United States Environmental Protection Agency
Region III
Office of Analytical Services and Quality Assurance
(410) 573-2600

ORIGINAL (Red)

839 Bestgate Road
Annapolis, MD 21401
FAX: (410) 573-2698
(410) 573-2702

201 Defense Hwy., Suite 200
Annapolis, MD 21401
FAX: (410) 573-2771
(410) 573-2772

DATE : July 27, 1998

SUBJECT: Region III Data QA Review

FROM : Fredrick Foreman
Region III ESAT RPO (3ES20)

TO : Robert Thomson
Regional Program Manager (3HW50)

Attached is the organic data validation (DAS R3430, SDG# 92550) report for the Radford Army Ammunition Plant site completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III ESD.

If you have any questions regarding this review, please call me at (410) 573-2629.

Attachment

cc: (b) (4) [redacted] Gannett Fleming

WA File: 0398202 TDF File: #0633

Lockheed Martin Services Group
Environmental Services & Technologies Region 3
1419 Forest Drive, Suite 104 Annapolis, MD 21403
Telephone 410-268-7705 Facsimile 410-268-0331

ORIGINAL (Red)

LOCKHEED MARTIN

DATE: July 16, 1998

SUBJECT: Level M3 Organic Data Validation for DAS R3430
SDG: 92550
Site: Radford Army Ammunition Plant

FROM: (b) (4) [redacted] MR
Organic Data Reviewer

(b) (4) [redacted]
Senior Organic Data Reviewer

TO: Fredrick Foreman
ESAT Regional Project Officer

THROUGH: Dale S. Boshart DSB
ESAT Team Manager

OVERVIEW

Radford Army Ammunition Plant, DAS R3430, Sample Delivery Group (SDG) 92550, consisted of two (2) soil and three (3) solid samples submitted to Maryland Department of Health and Mental Hygiene, Division of Environmental Chemistry, Baltimore, MD, for asbestos analyses. Samples included one (1) field duplicate pair. Samples were analyzed according to EPA 600/M4-82-020, Interim Method of Determination of Asbestos in Bulk Insulation. The samples were analyzed through Delivery of Analytical Services (DAS) program.

SUMMARY

Data were validated according to Region III Modifications to the National Functional Guidelines for Organic Data Review, Level M3. Chrysotile asbestos was identified in all samples and quantified (by point count techniques) at less than 3% in each sample. Non-asbestos, organic fibers were also reported in all samples and estimated at 5-35% (by visual quantitation). All samples were successfully analyzed.

NOTES

- Method of analyses specified in DAS R3430 was Polarized Light Microscopy Analysis (OSHA Method ID191). The Laboratory Narrative indicates analyses were performed by EPA Method 600/M4-82-020. Both procedures utilize Polarized Light Microscopy and Dispersion Staining Techniques and are equivalent with regard to identification and quantification of asbestos in solid samples.

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- Results reported on Data Summary Form (DSF) in Appendix B are average results from two (2) quantitations (by different analysts) using point counting procedures. Point counting techniques were used when visual determinations indicated sample asbestos contents less than 10%.

- Point counting was performed on sample fractions that had been previously ashed to remove organic content and subsequently acid-treated to remove carbonate materials present in parent samples. Sample reductions due to ashing and acid treatment were recorded. Asbestos contents determined by point counting were corrected for sample treatment reductions and reflect asbestos content in original samples.

- Laboratory work sheets for individual analyst's visual determinations and point counts are included in Support Documentation, Appendix D.

- Field Duplicate Pair, samples 4300331WS5 and 4300331W5D, had results of 1.6% and 1.2% chrysotile, respectively. Relative Percent Difference (RPD) for these samples is 29%.

- Laboratory Form Is for samples 4300331WS5 and 4300331W5D and the Laboratory Data Summary provided in data package both contained rounding errors in calculation of Average Area %. Form Is and the Laboratory Summary Form were corrected during data review with amended results initialed by data reviewer. Corrected results were used in preparation of DSF included in Appendix B.

