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TECHNICAL REPORT

Project No. **A10569**
Date: **5-Jan-11**

To: **John Poston**
From: **Andrew Zamurs**
Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**
Copy: **S. Sharma, J. Pier**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
OCTOBER 2010

Request: Three samples, representing products milled at Houston were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A10569 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP Composite	October 2010	A10569-2	0	0	BDL	0	0	BDL
██████████ ██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A10569 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP Composite	October 2010	A10569-2	0.2395	0.4	10	92.2	0.010	0.07	0.007	0.04
██████████ ██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A10628**

Date: **24-Jan-11**

To: **John Poston**

From: **Carol Slowik**

Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**

Copy: **S. Sharma, J. Pier**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES
NOVEMBER 2010**

Request: Four samples, representing products milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A10628 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSOTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP Composite	November 2010	A10628-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A10628 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP Composite	November 2010	A10628-2	0.2764	0.4	10	106.4	0.009	0.06	0.006	0.04
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A10632**
Date: **13-Jan-11**

To: **John Poston**
From: **Carol Slowik**
Analyst(s): **C. Slowik, A. Zamurs**
Copy: **S. Sharma, J. Pier**

Title: **TEM ASBESTOS ANALYSIS OF HOSUTON PRODUCT SAMPLES**
SEPTEMBER 2010

Request: Two samples, representing products milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A10632 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP Composite	September 2010	A10632-2	0	0	BDL	0	0	BDL

BDL = Below detection limit, as defined by ASTM D 6620

A10632 TEM Analysis Parameters

Table 2. Analysis parameters

Sample Description		Sample No.					AMPHIBOLE		CHRYBOTILE	
			Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP Composite	September 2010	A10632-2	0.2630	0.4	10	101.3	0.009	0.06	0.006	0.04

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11033**

Date: **28-Jan-11**

To: **J. Poston**

From: **J. Sulik**

Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**

Copy: **J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES
DECEMBER 2010**

Request: Two samples, representing products of Chinese ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11033 TEM Analysis Results

Table 1. Result Summary

			AMPHIBOLE			CHRYSTILE		
Sample Description		Sample No.	Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████ ██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP Composite	December 2010	A11033-2	0	0	BDL	0	0	BDL

BDL = Below detection limit, as defined by ASTM D 6620

A11033 TEM Analysis Parameters

Table 2. Analysis parameters

Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	AMPHIBOLE		CHRYBOTILE	
							Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████ ██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP Composite	December 2010	A11033-2	0.2398	0.4	10	92.4	0.010	0.07	0.007	0.04

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11075**
Date: **30-Mar-11**

To: **J. Poston**
From: **Andrew Zamurs**
Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**
Copy: **M. Mellon, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
JANUARY 2011

Request: Four samples, representing products of Chinese & Yellowstone ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11075 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYBOTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	JANUARY 2011	A11075-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A11075 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
████████	████████	██████	██████	██	██	████	████	██	████	██
Grade 25 USP	JANUARY 2011	A11075-2	0.2417	0.4	10	93.1	0.010	0.07	0.007	0.04
████████	████████	██████	██████	██	██	████	████	██	████	██
████████	████████	██████	██████	██	██	████	████	██	████	██

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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CONFIDENTIAL

ORE ANALYSIS REPORT

Date: March, 3rd 2011

To:

Reported by: Andrew Zamurs

Copy: J. Poston, S. Wulf

Results:

The following composite ore sample, representing the MV Hosanger Gaungxi #2 shipment to Houston was analyzed by X-ray diffraction (XRD) for the presence of amphibole minerals and quartz. The sample was also analyzed by transmission electron microscopy (TEM) for the presence of asbestiform minerals. The requested tests are in partial fulfillment of specifications required by [REDACTED].

