FIGURE 1
BRIDGE PROFILE
DEPICTING SAMPLE LOCATIONS

10/2016
PROJECT NO: 193416001
SHEET NO: 1 OF 1

APPENDIX A

Asbestos Inspection Accreditations

THE STATE OF TENNESSEE

Department of Environment and Conservation Division of Solid Waste Management
Toxic Substances Program
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 14th Floor Nashville TN 37243

By virtue of the authority vested by the Division of Solid Waste Management, the Company named below is hereby accreditted to offer and/or conduct Asbestos activities pursuant to Rule 1200-01-20:

AMEC Foster Wheeler Env. & Infrastructure, Inc.

3800 Ezell Road, Suite 100 Nashville TN, 37211

to conduct ASBESTOS ACTIVITIES in schools or public and commercial buildings in Tennessee. This firm is responsible for compliance with the applicable requirements of Rule 1200-01-20.

Discipline	Type	Accreditation Number	Effective Date	Expiration Date
Accreditation	Re-Accreditation	A-F-948-50259	June 01, 2016	June 30, 2017

Given under the Seal of the State of Tennessee in Nashville.

This **6th** Day of **June 2016**

Division of Solid Waste Management
Toxic Substance Program

CN-1324 **(Rev 6/13)** **RDA-3020**

THE STATE OF TENNESSEE

Department of Environment and Conservation
Division of Solid Waste Management
Toxic Substances Program

James K. Hampel

DOB	Sex	HGT	WGT
10-Jun-1949	M	6'0"	275

Discipline	Accreditation	Expiration
Management Planner	A-MP-46068-44081	Sep-30-2016
Project Designer	A-PD-46068-44082	Sep-30-2016

Asbestos Accreditation

THE STATE OF TENNESSEE

Department of Environment and Conservation
Division of Solid Waste Management
Toxic Substances Program

Nicholas J Smith

DOB	Sex	HGT	WGT
21-Apr-1982	M	6' 3"	180

Discipline	Accreditation	Expiration
Inspector	A-I-76036-45058	Oct-31-2016

Date Issued: 11/13/20

Re-Accreditation

Asbestos Accreditation

APPENDIX B

Photographs

Amec Foster Wheeler
Photographic Record

Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
South

Comments:
P-1 –Profile of Bridge. Bridge has 4 spans supported by 3 pier bents and abutments.

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
West

Comments:
P-2 – View of the top of the bridge and railings. Post & rail barriers and sidewalk on both sides of bridge. Traffic lanes topped with asphaltic concrete.

Amec Foster Wheeler
Photographic Record

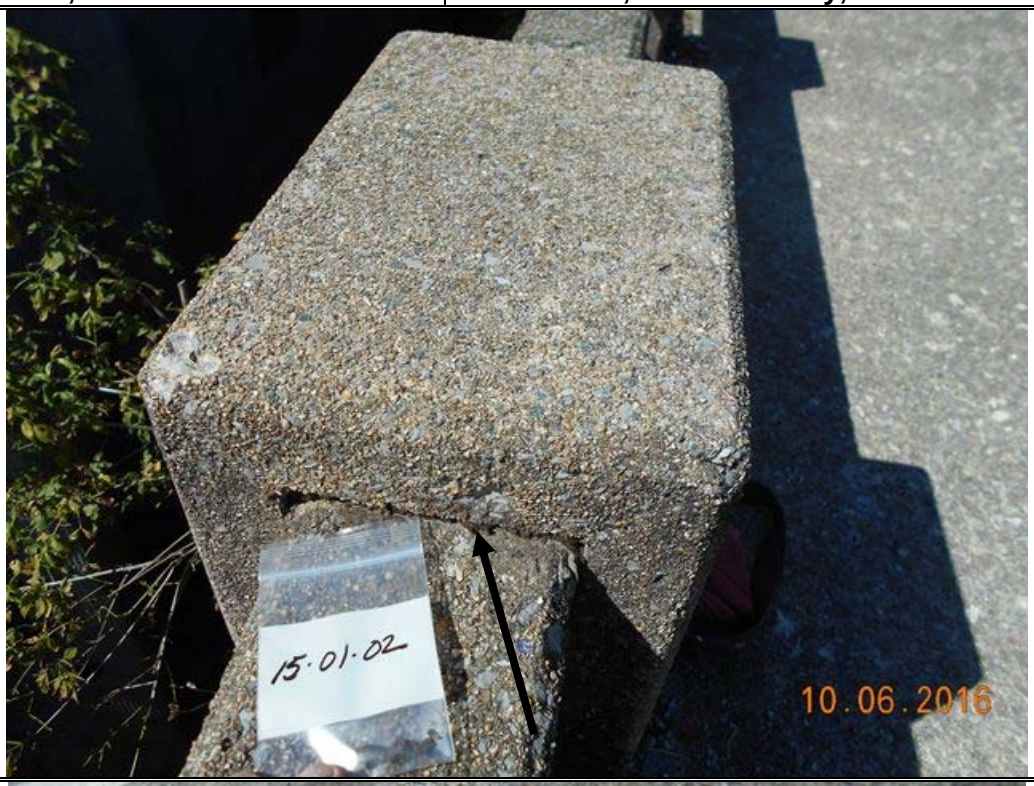
Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-3 – Post and Rail barrier concrete was sampled as HA-02. Builders felt from post socket was sampled as HA-01. Neither HA contained asbestos material.



Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-4- Concrete from sidewalk was sampled as HA-03. Sidewalk appeared to be same as deck. No asbestos was observed in the concrete samples by the analyst.

Amec Foster Wheeler
Photographic Record

Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
East

Comments:
P-5 – Roadway striping was was sampled as HA-04. Striping samples were not asbestos.

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-6 – A thin piece of Transite (HA-05) was found in the joint of the SW corner expansion beam seat. Material from slot was 30% asbestos. Material was not visible at other corners.

Amec Foster Wheeler
Photographic Record

Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-7 – Samples of black expansion material (HA-06) were collected from wing walls at abutments & under diaphragms. No asbestos fibers were observed in the samples.

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-8 – Substructure concrete was sampled as HA-07. No asbestos was found in concrete from the original structure or the expansion.

Amec Foster Wheeler
Photographic Record

Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer: Hampel/Smith

Date: 10/06/2016

Direction: West

Comments:
P-9 – Substructure concrete was collected from abutments and bent caps as HA-07. HA-07 included concrete of both ages. No asbestos was identified in the concrete samples.

Photographer: Hampel/Smith

Date: 10/06/2016

Direction: NA, Close-up

Comments:
P-10 – Concrete samples were collected from piers of both ages. No asbestos was identified in concrete pier samples from HA-08.

Amec Foster Wheeler
Photographic Record

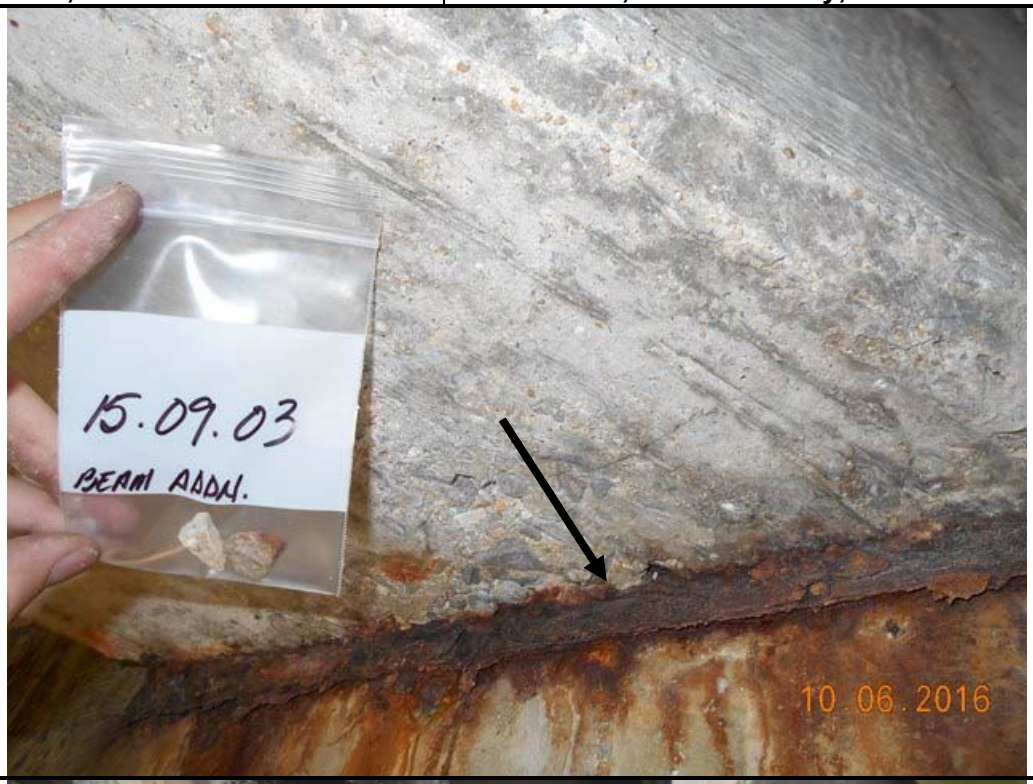
Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-11 –Samples from expanded concrete beams & underside of deck were collected as HA-09. No asbestos was identified in the concrete. Rusted steel bearing plates under beams were observed.



Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
East

Comments:
P-12 – Concrete of original beams and deck over railroad bed were stained with soot and had metal plates. Bridge expansion beams were still clean.