- Laboratory directed each analyst perform analyses for two Laboratory Control Samples (LCSs) of known chrysotile content. Each analyst had acceptable results on each of the LCS. Individual results are included in Appendix D.

- Laboratory Narrative and Laboratory-prepared Data Summary incorrectly identify sample 4300331W5D as sample 4300331WSD. These typographical errors were corrected during data validation.

All data for DAS R3430, SDG 92550, were reviewed in accordance with Region III Modifications to the National Functional Guidelines for Organic Data Review, September 1994.

ATTACHMENTS

Appendix A Glossary of Data Qualifier Codes
Appendix B Data Summary Form
Appendix C Results Reported on Laboratory Form Is
Appendix D Supporting Documentation

DCN: R3430rpt

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Appendix A

Glossary of Data Qualifiers

ORIGINAL (Red)

GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

CODES RELATED TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

NO CODE = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unusable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODES

NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

Q = No analytical result.

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Appendix B

Data Summary Forms

DATA SUMMARY FORM: ASBESTOS CONTENT

Site Name: RADFORD ARMY AMMUNITION PLANT

SOIL SAMPLES

(AVERAGE AREA PERCENT)

Case #: DAS R3430 Sampling Date(s): 3/30/98 - 3/31/98

+ Due to dilution, sample quantitation limit is affected.
See dilution table for specifics.

	Sample No.	4300330S12	4300330WS3	4300331WS4	4300331WS5	4300331W5D					
	Dilution Factor	1.0	1.0	1.0	1.0	1.0					
	Location	NR-SS-12	NR-WS-03	NR-WS-04	NR-WS-05	NR-WS-05D					
RL	ANALYTE				DUPLICATE OF 4300331W5D	DUPLICATE OF 4300331WS5					
1.0	Chrysotile	2.1	2.6	1.6	1.6	1.2					

RL = Reporting Limit

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Appendix C

Form I s

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration
201 W. Preston Street
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (Red)

LAB. NO. _____

AIR QUALITY LABORATORY
BULK ASBESTOS MICROSCOPIC ANALYSIS

COUNTY _____ DATE COLLECTED 3/30/98 1102

SOURCE OF SAMPLE 13-2864 SS-12 NR-SS-12

SUBMITTED BY (b) (4) [redacted] SAMPLE IDEN. NO.: 4300330512/3-224425

SUBMIT RESULTS TO: (NAME/ADDRESS/TELEPHONE) _____

NATURE OF MATERIAL _____

CHAIN OF CUSTODY SAMPL (b) (4) [redacted]

FROM (b) (4) [redacted] 4/30/98 / 1422 TO [redacted]
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

RESULTS:

SAMPLE COLOR: Red/Brown soil

LAYERED: YES ( ) NO (✓)

TOS FIBERS	AREA	PERCENT *		NON-ASBESTOS FIBERS	~~AREA~~ Weight %	PERCENT	
	Layer 1	Layer 2	Total		Layer 1	Layer 2	Total
CHRYSOTILE			2.1	ORGANIC			15-20
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHER				OTHERS:			
NON-FIBROUS PARTICULATE				LAYER 1:			
carbonates, iron oxide & quartz			75-85	LAYER 2:			

ANALYTICAL METHOD: EPA 600/M4-82-020 with ashing - acid dissolution

DATE COMPLETED 6/12/98 410-767-5399

ANALYST(S)/DATE (b) (4) [redacted]
(b) (4) [redacted]

LAB. SUPERVISOR/DATE (b) (4) [redacted]

* Chrysotile % determined by point counting

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RESULTS ONLY VALID FOR SAMPLE RECEIVED

DHMH-3102 (1/98) 15M

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STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration
201 W. Preston Street
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL

LAB. NO. _____

AIR QUALITY LABORATORY
BULK ASBESTOS MICROSCOPIC ANALYSIS

COUNTY _____ DATE COLLECTED 3/30/98 1015

SOURCE OF SAMPLE 13-286Y WS-03 NR-WS-03

SUBMITTED BY (b) (4) [redacted] SAMPLE IDEN. NO.: 430 0330 WS3/3-224425

SUBMIT RESULTS TO: (NAME/ADDRESS/TELEPHONE) _____

NATURE OF MATERIAL _____

(b) (4) [redacted] CUSTODY SAMPLE (b) (4) [redacted]

FROM [redacted] 1423 TO [redacted]
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

_____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

RESULTS:

SAMPLE COLOR: Dark Red soil

LAYERED: YES ( ) NO (✓)

ASBESTOS FIBERS	AREA PERCENT *			NON-ASBESTOS FIBERS	~~AREA~~ Weight %	PERCENT	
	Layer 1	Layer 2	Total		Layer 1	Layer 2	Total
CHRYSOTILE			2.6	ORGANIC			14-18
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHER				OTHERS:			
NON-FIBROUS PARTICULATE				LAYER 1:			
carbonates iron oxide			75-85	LAYER 2:			
& quartz							

ANALYTICAL METHOD: EPA 600/M4-82-020 with ashing & acid dissolution

DATE COMPLETED 6/12/98 410-767-5899

ANALYST(S)/DATE (b) (4) [redacted]

LAB. SUPERVISOR/DATE (b) (4) [redacted]

* chrysotile % determined by point counting

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RESULTS ONLY VALID FOR SAMPLE RECEIVED

DHMH-3102 (1/98)

15M

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STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration
201 W. Preston Street
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

A680429

LAB. NO. _____

AIR QUALITY LABORATORY
BULK ASBESTOS MICROSCOPIC ANALYSIS

COUNTY _____ DATE COLLECTED 3/31/98 1110

SOURCE OF SAMPLE 13-2864 WS04 NR-WS-04

SUBMITTED BY (b) (4) [redacted] SAMPLE IDEN. NO.: 430 0331 WS4/ ~~3-224~~ 3-224425 VT3C 4/3

SUBMIT RESULTS TO: (NAME/ADDRESS/TELEPHONE) _____

NATURE OF MATERIAL _____

CHAIN OF CUSTODY SAMPLE POSSESSION

FROM (b) (4) [redacted] NAME/DATE/TIME TO (b) (4) [redacted] NAME/DATE/TIME

FROM _____ NAME/DATE/TIME TO _____ NAME/DATE/TIME

FROM _____ NAME/DATE/TIME TO _____ NAME/DATE/TIME

RESULTS:

SAMPLE COLOR: Brick red rocks

LAYERED: YES ( ) NO (✓)

ASBESTOS FIBERS	AREA PERCENT *			NON-ASBESTOS FIBERS	~~AREA~~ weight % PERCENT		
	Layer 1	Layer 2	Total		Layer 1	Layer 2	Total
CHRYSOTILE			1.6	ORGANIC			19-23
				SYNTHETIC			
...OLITE				GLASS WOOL/ROCK WOOL			
OTHER				OTHERS:			
NON-FIBROUS PARTICULATE				LAYER 1:			
Carbonates, iron oxide + quartz			75-85	LAYER 2:			

ANALYTICAL METHOD: EPA 600/M4-82-020 with ashing & acid dissolution

DATE COMPLETED 6/12/98 410-767-5899

ANALYST(S)/DATE (b) (4) [redacted] K.

LAB. SUPERVISOR/DATE (b) (4) [redacted]

* chrysotile % determined by point counting

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DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration
201 W. Preston Street
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (Red)

LAB. NO. _____

AIR QUALITY LABORATORY
BULK ASBESTOS MICROSCOPIC ANALYSIS

COUNTY _____ DATE COLLECTED 3/31/98 1205

SOURCE OF SAMPLE 13-2864 WS-05 NR-WS-05

SUBMITTED BY (b) (4) [redacted] SAMPLE IDEN. NO.: 4300331 WS5/3-2244254

SUBMIT RESULTS TO: (NAME/ADDRESS/TELEPHONE) _____

NATURE OF MATERIAL _____

CHAIN OF CUSTODY SAMPLE POSSESSION

FROM (b) (4) [redacted] TO (b) (4) [redacted]
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