	Guangxi #2 Composite MV Hosagner A11128-1
Analytical Lab Code:	
Specification:	
<i>Initial Ore Results – After Grinding (1B)</i>	
3.14 Percent Fibrous Amphibole (CTFA J4-1)	
Part A (X-ray Diffraction):	None detected
Part B (Optical Microscopy):	Not required
3.15 Percent Free Crystalline Silica Quartz (CTFA Method J6-1) (X-Ray Diffraction)	<0.1% (Passes Test)
<i>TEM Results – After Grinding (1C)</i>	
3.16 Asbestos by Transmission Electron Microscope (TM 7024)	None detected



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TECHNICAL REPORT

Project No. **A11135**
Date: **5-Apr-11**

To: **John Poston**
From: **Carol Slowik**
Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**
Copy: **M. Mellon, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
FEBRUARY 2011

Request: Four samples, representing products milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11135 TEM Analysis Results

Table 1. Results

Sample Description		Sample No.	AMPHIBOLE		CHRYBOTILE			Asbestos Concentration
			Number of Structure		Fiber Concentration	Number of Structure		
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
			■	■	■	■	■	■
Grade 25 USP	February 2011	A11135-2	0	0	BDL	0	0	BDL
			■	■	■	■	■	■
			■	■	■	■	■	■

BDL = Below detection limit, as defined by ASTM D 6620

A11135 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
████████	████████	██████	██████	██	██	████	████	██	████	██
Grade 25 USP	February 2011	A11135-2	0.2749	0.4	10	105.9	0.009	0.06	0.006	0.04
████████	████████	██████	██████	██	██	████	████	██	████	██
████████	████████	██████	██████	██	██	████	████	██	████	██

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11198**

Date: **18-May-11**

To: **J. Poston**

From: **Andrew Zamurs**

Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**

Copy: **M. Mellon, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES
MARCH 2011**

Request: Five samples, representing products of Chinese, Yellowstone, & Three Springs ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11198 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
████████	████████	████████	■	■	████████	■	■	████████
Grade 25 USP	MARCH 2011	A11198-2	0	0	BDL	0	0	BDL
████████	████████	████████	■	■	████████	■	■	████████
████████	████████	████████	■	■	████████	■	■	████████
████████	████████	████████	■	■	████████	■	■	████████

BDL = Below detection limit, as defined by ASTM D 6620

A11198 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP	MARCH 2011	A11198-2	0.2330	0.4	10	89.7	0.010	0.07	0.007	0.05
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.

^ Estimated weight of 0.25g used, re-prep not required because no structures were detected



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TECHNICAL REPORT

Project No. **A11248**

Date: **31-May-11**

To: **J. Poston**

From: **Andrew Zamurs**

Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**

Copy: **M. Mellon, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES
APRIL 2011**

Request: Four samples, representing products of Chinese, Yellowstone, & Three Springs ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11248 TEM Analysis Results

Table 1. Result Summary

			AMPHIBOLE			CHRYBOTILE		
Sample Description		Sample No.	Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	APRIL 2011	A11248-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

^ Estimated weight of 0.25g used, re-prep not required because no structures were detected

A11248 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP	APRIL 2011	A11248-2	0.2543	0.4	10	97.9	0.010	0.06	0.006	0.04
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11304**
Date: **27-Jun-11**

To: **J. Poston**
From: **Andrew Zamurs**
Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**
Copy: **M. Mellon, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
MAY 2011

Request: Four samples, representing products of Chinese, Yellowstone, & Three Springs ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11304 TEM Analysis Results

Table 1. Result Summary

			AMPHIBOLE			CHRYBOTILE		
Sample Description		Sample No.	Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	May 2011	A11304-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A11304 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████
Grade 25 USP	May 2011	A11304-2	0.2643	0.4	10	101.8	0.009	0.06	0.006	0.04
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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CONFIDENTIAL

ORE ANALYSIS REPORT

Date: June 23, 2011

To:

Reported by: Andrew Zamurs

Copy: J. Poston, S. Wulf

Results:

The following composite ore sample, representing the MV Navios Star Gaungxi #2 shipment to Houston was analyzed by X-ray diffraction (XRD) for the presence of amphibole minerals and quartz. The sample was also analyzed by transmission electron microscopy (TEM) for the presence of asbestiform minerals. The requested tests are in partial fulfillment of specifications required by [REDACTED].