Amec Foster Wheeler
Photographic Record

Client: TDOT	**Project Number:** 193416001
Site Name: Bridge 16SR0020015 (16-SR002-14.28) **SR-2 Bridge over CFW Railroad, LM 14.28**	**Site Location:** **Manchester, Coffee County, Tennessee**

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

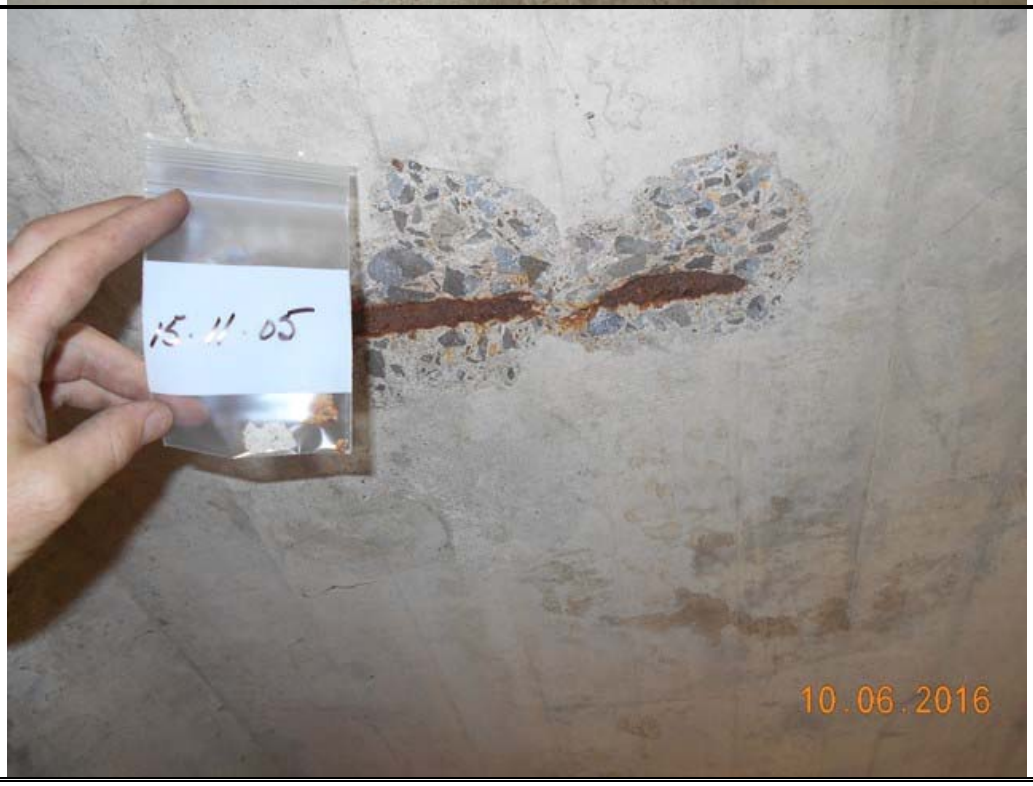
Comments:
P-13 –Samples from Transite scuppers visible only from underside of deck were collected. The ACM contained 12% asbestos.

Photographer:
Hampel/Smith

Date: 10/06/2016

Direction:
NA, Close-up

Comments:
P-14 – Original concrete beams and underside of deck were sampled as HA-11. No asbestos was detected in the concrete by the analyst.



APPENDIX C

Asbestos Sample Laboratory Analysis Data

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248491	Builders Felt from Joint Rail/Post, Span 1 15-01-01 HA01	None Detected-Felt
248492	Builders Felt from Joint Rail/Post, Span 2 15-01-02 HA01	None Detected-Felt
248493	Builders Felt from Joint Rail/Post, Span 4 15-01-03 HA01	None Detected-Felt
248494	Concrete Post Rail Barrier Rail, Span 1 15-02-01 HA02	None Detected-Concrete
248495	Concrete Post Rail Barrier Post, Span 2 15-02-02 HA02	None Detected-Concrete
248496	Concrete Post Rail Barrier Rail, Span 4 15-02-03 HA02	None Detected-Concrete

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248497	Top Deck/Sidewalk Span 1 15-03-01 HA03	None Detected-Concrete
248498	Top Deck/Sidewalk Span 2 15-03-02 HA03	None Detected-Concrete
248499	Top Deck/Sidewalk Span 4 15-03-03 HA03	None Detected-Concrete
248500	Pavement Striping Span 1, White 15-04-01 HA04	None Detected-Striping-White
248501	Pavement Striping Span 2, Yellow 15-04-02 HA04	None Detected-Striping-Yellow
248502	Pavement Striping Span 4, White 15-04-03 HA04	None Detected-Striping-White

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248503	Bearing Pads, Transite Thin Outside Top Abutment 1 Addition 15-05-01 HA05	30% Chrysotile-Bearing Pad
248504	Bearing Pads, Transite Thin Outside Top Abutment 1 Addition 15-05-02 HA05	Not Analyzed-Bearing Pad
248505	Black Expansion Board Abutment 1 at Wingwall 15-06-01 HA06	None Detected-Expansion Material
248506	Black Expansion Board Abutment 1 under Diaphragm 15-06-02 HA06	None Detected-Expansion Material
248507	Black Expansion Board Abutment 2 at Wingwall 15-06-03 HA06	None Detected-Expansion Material
248508	Substructure Concrete Abutment 1 Addition 15-07-01 HA07	None Detected-Concrete

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248509	Substructure Concrete Abutment 1 Addition 15-07-02 HA07	None Detected-Concrete
248510	Substructure Concrete Abutment 2 Addition 15-07-03 HA07	None Detected-Concrete
248511	Substructure Concrete Abutment 1 Original Structure 15-07-04 HA07	None Detected-Concrete
248512	Substructure Concrete Abutment 2 Original Structure 15-07-05 HA07	None Detected-Concrete
248513	Substructure Concrete Underside Deck Span 4 15-07-06 HA07	None Detected-Concrete
248514	Concrete Pier Bent 1, Addition 15-08-01 HA08	None Detected-Concrete

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248515	Concrete Pier Bent 2, Addition 15-08-02 HA08	None Detected-Concrete
248516	Concrete Pier Bent 3, Addition 15-08-03 HA08	None Detected-Concrete
248517	Concrete Pier Bent 1, Original 15-08-04 HA08	None Detected-Concrete
248518	Concrete Pier Bent 2, Original 15-08-05 HA08	None Detected-Concrete
248519	Concrete Pier Bent 3, Original 15-08-06 HA08	None Detected-Concrete
248520	Concrete Beam Span 1, Addition 15-09-01 HA09	None Detected-Concrete

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248521	Underside Deck Span 1, Addition 15-09-02 HA09	None Detected-Concrete
248522	Concrete Beam Span 2, Addition 15-09-03 HA09	None Detected-Concrete
248523	Scupper, Transite Pipe Span 1 W 15-10-01 HA10	10% Chrysotile-Cement Asbestos Pipe 2% Crocidolite-Cement Asbestos Pipe
248524	Scupper, Transite Pipe Span 1 E 15-10-02 HA10	Not Analyzed-Cement Asbestos Pipe
248525	Scupper, Transite Pipe Span 4 15-10-03 HA10	Not Analyzed-Cement Asbestos Pipe
248526	Concrete Beam, Original Span 1 15-11-01 HA11	None Detected-Concrete

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 10/14/2016, forty (40) bulk material samples were submitted by James Hampel for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
248527	Underside Deck, Original Span 1 15-11-02 HA11	None Detected-Concrete
248528	Concrete Beam, Original Span 2 15-11-03 HA11	None Detected-Concrete
248529	Concrete Beam, Original Span 4 15-11-04 HA11	None Detected-Concrete
248530	Underside Deck, Original Span 4 15-11-05 HA11	None Detected-Concrete

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. The EPA considers a material to be asbestos containing only if it contains more than one percent asbestos by Calibrated Visual Area Estimation (CVAE). EPA regulations also state that Regulated Asbestos Containing Materials (RACM) -- materials which are friable or may become friable -- be further analyzed by point counting when the results indicate less than ten percent asbestos by CVAE. Our laboratory utilizes CVAE on a routine basis and does not include point counting unless specifically requested. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be at the client's and recipient's sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Tennessee Department of Transportation	AMEC Job No. :	193416001-01
Project :	Coffee County SR-2 over CFW Railroad Bridge 15	Report Date :	10/14/2016
Client Project No.:	16003-4244-04	Sample Date :	10/6/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

STATEMENT OF LABORATORY ACCREDITATION

These samples were analyzed at the Atlanta Branch of Amec Foster Wheeler Environment & Infrastructure, Inc. in the Asbestos Laboratory at 2677 Buford Hwy, Atlanta, GA, 30324. The laboratory holds accreditation from the National Institute of Standards and Technology (formerly National Bureau of Standards) under the National Voluntary Laboratory Accreditation Program (NVLAP). This laboratory also is licensed and authorized to perform as an Asbestos Laboratory in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

The samples were analyzed by polarized light microscopy in general accordance with the procedures described in the Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116. The results of each bulk sample analysis relate only to the material tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Specific questions concerning bulk sample results shall be directed to the PLM Laboratory Manager.

Analyst : Tom D. Morrison

PLM Laboratory Manager : Tom D. Morrison

Approved Signatory : Tom D Morrison

NVLAP
LAB CODE 101066-0

LAB # 248491-248530

amec foster wheeler

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Highway, Atlanta, GA 30324

Bulk Sample Chain of Custody

Total # of Samples: 40

Project Name: WO# 001 TDOT Coffee County SR-2 over CFW Railroad BR 16SR0020015 **Date Collected:** 10/06/2016

Project No.: 19341600Ø1 **Phase:** 01 **Task:** **** **Date Results Needed By:** Standard

Client: Tennessee Department of Transportation Pin: 123696.00 **Client Project No.:** 16003-4244-04

Analyst's Department No.: 6142 **Special Instructions For Analyst:** Analyze First Positive Stop----------

Need Results Transmitted As Follows: ☐ Verbal ☐ By Fax ☒ By E-Mail ☐ By Overnight Delivery

Transmit Results To The Attention Of: james.hampel@amecfw.com

Sender's Signature: James K. Hampel **Date:** 10/10/2016

Samples Delivered to: AMEC FOSTER WHEELER-ATLANTA PLM LAB – 2677 Buford Highway – Atlanta, GA 30324

Note – unless otherwise requested in writing samples will be disposed of 90 days after the date of analysis.

Samples Received By: _____ **Date:** 10/12/16

Sample No.	HA No.	General Description of Material Sampled	Approximate Sample Location
15-01-01	01	Builders Felt from Joint	Rail/Post, Span 1
15-01-02	01	Builders Felt from Joint	Rail/Post, Span 2
15-01-03	01	Builders Felt from Joint	Rail/Post, Span 4
15-02-01	02	Concrete Post Rail Barrier	Rail, Span 1
15-02-02	02	Concrete Post Rail Barrier	Post, Span 2
15-02-03	02	Concrete Post Rail Barrier	Rail, Span 4
15-03-01	03	Top Deck/Sidewalk	Span 1
15-03-02	03	Top Deck/Sidewalk	Span 2
15-03-03	03	Top Deck/Sidewalk	Span 4
15-04-01	04	Pavement Striping	Span 1, White

(Use additional pages as necessary and securely attach to this sheet.)

TURN AROUND TIME

☐ PLM 24 Hour ☐ PLM 48 Hour ☒ PLM 3-7 Days

Sample No.	HA No.	General Description of Material Sampled	Approximate Sample Location
15-04-02	04	Pavement Striping	Span 2, Yellow
15-04-03	04	Pavement Striping	Span 4, White
15-05-01	05	Bearing Pads, Transite Thin	Outside Top Abutment 1 Addition
15-05-02	05	Bearing Pads, Transite Thin	Outside Top Abutment 1 Addition
15-06-01	06	Black Expansion Board	Abutment 1 at Wingwall
15-06-02	06	Black Expansion Board	Abutment 1 under Diaphragm
15-06-03	06	Black Expansion Board	Abutment 2 at Wingwall
15-07-01	07	Substructure Concrete	Abutment 1 Addition
15-07-02	07	Substructure Concrete	Abutment 1 Addition
15-07-03	07	Substructure Concrete	Abutment 2 Addition
15-07-04	07	Substructure Concrete	Abutment 1 Original Structure
15-07-05	07	Substructure Concrete	Abutment 2 Original Structure
15-07-06	07	Substructure Concrete	Underside Deck Span 4
15-08-01	08	Concrete Pier	Bent 1, Addition
15-08-02	08	Concrete Pier	Bent 2, Addition
15-08-03	08	Concrete Pier	Bent 3, Addition
15-08-04	08	Concrete Pier	Bent 1, Original
15-08-05	08	Concrete Pier	Bent 2, Original
15-08-06	08	Concrete Pier	Bent 3, Original
15-09-01	09	Concrete Beam	Span 1, Addition
15-09-02	09	Underside Deck	Span 1, Addition
15-09-03	09	Concrete Beam	Span 2, Addition
15-10-01	10	Scupper, Transite Pipe	Span 1 W
15-10-02	10	Scupper, Transite Pipe	Span 1 E

(Securely attach to page 1.)

Sample No.	HA No.	General Description of Material Sampled	Approximate Sample Location
15-10-03	10	Scupper, Transite Pipe	Span 4
15-11-01	11	Concrete Beam, Original	Span 1
15-11-02	11	Underside Deck, Original	Span 1
15-11-03	11	Concrete Beam, Original	Span 2
15-11-04	11	Concrete Beam, Original	Span 4
15-11-05	11	Underside Deck, Original	Span 4

APPENDIX D

Site Specific Health & Safety Plan

HEALTH AND SAFETY PLAN
Asbestos Survey
SR-2 Bridge over CFW Railroad, LM 14.28
Coffee County, Tennessee
TDOT Const. No. 16003-4244-04
TDOT PIN 123696.00

Prepared by:

Amec Foster Wheeler Environment and Infrastructure, Inc.
3800 Ezell Road, Suite 100
Nashville, Tennessee 37211

September 2016

AMECFW PROJECT NO. 193416001

Tennessee Department of Transportation
Asbestos Survey, SR-2 Bridge over CFW Railroad, LM 14.28
Coffee County, Tennessee
TDOT Const. No. 16003-4244-04, TDOT PIN 123696.00
September, 2016

The attached Document has been prepared for Tennessee Department of Transportation Hazardous Waste Contract, E1934. The base document has been submitted for review according to Company Policy and edited for this Work Order to be site specific.

Reviewed By:

James K. Hampel, PE
Associate, Asbestos Safety Board

Tobias N. Collins
Health and Safety Technician IV

AMECFW PROJECT NO. 193416001

Tennessee Department of Transportation
Asbestos Survey, SR-2 Bridge over CFW Railroad, LM 14.28
Coffee County, Tennessee
TDOT Const. No. 16003-4244-04, TDOT PIN 123696.00
September, 2016

Daily Safety Meeting Attendees

Name	Signature	Date	Company
Jim Hampel		10/6/2016	AMEC FW
Nick Smith		10/6/16	AMEC FW

AMECFW PROJECT NO. 193416001

Tennessee Department of Transportation
Asbestos Survey, SR-2 Bridge over CFW Railroad, LM 14.28
Coffee County, Tennessee
TDOT Const. No. 16003-4244-04, TDOT PIN 123696.00
September, 2016

EMERGENCY CONTACT LIST

IN THE EVENT OF AN ON-SITE EMERGENCY WHILE WORKING ON THIS PROJECT IMMEDIATELY CONTACT THE FOLLOWING IN ORDER:

1. FIRE, POLICE, OR AMBULANCE CALL **911**
2. AMECFW, MS. BERTISABEL CUSTER, **615-333-0630**
3. AMECFW, MR. BRAD GLISSON, **615-479-0941**
4. AMECFW, TOBIAS COLLINS, **615-305-6598**

IN CASE NUMBER 1 OR 2 ABOVE CAN NOT BE REACHED, CONTACT MR. EDWIN WATKINS WITH AMECFW AT **615-333-0630.**

amec foster wheeler

TABLE OF CONTENTS

SECTION **PAGE**

1.0 INTRODUCTION 1

2.0 POTENTIAL SAFETY HAZARDS 1
2.1 Physical Hazards 2
2.2 Chemical Hazards 3
2.3 Safety Precautions 4

3.0 PERSONNEL REQUIREMENTS 5
3.1 Incident Manager 5
3.2 Site Health and Safety Officer 5
3.3 Project Personnel 6

4.0 DESIGNATION OF THE LEVELS OF PROTECTION 7
4.1 Level D Personal Protection Equipment 7
4.2 Level C Personal Protection Equipment 8

5.0 DELINEATION OF THE WORK AREA 8

6.0 CONTROL PROCEDURES 8
6.1 Work Limitations 8
6.2 Traffic Control Plans 9
6.2.1 Performing Tasks in Traffic Areas 9
6.2.2 Performing Tasks in Roadways 9
6.2.3 Examples of Precautionary Measures/Controls 10
6.2.4 Examples of Traffic Control Devices 10
6.3 Decontamination Procedures 11
6.3.1 Personnel Decontamination 11
6.3.2 Equipment Decontamination 11
6.3.3 Level D Decontamination 11
6.3.4 Level C Decontamination 12
6.4 Disposal of Materials Generated During Field Work 12

7.0 TRAINING REQUIREMENTS FOR PERSONNEL 12

8.0 WEATHER RELATED HAZARDS 13
8.1 Heat Stress 13
8.2 Cold Stress 14

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

9.0 MEDICAL REQUIREMENTS 14
9.1 Health Monitoring 14
9.2 Site Specific Requirements 15

10.0 ON-SITE EMERGENCIES 15
10.1 Emergency Procedures 15
10.1.1 Emergency Situation 15
10.1.2 Project Telephone 16
10.1.3 Emergency Communications 16
10.1.4 Emergency Organizations 16
10.1.5 Emergency Evacuation 16
10.1.6 Emergency Equipment 17
10.2 Emergency Medical Care 17
10.2.1 Local Hospital 17
10.2.2 Medical Clinic 17
10.2.3 Emergency Drills 17

11.0 SUMMARY 17

APPENDICES

MATERIAL SAFETY DATA SHEETS ..... APPENDIX 1
AMECFW INCIDENT FLOW CHART ..... APPENDIX 2
MAP TO HOSPITAL ..... APPENDIX 3

1.0 INTRODUCTION

This document presents Amec Foster Wheeler Environment and Infrastructure, Inc. (AMECFW) Health and Safety Policies and Procedures for the year 2016 as they apply to asbestos sampling activities to be performed on the SR-2 Bridge over CFW Railroad in Manchester, Coffee County, Tennessee. An EPA AHERA accredited asbestos inspector will oversee the asbestos sampling activities.

TDOT Region 2 was not requested to provide access, or establish a safe work zone on the Route. AMEC will provide signage and ladders to access the asbestos samples on this project.

The Caney Fork & Western Railroad is a short line Railroad servicing industrial parks from Tullahoma, TN to McMinnville, TN. The railroad runs 3-4 days per week at a top speed of 10 miles per hour. The rail schedule for the week can be obtained from the Roadmaster Ryan Brown (Cell (931) 224-0393, or Office (931) 473-4910). At least 1 member of the crew shall have completed Roadway Worker Protection Contractor Safety.

The Health and Safety Policies and Procedures detailed herein shall be followed by on-site AMECFW personnel, contract personnel, or site visitors, and constitutes the project Health and Safety Plan. The Site Health and Safety Officer will review this plan with each person working at the project site, so that everyone will be familiar with this plan and the hazards of the work to be performed.

Hazardous conditions may arise in the work area during the field operations. For this reason, on-site AMECFW personnel must read this document and must be knowledgeable of the appropriate health and safety measures needed to assure a safe working environment.