	Guangxi #2 Composite MV Navios Star A11307-2
Analytical Lab Code:	
Specification:	
<i>Initial Ore Results – After Grinding (1B)</i>	
3.14 Percent Fibrous Amphibole (CTFA J4-1)	
Part A (X-ray Diffraction):	None detected
Part B (Optical Microscopy):	Not required
3.15 Percent Free Crystalline Silica Quartz (CTFA Method J6-1) (X-Ray Diffraction)	0.1% (Passes Test)
<i>TEM Results – After Grinding (1C)</i>	
3.16 Asbestos by Transmission Electron Microscope (TM 7024)	None detected



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TECHNICAL REPORT

Project No. **A11361**
Date: **28-Jul-11**

To: **J. Poston**
From: **Andrew Zamurs**
Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**
Copy: **M. Mellon, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
JUNE 2011

Request: Four samples, representing products of Chinese, Yellowstone, & Three Springs ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11361 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	June 2011	A11361-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A11361 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP	June 2011	A11361-2	0.2661	0.4	10	102.5	0.009	0.06	0.006	0.04
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11392**
Date: **16-Sep-11**

To: **J. Poston**
From: **Andrew Zamurs**
Analyst(s): **C. Slowik, A. Zamurs**
Copy: **G. Myers, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
JULY 2011

Request: Four samples, representing products of Chinese, Yellowstone, & Three Springs ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11392 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	July 2011	A11392-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A11392 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████
Grade 25 USP	July 2011	A11392-2	0.2523	0.4	10	97.2	0.010	0.06	0.006	0.04
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11426**
Date: **26-Sep-11**

To: **John Poston**
From: **Jennie Sulik**
Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**
Copy: **J. Pier, S. Sharma, G. Myers**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES**
AUGUST 2011

Request: Three samples, representing products of Australian, Chinese #2, and Yellowstone ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11426 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	August 2011	A11426-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A11426 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████
Grade 25 USP	August 2011	A11426-2	0.2439	0.4	10	93.9	0.010	0.07	0.007	0.04
██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.



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TECHNICAL REPORT

Project No. **A11459**

Date: **11-Nov-11**

To: **J. Poston**

From: **Andrew Zamurs**

Analyst(s): **C. Slowik, J. Sulik, A. Zamurs**

Copy: **G. Myers, J. Pier, S. Sharma**

Title: **TEM ASBESTOS ANALYSIS OF HOUSTON PRODUCT SAMPLES
SEPTEMBER 2011**

Request: Four samples, representing products of Chinese, Yellowstone, & Three Springs ore milled at Houston, were submitted to the Technical Center for asbestos analysis by transmission electron microscopy (TEM). This analysis is in partial fulfillment of RTM's Fiber Management Framework Program.

Results: The attached TEM results were obtained using the current ASTM draft method "Standard test method for indirect analysis of talc by transmission electron microscopy for asbestos mass concentration." This method is currently being developed by ASTM committee D22.07 (Sampling and Analysis of Asbestos) and is a modification of ASTM method D 5756 "Standard test method for microvacuum sampling and indirect analysis of dust by transmission electron microscopy for asbestos mass surface loading." The modification is to adapt existing methodology to the specific analysis of talc products and/or ore samples.

A program of laboratory "blank" analysis is in place and has been used to determine the detection limit for this analysis according to ASTM method D 6620, "Standard practice for asbestos detection limit based on counts."

A11459 TEM Analysis Results

Table 1. Result Summary

Sample Description			AMPHIBOLE			CHRYSOTILE		
			Number of Structures		Fiber Concentration	Number of Structures		Asbestos Concentration
			≥5 μm	<5 μm	ppm	≥5 μm	<5 μm	ppm
██████████	██████████	██████████	■	■	██████████	■	■	██████████
Grade 25 USP	September 2011	A11459-2	0	0	BDL	0	0	BDL
██████████	██████████	██████████	■	■	██████████	■	■	██████████
██████████	██████████	██████████	■	■	██████████	■	■	██████████

BDL = Below detection limit, as defined by ASTM D 6620

A11459 TEM Analysis Parameters

Table 2. Analysis parameters

							AMPHIBOLE		CHRYSTILE	
Sample Description		Sample No.	Starting Weight	Aliquot Filtered	Grid Spaces Analyzed	Total Sample Analyzed	Analytical Sensitivity*	Detection Limit	Analytical Sensitivity*	Detection Limit
			g	mL	#	ng	ppm	ppm	ppm	ppm
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████
Grade 25 USP	July 2011	A11459-2	0.2539	0.4	10	97.8	0.010	0.06	0.006	0.04
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████
████████	████████	████████	████████	████████	████████	████████	████████	████████	████████	████████

*Analytical Sensitivity is defined by ASTM D 5756 as the detection of one structure with minimum dimensions.