2.0 POTENTIAL SAFETY HAZARDS

In order to promote the safety and well being of personnel conducting work at the project site, they shall be informed as to the potential hazards that may be encountered there. These hazards take two forms, the risk of physical injury associated with typical site activities, and the risk of chemical exposure from product or waste located at the project site.

The project site will be periodically reevaluated to determine if the level of risk has changed, based on information gathered during the assessment.

Equipment operators and support personal will remain vigilant of safety procedures. OSHA requires that fall protection be provided at elevations of four feet in general industry workplaces, five feet in shipyards, six feet in the construction industry and eight feet in long shoring operations. In addition, OSHA requires that fall protection be provided when working over dangerous equipment and machinery, regardless of the fall distance.

2.1 Physical Hazards

Physical hazards associated with performing the asbestos sampling activities may include the use of sharp hand tools and ladders. The physical hazards may be compounded by the restricted environment. Safe work practices include the following:

- **Equipment Safety Inspections**
  1. All equipment and vehicles shall be scheduled for a periodic safety inspection at a minimum of every three months (29 CFR 1926.550). The inspections shall be accomplished by trained mechanics and supervisory personnel. The inspections shall include but are not limited to all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, and controls, etc. Inspection schedules, the vehicle and equipment description, nomenclature, the license plate or ID number for the equipment, the findings of the inspections and the corrective action taken shall be maintained.

  2. The foreman in charge of any subcontracting crew, along with the site health and safety officer, shall inspect the equipment on a daily basis covering all major systems as outlined above. If potentially hazardous deficiencies are found during the daily inspections, the job shall be shut down until the deficiencies are corrected and potential hazards are deleted.

  3. Each user shall inspect their personal safety equipment daily prior to use.

- **Safe Operation of Equipment and General Site Conditions**

1. The subcontractor in charge shall assure that only qualified personnel operate equipment.
2. All equipment shall be operated in a safe and non-hazardous manner.
3. Only adequately trained personnel shall perform asbestos abatement activities.
4. When using hand tools, use hand tool only for designed propose, do not use excessive force while using hand tools, do not use damaged hand tools, and wear appropriate PPE including groves and safety glasses.
5. If fire extinguishers are used to fight a fire, the extinguisher shall be refilled or replaced immediately after use.
6. Fall protection equipment, such as safety harness, shall be secured to the work basket at all times.
7. At least 1 member of the crew shall have current Roadway Worker Protection Contractor Safety.

- **Hazardous Noise.**

1. All workers shall wear hearing protection whenever they are working in a high noise area.
2. If measurements have not been made, or there is not an accurate way to measure the sound level, then ear protection shall be worn if workers have to shout to communicate when they are three feet apart or less.
3. Ear plugs shall be worn by all personnel at any location where there is the potential to be exposed to hazardous noise.

The project site is located in Coffee County, Tennessee. The site and surrounding areas may experience a low to moderate volume of traffic, and workers should be prepared to deal with this. Barricades or warning tape should be used to prevent access of unauthorized personnel or their vehicles to the work area, if necessary. A spotter shall be alert whenever anyone is working on the rail bed. In addition, on-site personnel should use caution when traveling to and from project sites.

2.2 Chemical Hazards

Under anticipated working conditions, the chemicals of concern at the Site and that could be encountered are asbestos fibers. AMECFW personnel must be aware that these or similar substances that may be encountered on-site, and be prepared to modify the work plan if they are encountered. It may be necessary to halt work and evacuate the project site until the risk associated with such substances can be evaluated and remedied.

Asbestos fibers are hazardous when inhaled. They can cause diseases including mesothelioma and asbestosis. Respirators shall be worn during asbestos remediation activities. Wet and other containment methods shall be used during remediation activities, to reduce airborne fibers.

Additional information for each substance can be found on the Material Safety Data Sheets (MSDS), presented in Appendix 1.

2.3 Safety Precautions

In order to reduce the health and safety risk to workers at the project site, the following precautions will be observed:

- Keep any potentially contaminated media away from eyes, skin, nose, and mouth,
- Eating, drinking, chewing gum or tobacco, or any practices that increase the probability of hand-to-mouth transfer and ingestion of contaminants is prohibited in the work area,
- Use soap and water to remove any media that contacts the skin. Do not use gasoline or similar solvents to remove oil and grease from the skin. Wash exposed skin promptly,
- Hands should be thoroughly washed upon leaving the work area,
- Properly dispose of rags, disposable gloves, etc.
- Keep work areas clean and well ventilated,
- All on-site personnel must be trained on equipment to be worn, safety procedures to be followed, and emergency procedures and communications to be practices,
- Any required respiratory protective devices and clothing must be worn by all personnel going into areas designated for wearing protective equipment,

- All on-site personnel should make use of their senses to alert themselves to potentially dangerous situations which they should avoid (e.g., presence of strong and irritating or nauseating odors),
- All personnel should practice unfamiliar operations prior to performing the actual procedure in the field,
- On-site field personnel shall be familiar with the physical characteristics of the site, including:
  - wind direction in relation to the work area,
  - accessibility to associates, equipment, and vehicles,
  - site access,
  - nearest water sources, and
  - location of the nearest telephone.

3.0 PERSONNEL REQUIREMENTS

3.1 Incident Manager

The incident manager, to whom on-site health hazards or emergencies shall be reported, is AMECFW's project manager for this particular project. This report shall be made in writing, and include factors relating to the incident. A duplicate copy of this report shall also be submitted to AMECFW's Corporate Health and Safety Officer. In addition, the AMECFW Incident Flow Chart shall be followed, which is included in Appendix 2.

3.2 Site Health and Safety Officer

The Site Health and Safety Officer will be AMECFW's on-site geologist, scientist or engineer who is medically monitored and health and safety trained. This person shall direct site activities, and implement the safety and health protection procedures outlined in this plan. He/She will have primary responsibility for:

- Denying access to unauthorized personnel,
- Assuring that on-site personnel have read the Site Health and Safety Plan and are aware of the potential hazards of the site and the proper procedures of handling those hazards should they occur, including the health and safety provisions and standards in this plan,

- Assuring that the proper personal protection equipment is available and utilized properly by personnel,
- Monitoring the performance of on-site personnel to ensure that health and safety procedures are being performed, in addition to correcting any performances that do not comply with the Health and Safety Plan,
- Coordinating safety procedures with the local authorities,
- Advising the project manager on health and safety matters relative to the site,
- Posting a copy of the Health and Safety Plan at the site with emergency telephone numbers and directions to the nearest telephone,
- Calibrating monitoring equipment and recording results on an instrument calibration log,
- Assuring that on-site personnel observe the appropriate work zones and decontamination procedures,
- Making "buddy" assignments for personnel, if necessary, and
- Reporting any safety violations to the Project Manager.

In addition to these responsibilities, the site health and safety officer shall be responsible for making modifications to the Health and Safety Plan during the course of the project, based upon the results of the site monitoring program.

3.3 Project Personnel

Project personnel involved in on-site investigations and operations are responsible for:

- Informing themselves of the guidelines outlined within the Health and Safety Plan, especially any aspects that they do not understand;
- Taking reasonable precautions to prevent injury to themselves and to their fellow employees; being alert to potentially harmful situations;
- Performing only those tasks that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the Site Health and Safety Officer;
- Notifying the Site Health and Safety Officer of any special medical conditions (i.e., allergies, pregnancy, diabetes) and, if necessary, assuring that on-site personnel are aware of any such conditions;

- Preventing spillage to the extent possible. In the event that a spillage occurs, contain the spillage and clean up the spill using clean up procedures as directed by the Site Health and Safety Officer;
- Practicing good housekeeping by keeping everything orderly and out of potentially harmful situations;
- Reporting injuries, and;
- Executing the "buddy system" so that each on-site worker is responsible for keeping track of their partner.

On-site personnel are responsible for implementing this Health and Safety Plan in order to promote a safe work environment.

4.0 DESIGNATION OF THE LEVELS OF PROTECTION

Modified Level D protection shall be used during asbestos survey activities. Level C protection will be used during asbestos abatement activities. Level C protection shall include all items specified under level D plus respirators fitted with particulate filters. Level C protection specifies additional clothing requirements to limit dermal contact.

4.1 Level D Personal Protection Equipment

Level D protection will be selected when it has been determined that there is no possibility of skin contact with contamination or respiratory hazard. This level is primarily a work uniform.

Level D Equipment:

- Clothing, low static, natural fiber (e.g., cotton) no loose or dangling clothing allowed because of the proximity to power operated equipment.
- Hard hat; ANSI Z89 nonmetallic hard hat.
- Safety glasses; ANSI Z87 glasses with rigid side shields. No contact lenses. Prescription glasses must meet ANSI Z87 or be fitted with approved "fit over" safety glasses.
- Safety shoes; leather or chemically-resistant, steel toe and shank.
- Gloves; inner PVC, outer cotton or leather work glove, if appropriate.

- Hearing protection; while on-site, have hearing protection available. Use hearing protection when noise levels exceed 85 decibels.

Modified Level D Equipment

- Respirator; half face, air purifying, cartridge type fitted with dust pre-mist filters

4.2 Level C Personal Protection Equipment

Level C protection will be selected when the types and concentrations of respirable material is known, or reasonably assumed to be not greater than the protection factors associated with air-purifying respirators, and exposure to the unprotected areas of the body in unlikely to cause harm.

Level C Equipment, in addition to those items already specified under Level D requirements is as follows:

- Respirator; full face, air purifying, cartridge type fitted with dust pre-mist filters
- Clothing; outer garments, one or two piece, chemical resistant fabric.
- Gloves

If conditions of the project site require a level of protection beyond Level C, then project operations shall cease and personnel shall evacuate the site while the increased hazard is evaluated.

5.0 DELINEATION OF THE WORK AREA

The work area shall be defined as the area adjacent to where environmental work is being performed. Traffic cones and/or barricades shall be used to identify the work area and control access to the work area.

6.0 CONTROL PROCEDURES

6.1 Work Limitations

To control access to the work zone and the decontamination zone, barricades or warning tape shall be used to delineate these areas. This will serve to protect unauthorized personnel from physical injury or chemical exposure.

Along with the control procedures the following safety requirements shall be observed:

- The work area is to be restricted to authorized personnel and their equipment. Personnel and equipment should be kept to a minimum, consistent with effective site operations. The work area should be barricaded or roped off, to prevent access by unauthorized personnel and/or their vehicles;
- No vehicular movement is allowed in the work area while work activities are underway.

If the level of contamination encountered at the site requires the use of personnel protective equipment above Level C, then a barricaded walkway shall be constructed from the work zone to the decontamination zone. The purpose of the walkway is to limit the spread of contaminated materials at the project site, and reduce the area that will require further decontamination efforts.

6.2 Traffic Control Plans

To protect the safety of all personnel working at this facility, AMECFW should implement the following Traffic Control Plans and Traffic Control Flow Diagram:

6.2.1 Performing Tasks in Traffic Areas (other than roadways)

- All employees are required to wear high-visibility clothing, ANSI Class III safety vest in Lime with reflective strips, at all times while onsite.
- Use a minimum of 2 additional traffic control measures/devices.
- A buddy system should be implemented in areas considered high risk.

6.2.2 Performing Tasks in Roadways

- All employees are required to wear high-visibility clothing, ANSI Class III safety vest in Lime with reflective strips, at all times while onsite.
- A buddy system should be implemented in areas considered high risk.
- Use a minimum of 2 additional traffic control measures/devices.
- Use lane closure procedures following the appropriate regulatory standards (e.g. DOT/OSHA, National Highway Safety Uniform Traffic Control), local standards or Global Remediation minimum standards

6.2.3 Examples of Precautionary Measures/Controls

- Be alert, pay attention, watch, and listen for cars
- Wear reflective vest and bright clothing
- Use cones at each point of service
- Place pole mounted warning flags inside of cones
- Park vehicle in order to block traffic
- Use flashing barricades
- Use light bars or reflective lights on trucks
- Consult site manager about traffic evaluation
- Avoid prolonged time in traffic lanes
- Don't work around corners, make yourself visible
- Stay upright as much as possible
- Give notice to vehicle drivers nearby
- Trust no one, even if they see you
- Use buddy system
- Work during non-peak hours
- Always face traffic
- Use floodlights in darkness
- Obtain TDOT or police assistance for roadwork and local permits as required
- Place letter on windshields to warn drivers – " CAUTION – Work Area Behind Vehicle"

6.2.4 Examples of Traffic Control Devices

- Traffic cones (at least two) in combination with Standard Warning Flag. Total height at least 42in. (1m)
- Molded Plastic Barricades
- Type I and II Barricades
- Use of Vehicle to block traffic
- Use of light bars or reflective lights on trucks
- Buddy System
- Place letter on windshield
- Use floodlights in darkness
- Placement of "Caution-Work Area" signs
- Plastic Channelizer (Orange Barrels)

6.3 Decontamination Procedures

The purpose of decontamination is primarily to limit the spread of contaminated materials. This is accomplished through a step-by-step procedure whereby the protective clothing and equipment are disposed, or washed.

6.3.1 Personnel Decontamination

When exiting the work area, all personnel shall follow the decontamination procedures outlined in Sections 6.3.3 and 6.3.4. Level C procedures are outlined in paragraph 6.2.4.

6.3.2 Equipment Decontamination

The Site Health and Safety Officer shall be responsible to assure that equipment is properly decontaminated and checked prior to being removed off-site. Reasonable efforts should be made to remove contamination by wiping, brushing or washing surfaces.

At a minimum, visual indication of contamination shall be removed and no organic vapors detectable above background should remain. Equipment should be reasonably clean, dry, unstained, and free from deposits, encrustations, or discoloration.

6.3.3 Level D Decontamination

- Remove trackable or loose materials.
- Remove work gloves and monitor clothing and hands.
- Thoroughly wash hands and face.

6.3.4 Level C Decontamination

The steps for Level C decontamination begin with gloves being washed and rinsed, and then tape being removed. Employee then initiates suit and safety boot wash and rinse, then removal of safety boots, followed by suit removal. Next, the face piece should be removed.

6.4 Disposal of Materials Generated During Field Work

Contaminated materials may be generated while conducting site environmental activities. AMECFW personnel shall be aware of the proper means of disposal for such materials. The following guidelines will be observed when dealing with such materials:

- Materials generated during field work (disposable protective gear, rags, etc.) will be placed in bags on site to be later removed from the project site,
- Asbestos-related waste will be kept separate and disposed separately.

7.0 TRAINING REQUIREMENTS FOR PERSONNEL

The Site Health and Safety Officer will be trained in the safety aspects of hazardous waste investigations particularly asbestos. On-site personnel shall have successfully attended and completed a 40-hour hazardous waste Site Investigation Health and Safety Trained Program, or Asbestos training as applicable to the project. This program shall contain specific training and demonstrations which will allow the Site Health and Safety Officer and on-site personnel to react in a proper and expeditious manner to contingencies which may arise in investigative activities. The Site Health and Safety Officer responsible for this project will be the field geologist/engineer assigned to the investigative program. Personnel engaged in on-site activities for this project must have been fit tested and medically approved to wear an air-purifying respirator. Additionally,

the Site Health and Safety Officer shall have successfully completed a Red Cross CPR/First Aid training course within the previous year.

On-site personnel shall also be familiar with the location and use of any emergency equipment (i.e. fire extinguisher, etc.) required at the project site. Personnel will also be familiar with any special procedures (i.e. confined space entry, etc.) that will be performed during the assessment.

8.0 WEATHER RELATED HAZARDS

Generally, environmental activities will be conducted outside, and therefore are subject to weather conditions. Precipitation, or extremes in temperature, can pose health or safety hazards and shall be considered. Extra care shall be taken when working in the rain, and operations shall cease in the presence of lighting. AMECFW personnel shall be able to recognize the symptoms of heat and cold stress, and take the appropriate measures to alleviate them. A location will be designated outside the work area where personnel can take rest breaks from extreme weather conditions.

8.1 Heat Stress

Personnel are likely to experience heat stress on hot, humid days with little or no breeze, especially if the ambient temperature is greater than 90°F. Conditions that can occur from heat stress are heat cramps, heat exhaustion and heat stroke.

Heat cramps are muscular pains and spasms brought on by the loss of water and electrolytes from heavy sweating. Proper treatment includes removing the affected person to a cooler place and providing small sips of water to drink if they want them.

Heat exhaustion is a more severe condition than heat cramps. Symptoms include pale, moist skin, heavy sweating, dilated pupils, headache, dizziness, nausea and vomiting. Treatment for this condition consists of removing the affected person to a cooler place, provide small sips of water at approximately fifteen minute intervals if the person can tolerate it, and placing towels moistened with cool water on the victim's skin. The victim should be closely monitored to determine if their condition is improving under this treatment. If no improvement is observed within a half hour to an hour, professional medical care should be sought to treat this condition.

Heat stroke is the most severe form of heat stress. This condition occurs when the system which regulates body temperature breaks down, often the victim stops sweating. Symptoms include a very high body temperature, red skin color, and very small pupils. Heat stroke is a very serious condition and professional medial treatment should be obtained for the victim as soon as possible. First aid includes removing the affected person to a cooler place, treating for shock, and bathing the victim with towels moistened with cool water.

8.2 Cold Stress

Personnel can experience cold stress on cool, humid, windy days especially when the ambient temperature is below 40°F. Personnel exposed to cold stress can suffer from hypothermia or frostbite.

Hypothermia occurs when the body temperature is depressed below 98.6°F. Symptoms include shivering, dizziness, numbness, weakness, confusion, and drowsiness. Treatment includes placing the affected person in a warm area sheltered from wind or rain, replacing wet clothing with dry, and if the victim is conscious, provide warm beverages and food (note: do not provide alcohol or stimulants to victims of cold stress).

Frostbite occurs when ice crystals form in body tissues, and restrict the flow of blood to the injured areas. Frostbite most commonly occurs at the body's extremities (e.g., fingers and toes) and on exposed skin (e.g., nose and ears). Symptoms of frostbite include white or grayish skin color, a feeling of pain in the early stages, often the affected area feels cold and numb. Treatment should include removing the affected person to a warm place, sheltered from the wind or rain, and allowing the affected area to thaw. Professional medical treatment should be sought for moderate or severe cases of frostbite.

9.0 MEDICAL REQUIREMENTS

9.1 Health Monitoring

AMECFW provides annual medical surveillance programs for employees who have risk of exposure to environmental waste products. AMECFW personnel on-site during the subject project shall be active in AMECFW's medical surveillance program. This program is based on recommendations within the NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities and includes the following areas of concern:

1. Occupational History
2. Medical History
3. Physical Examination
4. Ophthalmology Assessment
5. Audiometry
6. Chest X-Ray
7. Electrocardiogram
8. Blood and Urine Screening
9. Pulmonary Function Test

9.2 Site Specific Requirements

Due to the nature of the substances used or stored at the subject site, no specific medical monitoring of personnel will be required while the abatement activities are being conducted. However, if a worker suffers a chemical exposure, or experience symptoms indicating that such an exposure may have occurred, then that worker will be checked by a physician to determine if he/she has suffered any adverse health effects as a result of this exposure.

10.0 ON-SITE EMERGENCIES

10.1 Emergency Procedures

10.1.1 Emergency Situation

Site activities present a potential risk to on-site personnel. During routine operations, a risk is minimized by establishing good work practices, staying alert, and using proper personal protective equipment. Unpredictable events such as physical injury, chemical exposure, or fires may occur and must be anticipated. If an emergency occurs these procedures should be followed:

- In the event that any on-site personnel experiences adverse effects or symptoms of exposure while on the scene, AMECFW personnel shall immediately halt work and act according to the instructions provided by the Site Health and Safety Officer;
- The discovery of a condition that would suggest the existence of a situation more hazardous than anticipated, should result in the evacuation of AMECFW personnel, followed by re-evaluation of the hazard and the level of personal protection required;
- In the event of an incident, the Project Manager and the Site Health and Safety Officer shall prepare a memorandum detailing all aspects of the incident. Follow-up action must be taken to correct the situation that caused the incident.

10.1.2 Project Telephone

The nearest telephone to the project site is the cellar phone located on AMECFW's onsite Health and Safety officer.

10.1.3 Emergency Communications

The "buddy system" will be enforced for field activities involving potential exposure to hazardous or toxic materials, and within the work zone. Each person will observe their partner for symptoms of chemical over exposures or heat stress and provide emergency assistance when warranted.

Emergency Signals: The following emergency signals shall be used:

· Grasping throat with hand	Emergency - help me
· Thumbs up	OK; understood
· Grasping buddy's wrist	Leave site now.

10.1.4 Emergency Organizations

A list of the organizations whose assistance might be required to deal with an on-site emergency is provided, along with their address, telephone number, and a point of contact (if relevant).

- Ambulance Service - 911
- Fire Department - 911
- Police Department - 911

- AMECFW Nashville, Bertisabel Custer - (615) 333-0630
- AMECFW Nashville. Toby Collins – (615) 305-6598

It may be necessary to coordinate activities with these organizations prior to beginning project operations.

10.1.5 Emergency Evacuation

If an emergency arises which requires personnel to evacuate the project site, personnel shall leave in an upwind direction to a point where safe deliberation can be made of how to respond to the emergency situation.

10.1.6 Emergency Equipment

A 20-pound fire extinguisher shall be readily available at the project site, capable of extinguishing class A-B-C fires. On-site personnel shall be familiar with its proper use.

A first-aid kit will also be available on-site, in the event a worker suffers a physical injury. On-site personnel certified in first aid can administer treatment to an injured worker.

10.2 Emergency Medical Care

10.2.1 Local Hospital

The closest hospital is the **Unity Medical Center** located at **481 Interstate Drive, Manchester, TN 37355**. The telephone number for the hospital is **(931) 728-6354**. This hospital is located approximately 2.3 miles north of the site with a travel time of approximately 4 minutes by car from Wells Creek. A map showing the location of and direction to the nearest hospital is presented in **Appendix 3**.

10.2.2 Medical Clinic

Injuries that are not serious will be treated at the nearest Convenient Care Center in Manchester, TN

10.2.3 Emergency Drills

The Site Health and Safety Officer may hold periodic emergency drills, to train on-site personnel in the correct procedures to follow in the event of an emergency. Special emphasis will be placed on the proper response to a fire or chemical exposure injury.

11.0 SUMMARY

AMECFW personnel involved with the scope of work for the subject project shall be familiar with the possible hazards involved, the safety procedures, and other inherent factors outlined in this plan. Prior to the commencement of work on the project, the Project Manager and the Site Health and Safety Officer should discuss general procedures to be implemented, addressing local safety and health requirements and any site-specific conditions that may require additional precautions.

APPENDIX 1

MATERIAL SAFETY DATA SHEET PACKET

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi
Telephone: 301-975-6776
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone Chem Trec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: Standard Reference Material (SRM) 1866b is comprised of three commercial-grade asbestos materials that were, or are, commonly used in commerce. These asbestos materials are typical of the asbestos found in bulk samples during routine asbestos inspections of building materials. The optical properties serve as a primary calibration standard in the identification of asbestos with polarized light microscopy (PLM). A unit of SRM 1866b consists of a set of three bottles: one bottle containing chrysotile, one bottle containing asbestiform grunerite (amosite), and one bottle containing asbestiform riebeckite (crocidolite). Each bottle contains between 1 gram and 3 grams of material.

Chrysotile

Asbestiform Grunerite (Amosite)

Asbestiform Riebeckite (Crocidolite)

An MSDS is provided for each of the three asbestos materials listed above, which contain hazardous components 1 % or greater and/or carcinogens 0.1 % or greater, in compliance with OSHA 29 CFR 1910.1200.

MATERIAL SAFETY DATA SHEET

1. Substance and Source Identification

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b
MSDS Number: 1866b
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi
Telephone: 301-975-6776
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: Standard Reference Material (SRM) 1866b is a set of three individual commercial-grade asbestos materials: **chrysotile**, asbestiform grunerite (amosite), and asbestiform riebeckite (crocidolite). A unit of SRM 1866b consists of three bottles, each containing between 1 gram and 3 grams of individual material.

Substance: **Chrysotile**

2. Composition and Information on Hazardous Ingredients[a]

Component:	**Chrysotile**
Other Designations:	**Chrysotile** (metaxite; serpentine chrysotile; asbestos; chrysotile asbestos)
CAS Number:	12001-29-5
EC Number (EINECS):	Not assigned.
SRM Nominal Concentration (% by weight or volume):	> 90
Component:	**Magnetite (as an impurity)**
Other Designation:	**Magnetite** (magnetic iron oxide; black iron oxide; magnetic iron ore; lodestone; black ferric oxide)
CAS Number:	1309-38-2
EC Number (EINECS):	215-169-8
SRM NominalConcentration (% by weight):	< 5
EC Classification:	T Carcinogen Category 1
EC Risk (R No.):	23, 45, 48
EC Safety (S No.):	45, 53

[a] Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

3. Hazards Identification

NFPA Ratings (Scale 0–4): Health = 1 Fire = 0 Reactivity = 0

Major Health Hazards: Cancer hazard (in humans)

Potential Health Effects
Inhalation: Inhalation of chrysolite asbestos dust may be irritating. Symptoms include a cough and chest pain. Chronic exposure may cause asbestosis, interstitial fibrosis of the lung tissue, which may develop within 4 years to 9 years, but onset may be typically delayed 20 years to 40 years after first exposure. Death from asbestosis may be due to respiratory or cardiac failure. Secondary lung infections may also occur. Chronic exposure of asbestos to workers may also cause pleural effusion as early as 3 years to 4 years after initial exposure. Chronic exposure of asbestos to workers also increases the chance of pleural and peritoneal mesotheliomas, bronchogenic carcinoma, lung cancer, and cancers of the gastrointestinal tract and larynx. The latent period for mesothelioma is 3 years to 40 years; for lung cancer, 15 years to 30 years.

Skin Contact: Direct contact may cause irritation. Asbestos fibers may penetrate the skin and result in "asbestos corns", due to thickening of the skin around the implanted fiber. These corns usually occur on the hands and forearms, and they disappear on removal of the fibers.

Eye Contact: Direct contact may cause irritation with redness due to mechanical action.

Ingestion: Acute exposure by cause gastrointestinal irritation. Chronic exposure of asbestos fibers may be involved in cancers of the buccal cavity and pharynx, esophagus, stomach, colon, and rectum.

Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
X		In the National Toxicology Program (NTP) Report on Carcinogens.
X		In the International Agency for Research on Cancer (IARC) Monographs.
X		By the Occupational Safety and Health Administration (OSHA).

4. First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

Skin Contact: Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Get immediate medical attention.

Eye Contact: Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: If a large amount is swallowed, get immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Chrysotile is a negligible fire hazard.

Extinguishing Media: Regular dry chemical. Carbon dioxide. Water. Regular foam.

Fire Fighting: If material is involved in a fire, extinguish fire with a medium appropriate for the surrounding fire. Material itself does NOT burn or burns with difficulty. Keep run-off water out of sewers and water sources. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Component: **Chrysotile**
Flash Point: Not applicable.
Method Used: Not applicable.

Autoignition Temp.: Not applicable.

Flammability Limits in Air
UPPER (Volume %): Not applicable.
LOWER (Volume %): Not applicable.

6. Accidental Release Measures

Occupational Release: Do NOT touch or walk through spilled material. Avoid inhalation of asbestos dust (see Section 8, "Exposure Controls and Personal Protection"). Collect small dry spills with a shovel and place material into an appropriate container for disposal. Prevent entry into waterways and sewers. Clean up residue with a HEPA filter vacuum.

Disposal: Refer to Section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. Exposure Controls and Personal Protection

Exposure Limits: **Chrysotile**
OSHA (PEL): 0.1 fibers/cc TWA
ACGIH (TLV): 0.1 fibers/cc TWA
NIOSH: 0.1 fibers/cc recommended TWA (10 h)

Ventilation: Provide local exhaust ventilation system equipped with a HEPA-filter dust collection system.

Respirator: If workplace conditions warrant a respirator's use, a NIOSH/MSHA approved respirator should be used under an implemented respiratory protection program in accordance with OSHA Standard 29 CFR 1910.134 (General Industry, Use of Respirators) and 29 CFR 1910.1001 for occupational exposure to asbestos.

Eye Protection: Wear safety goggles. An eye wash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and gloves to prevent skin exposure. Refer to OSHA Regulated Substances: OSHA 29 CFR 1910.1001.

9. Physical and Chemical Properties

Component: **Chrysotile**
Appearance: Fibrous solid to dust-like powder. White to grey-brown. Odorless.
Relative Molecular Mass: Not applicable.
Molecular Formula: $Mg_3(Si_2O_5)(OH)_4$
Water Solubility: Insoluble.
Solvent Solubility: Insoluble in organic solvents.

10. Stability and Reactivity

Stability: X Stable ____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid generating dust. Keep out of water supplies and sewers.

Incompatible Materials: May be attacked by strong acids.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Completely decomposes at temperatures of 1 000 °C.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. Toxicological Information

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data: **Chrysotile**
Human, Inhalation TCL_O: 2.8 fibers/cc (5 years)
Rat, Inhalation-Intermittent TCL_O: 8 210 µg/m^3 (6 h to 20 d)
Rat, Oral-Continuous TDL_O: 10 867 mg/kg (78 weeks)

Tumorigenic, Reproductive, Mutagenic Data: Chrysotile has been investigated as a tumorigenic and mutagenic effector.

Health Effects (Acute and Chronic): See Section 3: "Hazards Identification" for potential health effects.

12. Ecological Information

Ecotoxicity Data: Not available.

13. Disposal Considerations

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. Transportation Information

U.S. DOT and IATA: Asbestos; UN2212; Hazard Class 9
NOTE: This material, as packaged for SRM 1866b, is not subject to the regulations per DOT Special Provision 156 and IATA special Provision A61.

15. Regulatory Information

U.S. Regulations: CERCLA Sections 102a/103 (40 CFR 302.4): Asbestos: 1 lbs RQ

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Asbestos.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	No.
CHRONIC:	Yes.
FIRE:	No.
REACTIVE:	No.
SUDDEN RELEASE:	No.

State Regulations: California Proposition 65: Asbestos is known to the state of California to cause cancer (Feb. 17, 1987).

CANADIAN Regulations
WHMIS Classification: Not determined for this material.

EUROPEAN Regulations

EC Classification (assigned):	T	Toxic. Carcinogen Category 1.
EC Risk Phrases:	R45	May cause cancer.
	R23/48	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
EC Safety Phrases:	S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
	S53	Avoid exposure.

National Inventory Status

U.S. Inventory (TSCA):	Asbestos:	Not listed on inventory.
TSCA 12(b) Export Notification:	Asbestos:	CAS No.: 1332-21-4 Section 6

16. Other Information

Sources: MDL Information Systems, Inc., MSDS *Chrysotile*, 15 June 2006.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

MATERIAL SAFETY DATA SHEET

1. Substance and Source Identification

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b
MSDS Number: 1866b
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi
Telephone: 301-975-6776
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: Standard Reference Material (SRM) 1866b is a set of three individual commercial-grade asbestos materials: chrysotile, **asbestiform grunerite (amosite)**, and asbestiform riebeckite (crocidolite). A unit of SRM 1866b consists of three bottles, each containing between 1 gram and 3 grams of individual material.

Substance: **Asbestiform Grunerite**

2. Composition and Information on Hazardous Ingredients[a]

Component:	**Asbestiform Grunerite**
Other Designations:	**Asbestiform Grunerite** (grunerite; amosite; brown asbestos; amosite asbestos)
CAS Number:	12172-73-5
EC Number (EINECS):	Not assigned.
SRM Nominal Concentration (% by weight or volume):	> 90
Component:	**Magnetite (as an impurity)**
Other Designation:	**Magnetite** (magnetic iron oxide; black iron oxide; magnetic iron ore; lodestone; black ferric oxide)
CAS Number:	1309-38-2
EC Number (EINECS):	215-169-8
SRM NominalConcentration (% by weight):	< 5
Component:	**Quartz**
Other Designation:	Quartz (alpha quartz; silicon dioxide; silica; silicic anhydride; agate)
CAS Number:	14808-60-7
EC Number (EINESC):	238-878-4
SRM NominalConcentration (% by weight):	< 5
EC Classification:	T Carcinogen Category 1
EC Risk (R No.):	23, 45, 48
EC Safety (S No.):	45, 53

[a] Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

3. Hazards Identification

NFPA Ratings (Scale 0–4): Health = 1 Fire = 0 Reactivity = 0

Major Health Hazards: Cancer hazard (in humans)

Potential Health Effects

Inhalation: Inhalation of grunerite asbestos dust may be irritating. Symptoms include a cough and chest pain. Chronic exposure may cause asbestosis, interstitial fibrosis of the lung tissue, which may develop within 4 years to 9 years, but onset may be typically delayed 20 years to 40 years after first exposure. Death from asbestosis may be due to respiratory or cardiac failure. Secondary lung infections may also occur. Chronic exposure of asbestos to workers may also cause pleural effusion as early as 3 years to 4 years after initial exposure. Chronic exposure of asbestos to workers also increases the chance of pleural and peritoneal mesotheliomas, bronchogenic carcinoma, lung cancer, and cancers of the gastrointestinal tract and larynx. The latent period for mesothelioma is 3 years to 40 years; for lung cancer, 15 years to 30 years.

Skin Contact: Direct contact may cause irritation. Asbestos fibers may penetrate the skin and result in "asbestos corns", due to thickening of the skin around the implanted fiber. These corns usually occur on the hands and forearms, and they disappear on removal of the fibers.

Eye Contact: Direct contact may cause irritation with redness due to mechanical action.

Ingestion: Acute exposure by cause gastrointestinal irritation. Chronic exposure of asbestos fibers may be involved in cancers of the buccal cavity and pharynx, esophagus, stomach, colon, and rectum.

Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
X		In the National Toxicology Program (NTP) Report on Carcinogens.
X		In the International Agency for Research on Cancer (IARC) Monographs.
X		By the Occupational Safety and Health Administration (OSHA).

4. First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

Skin Contact: Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

Eye Contact: Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: If a large amount is swallowed, get immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Asbestiform grunerite is a negligible fire hazard.

Extinguishing Media: Regular dry chemical. Carbon dioxide. Water. Regular foam.

Fire Fighting: If material is involved in a fire, extinguish fire with a medium appropriate for the surrounding fire. Material itself does NOT burn or burns with difficulty. Keep run-off water out of sewers and water sources. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Component: **Asbestiform Grunerite**
Flash Point: Not applicable.
Method Used: Not applicable.

Autoignition Temp.: Not applicable.

Flammability Limits in Air
UPPER (Volume %): Not applicable.
LOWER (Volume %): Not applicable.

6. Accidental Release Measures

Occupational Release: Do NOT touch or walk through spilled material. Avoid inhalation of asbestos dust (see Section 8, "Exposure Controls and Personal Protection"). Collect small dry spills with a shovel and place material into an appropriate container for disposal. Prevent entry into waterways and sewers. Clean up residue with a HEPA filter vacuum.

Disposal: Refer to Section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. Exposure Controls and Personal Protection

Exposure Limits:

Abestiform Grunerite
OSHA (PEL): 0.1 fibers/cc TWA
ACGIH (TLV): 0.1 fibers/cc TWA
NIOSH: 0.1 fibers/cc recommended TWA (10 h)

Quartz
OSHA (PEL): 0.3 mg/m^3 TWA (total dust) 30 mg/m^3/% SiO^2 + 2, based on size/aerodynamic characteristics)
OSHA (PEL): 0.1 mg/m^3 TWA (respirable dust) 10 mg/m^3/% SiO^2 + 2, based on size/aerodynamic characteristics)
ACGIH (TLV): 0.025 mg m^3 TWA (respirable dust)
NIOSH: 0.05 mg/m^3 recommended TWA (10 h) (respirable dust)

UK WEL: 0.3 mg/m^3 TWA (respirable particulate) (Chemical Hazard Alert Notice issued).

Ventilation: Provide local exhaust ventilation system equipped with a HEPA-filter dust collection system.

Respirator: If workplace conditions warrant a respirator's use, a NIOSH/MSHA approved respirator should be used under an implemented respiratory protection program in accordance with OSHA Standard 29 CFR 1910.134 (General Industry, Use of Respirators) and 29 CFR 1910.1001 for occupational exposure to asbestos.

Eye Protection: Wear safety goggles. An eye wash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and gloves to prevent skin exposure. Refer to OSHA Regulated Substances: OSHA 29 CFR 1910.1001.

9. Physical and Chemical Properties

Component: **Asbestiform Grunerite**
Appearance: Fibrous solid to dust-like powder. Grey-brown to light brown. Odorless.
Relative Molecular Mass: Not applicable.
Molecular Formula: $Fe^{2+}_7(Si_8O_{22})(OH)_2$
Water Solubility: Insoluble

10. Stability and Reactivity

Stability: X Stable _____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid generating dust. Keep out of water supplies and sewers.

Incompatible Materials: May be attacked by strong acids.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Completely decomposes at temperatures of 1 000 °C.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data: **Asbestiform Grunerite**
Rat, Intrapleural TD_{LO}: 150 mg/kg

Tumorigenic, Reproductive, Mutagenic Data: Asbestiform grunerite has been investigated as a tumorigenic and mutagenic effector.

Health Effects (Acute and Chronic): See Section 3: "Hazards Identification" for potential health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Not available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: **U.S. DOT and IATA:** Asbestos; UN2212; Hazard Class 9
NOTE: This material, as packaged for SRM 1866b, is not subject to the regulations per DOT Special Provision 156 and IATA special Provision A61.

15. REGULATORY INFORMATION

U.S. Regulations: CERCLA Sections 102a/103 (40 CFR 302.4): Asbestos: 1 lbs RQ.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Asbestos.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	No.
CHRONIC:	Yes.
FIRE:	No.
REACTIVE:	No.
SUDDEN RELEASE:	No.

State Regulations: California Proposition 65: Asbestos is known to the state of California to cause cancer (Feb. 27, 1987).

CANADIAN Regulations
WHMIS Classification: Not determined for this material.

EUROPEAN Regulations

EC Classification (assigned):	T	Toxic. Carcinogen Category 1
EC Risk Phrases:	R45	May cause cancer.
	R23/48	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
EC Safety Phrases:	S45	In case of accident of if you feel unwell, seek medical advice immediately (show the label where possible).
	S53	Avoid exposure.

National Inventory Status		
U.S. Inventory (TSCA):	Asbestos:	Not listed on inventory.
TSCA 12(b) Export Notification:	Asbestos:	CAS No.: 1332-21-4 Section 6

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Amosite*, 16 June 2005.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b
MSDS Number: 1866b
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi
Telephone: 301-975-6776
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: Standard Reference Material (SRM) 1866b is a set of three individual commercial-grade asbestos materials: chrysotile, asbestiform grunerite (amosite), and **asbestiform riebeckite (crocidolite)**. A unit of SRM 1866b consists of three bottles, each containing between 1 gram and 3 grams of individual material.

Substance: **Asbestiform Riebeckite**

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS[a]

Component:	**Asbestiform Riebeckite**
Other Designations:	**Asbestiform Riebeckite** (blue asbestos; crocidolite; asbestos; crocidolite asbestos)
CAS Number:	12001-28-4
EC Number (EINECS):	Not assigned.
SRM Nominal Concentration (% by weight or volume):	> 90
Component:	**Magnetite (as an impurity)**
Other Designation:	**Magnetite** (magnetic iron oxide; black iron oxide; magnetic iron ore; lodestone; black ferric oxide)
CAS Number:	1309-38-2
EC Number (EINECS):	215-169-8
SRM NominalConcentration (% by weight):	< 5
EC Classification:	T Carcinogen Category 1
EC Risk (R No.):	23, 45, 48
EC Safety (S No.):	45, 53

[a] Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 1 Fire = 0 Reactivity = 0

Major Health Hazards: Cancer hazard (in humans)

Potential Health Effects
Inhalation: Inhalation of riebeckite asbestos dust may be irritating. Symptoms include a cough and chest pain. Chronic exposure may cause asbestosis, interstitial fibrosis of the lung tissue, which may develop within 4 years to 9 years, but onset may be typically delayed 20 years to 40 years after first exposure. Death from asbestosis may be due to respiratory or cardiac failure. Secondary lung infections may also occur. Chronic exposure of asbestos to workers may also cause pleural effusion as early as 3 years to 4 years after initial exposure. Chronic exposure of asbestos to workers also increases the chance of pleural and peritoneal mesotheliomas, bronchogenic carcinoma, lung cancer, and cancers of the gastrointestinal tract and larynx. The latent period for mesothelioma is 3 years to 40 years; for lung cancer, 15 years to 30 years.

Skin Contact: Direct contact may cause irritation. Asbestos fibers may penetrate the skin and result in "asbestos corns", due to thickening of the skin around the implanted fiber. These corns usually occur on the hands and forearms, and they disappear on removal of the fibers.

Eye Contact: Direct contact may cause irritation with redness due to mechanical action.

Ingestion: Acute exposure by cause gastrointestinal irritation. Chronic exposure of asbestos fibers may be involved in cancers of the buccal cavity and pharynx, esophagus, stomach, colon, and rectum.

Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
X		In the National Toxicology Program (NTP) Report on Carcinogens.
X		In the International Agency for Research on Cancer (IARC) Monographs.
X		By the Occupational Safety and Health Administration (OSHA).

4. First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

Skin Contact: Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

Eye Contact: Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: Get immediate medical attention. If vomiting occurs, keep head lower than hips to prevent aspiration. Give artificial respiration, if not breathing, by qualified personnel.

5. Fire Fighting Measures

Fire and Explosion Hazards: Asbestiform Riebeckite

Extinguishing Media: Regular dry chemical. Carbon dioxide. Water. Regular foam.

Fire Fighting: If material is involved in a fire, extinguish fire with a medium appropriate for the surrounding fire. Material itself does NOT burn or burns with difficulty. Keep run-off water out of sewers and water sources. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Component: **Asbestiform Riebeckite**
Flash Point: Not applicable.
Method Used: Not applicable.

Autoignition Temp.: Not applicable.

Flammability Limits in Air
UPPER (Volume %): Not applicable.
LOWER (Volume %): Not applicable.

6. Accidental Release Measures

Occupational Release: Do NOT touch or walk through spilled material. Avoid inhalation of asbestos dust (see Section 8, "Exposure Controls and Personal Protection"). Collect small dry spills with a shovel and place material into an appropriate container for disposal. Prevent entry into waterways and sewers. Clean up residue with a HEPA filter vacuum.

Disposal: Refer to Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Store in a cool, dry place.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:
Asbestiform Riebeckite
OSHA (PEL): 0.1 fibers/cc TWA
ACGIH (TLV): 0.1 fibers/cc TWA
NIOSH: 0.1 fibers/cc recommended TWA (10 h)

Ventilation: Provide local exhaust ventilation system equipped with HEPA-filter dust collection system.

Respirator: If workplace conditions warrant a respirator's use, a NIOSH/MSHA approved respirator should be used under an implemented respiratory protection program in accordance with OSHA Standard 29 CFR 1910.134 (General Industry, Use of Respirators) and 29 CFR 1910.1001 for occupational exposure to asbestos.

Eye Protection: Wear safety goggles. An eye wash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and gloves to prevent skin exposure. Refer to OSHA Regulated Substances: OSHA 29 CFR 1910.1001.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: **Asbestiform Riebeckite**
Appearance: Fibrous solid to dust-like powder. Blue to purple color. Odorless.
Molecular Formula: $Na_2(Fe^{2+}{}_3Fe^{3+}{}_2)(Si_8O_{22})(OH)_2$
Water Solubility: Insoluble.

10. STABILITY AND REACTIVITY

Stability: X Stable ____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid generating dust. Keep out of water supplies and sewers.

Incompatible Materials: May be attacked by strong acids.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Completely decomposes at temperatures of 1 000 °C.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data:
Asbestiform Riebeckite
Rat, Intraperitoneal LD_{LO}: 300 mg/kg
Rat, Inhalation-Intermittent TC_{LO}: 7 200 µg/m^3 (6 h – 20 days)
Rat, Inhalation-Intermittent TC_{LO}: 13 600 µg/m^3 (6 h – 5 days)

Tumorigenic, Reproductive, Mutagenic Data: Riebeckite asbestos has been investigated as a tumorigenic and mutagenic effector.

Health Effects (Acute and Chronic): See Section 3: "Hazards Identification" for potential health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Not available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: **U.S. DOT and IATA:** Asbestos; UN2212; Hazard Class 9
NOTE: This material, as packaged for SRM 1866b, is not subject to the regulations per DOT Special Provision 156 and IATA special Provision A61.

15. REGULATORY INFORMATION

U.S. Regulations: CERCLA Sections 102a/103 (40 CFR 302.4): Asbestos: 1 lbs RQ.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Asbestos.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	No.
CHRONIC:	Yes.
FIRE:	No.
REACTIVE:	No.
SUDDEN RELEASE:	No.

State Regulations: California Proposition 65: Asbestos is known to the state of California to cause cancer (Feb. 27, 1987)

CANADIAN Regulations
WHMIS Classification: Not determined.

EUROPEAN Regulations

EC Classification (assigned):	T	Toxicity. Carcinogen Category 1.
EC Risk Phrases:	R45	May cause cancer.
	R23/48	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
EC Safety Phrases:	S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
	S53	Avoid exposure.

National Inventory Status

U.S. Inventory (TSCA):	Asbestos:	Not listed on inventory.
TSCA 12(b) Export Notification:	Asbestos:	CAS No. 1332-21-4 Section 6

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Crocidolite*, 14 September 2006.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

amec foster wheeler

APPENDIX 2

Incident flow chart

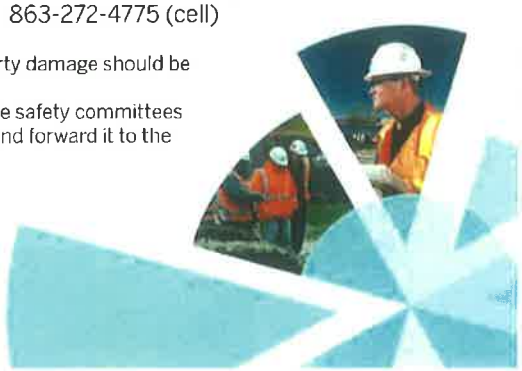
Call immediately

amec foster wheeler

E&I Corporate HSE department contact list

Name/email	Office location	Contact information
Bruce Voss bruce.voss@amecfw.com	Cathedral City, CA	760.202.3737 (office) 951.897.6381 (cell)
Chad Barnes chad.barnes@amecfw.com	Phoenix, AZ	602.733.6000 (office) 480.495.9846 (cell)
Cindy Sundquist cynthia.sundquist@amecfw.com	Portland, ME	207.828.3309 (office) 207.650.7593 (cell) 207.892.4402 (home)
Gabe Sandholm gabe.sandholm@amec.com	Minneapolis, MN	612.252.3785 (office) 206.683.9190 (cell)
John Mazur john.mazur@amec.com	Wilmington, NC	910.444.2978 (office) 910.431.2330 (cell) 910.681.0538 (home)
Lori Dowling lori.dowling@amec.com	Prince George, BC	250.564.3243 (office)
Philip Neville philip.neville@amec.com	Thorold, ON	905.687.6616 (office) 905.380.4465 (cell)
Tim Kihn tim.kihn@amec.com	Edmonton, AB	780.944.6363 (office) 780.717.5058 (cell)
Vladimir Ivensky (can call 24/7) vladimir.ivensky@amec.com	Plymouth Meeting, PA	610.877.6144 (office) 484.919.5175 (cell) 215.947.0393 (home)
Kirby Lastinger kirby.lastinger@amec.com	Lakeland, FL	836-667-2345 x207 (office) 863-272-4775 (cell)

*High potential near misses, subcontractor incidents, regulatory inspections, spills, and property damage should be reported within 60 minutes to one of the above HSE Representatives.
WITHIN 24 HOURS - Local Supervisor, HSE Coordinator, Project HSE Officer, and any applicable safety committees must complete preliminary investigation, along with the initial Incident Analysis Report Form and forward it to the Corporate HSE Department



amec
foster
wheeler

APPENDIX 3

Google Maps

210 Hillsboro Boulevard, Manchester, TN 37355 to Unity Medical Center

Drive 2.3 miles, 4 min

210 Hillsboro Boulevard

Manchester, TN 37355

1. **Head northwest on US-41 N/Hillsboro Blvd toward S Woodland St**
   Continue to follow US-41 N

0.6 mi

2. **Turn right onto TN-53 N**

1.1 mi

3. **Turn right onto Interstate Dr**

0.6 mi

Unity Medical Center

481 Interstate Drive, Manchester, TN 37355