RESULTS:

SAMPLE COLOR: Brick red rocks

LAYERED: YES ( ) NO (✓)

ASBESTOS FIBERS	AREA PERCENT *			NON-ASBESTOS FIBERS	~~AREA~~ Weight A.V.M. PERCENT		
	Layer 1	Layer 2	Total		Layer 1	Layer 2	Total
CHRYSOTILE			1.6 1.7	ORGANIC			25-35
AMOSITE		DJ 7/6/98		SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHER				OTHERS:			
NON-FIBROUS PARTICULATE				LAYER 1:			
Carbonates, iron oxide & quartz			60-70	LAYER 2:			

ANALYTICAL METHOD: EPA 600/M4-82-020 with ashing & acid dissolution

DATE COMPLETED 6/12/98 410-767-5899

ANALYST(S)/DATE (b) (4) [redacted]

LAB. SUPERVISOR/DATE (b) (4) [redacted]

*chrysotile % determined by point counting

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STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration
201 W. Preston Street
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

LAB. NO. _____

AIR QUALITY LABORATORY
BULK ASBESTOS MICROSCOPIC ANALYSIS

COUNTY _____ DATE COLLECTED 3/31/98 1205

SOURCE OF SAMPLE 13-286Y WS-05D NR-WS-05D

SUBMITTED BY (b) (4) [redacted] SAMPLE IDEN. NO.: 4330033/WSD/3-2244255

SUBMIT RESULTS TO: (NAME/ADDRESS/TELEPHONE) _____

NATURE OF MATERIAL _____

CHAIN OF CUSTODY SAMPLE POSSESSION

FROM (b) (4) [redacted] TO (b) (4) [redacted]
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

FROM _____ TO _____
NAME/DATE/TIME NAME/DATE/TIME

RESULTS:

SAMPLE COLOR: Brick red rocks

LAYERED: YES ( ) NO (✓)

ASBESTOS FIBERS	AREA PERCENT *			NON-ASBESTOS FIBERS	~~AREA~~ Weight A.V.M. PERCENT		
	Layer 1	Layer 2	Total		Layer 1	Layer 2	Total
CHRYSOTILE			~~1.3~~ 1.2	ORGANIC			25-35
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHER				OTHERS:			
NON-FIBROUS PARTICULATE				LAYER 1:			
Carbonates, iron oxide & quartz			65-75	LAYER 2:			

ANALYTICAL METHOD: EPA 600/M4-82-020 with ashing & acid dissolution

DATE COMPLETED 6/12/98 410-767-5899

ANALYST(S)/DATE (b) (4) [redacted]

LAB. SUPERVISOR/DATE (b) (4) [redacted]

* chrysotile % determined by point counting

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RESULTS ONLY VALID FOR SAMPLE RECEIVED

DHMH-3102 (1/98) 15M

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Appendix D

Support Documentation

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DAS Number: R3430
Date: 03/19/98

U.S. EPA
REGION III
DAS ANALYTICAL SERVICES REQUEST FORM

Site: Radford Army Ammunition Plant		Validation Level: M3/ILM2
City: Radford	County: Montgomery and Pulaski	State: VA
Latitude: 37 07' 50" N	Longitude: 80 34' 30" W	Altitude: 550 m
Program: Superfund		Activity: Federal Facility Oversight
Account Number: 98 T 03N YPX 038YGE00		PRP Lab: Not Applicable
Preparer: Cynthia Cheatwood	Phone #: 410-433-8832	Fax #: 410-433-6520
Site Leader: Frank Swit	Phone #: 717-763-7211	Fax #: 717-763-7323
EPA RPM: Robert Thomson (3HW50)	Phone #: 215-566-3357	Fax #: 215-566-3001
EPA CO: Pamela Pilz	Phone #: 202-260-3205	Fax #: 202-260-1880
Contract Type: ROC Zone 1	Prime: Gannett Fleming	Sub:

Conc. Level	No. of Samples	Method	Parameter	Matrix
LM	6	Polarized Light Microscopy Analysis (OSHA Method ID191)	asbestos 15773	solid
	4	Polarized Light Microscopy Analysis (OSHA Method ID191)	asbestos 15774	soil
			4-14-98	

Shipping Dates	From:3/30/98	To:4/10/98

Required TAT:35 days	Carrier:FEDEX

. **SPECIAL INSTRUCTIONS::**

. **STATEMENT of OBJECTIVES:** Please include the following approved project plan elements:

ROJECT PLAN IDENTIFICATION:
Sampling Plan for New River Depot Area, Radford Army Aminunition Plant, May 1997"
NTICIPATED USE OF THE DATA: The subject samples will be used for site characterization.
ROGRAM/PROJECT REQUIRED REPORTING LIMITS: As per CLP SOW.
ATA QUALITY OBJECTIVES (ACCURACY AND PRECISION):As per method.

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 3
841 Chestnut St.
Philadelphia, Pennsylvania 19107

CHAIN OF CUSTODY RECORD

PROJ. NO.: 13-286Y
PROJECT NAME: NR

SAMPLERS: (Signature) Robert Scrafford, Robert W. Hill
Sidney Curran, Sidney Curran

Div. Env. Chem Lab
201 W. Preston St.
Baltimore, MD 21202
Attn: Delores Willis

REMARKS
DAS # R3430

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Asbestos OSHA method ID191 4-02 Jar						DAS #	TAG #
SS-12	3/30/98	1102		X	NR-SS-12	1	1						4300330512	3-2244251
WS-03	3/30/98	1015		X	NR-WS-03	1	1						4300330WS3	3-2244252
WS-04	3/31/98	1110		X	NR-WS-04	1	1						4300331WS4	3-2244253
WS-05	3/31/98	1205		X	NR-WS-05	1	1						4300331WS5	3-2244254
WS-05D	3/31/98	1205		X	NR-WS-05D	1	1						4300331WS5D	3-2244255

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Robert W. Hill	4/29/98 1431	Delores Willis	Delores Willis	4/30/98 2:04pm	Yvonne Tai-Sen Chay
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Yvonne Tai-Sen Chay	4/30/98 1420	Sara V. Mockeman			
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
ORIGINAL (Red)				Fed ex Airbill No: 2894308432	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

Page 1 of 1

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PAGE 1 OF 1

EPA SAMPLE SHIPPING LOG

(1) (REQUIRED FOR ALL SAMPLES SENT THROUGH THE CONTRACT LAB PROGRAM)

PROJECT SITE NAME: Rockford Army Ammunition Plant ; EPA PROJ. OFFICER: Robert Thomson
RAS NO. _____ ; ~~SAS~~ DAS NO. R3430 ; TASK OR SET NO. _____
PROJECT SITE LEADER: Frank Swift ; PHONE NO. (717) 263-7211
PROJECT SAMPLE COORDINATOR: Sidney Curran ; PHONE NO. (410) 433-8832

QC SAMPLE INFORMATION AND/OR COMMENTS	CONC. (LOW/ MED./ HIGH)	SAMPLE PHASE (AQ/ SOL.)	TYPE OF REQUEST (ORG. DIO. OR INOR) SAS	EPA SAMPLE NO.	ORGANICS OR INORGANICS: LAB NAME	DATE SHIPPED	DATA RECEIVED (XX-OUT ITEMS NOT REQUESTED): VOA	BNA	PEST	TCDD	METALS	CN
(2)	(3)	(4)	(5)	(6)	(7)	(8)	←			(9)		→
	LOW	SOL	DAS	4300330512								
				4300330WS3								
				4300331WS4								
				4300331WS5								
Duplicate of 4300331WS5				4300331WS5D								

SAS REQUEST (DETAILS REQUIRED) (10)	LAB NAME (11)	~~SAS~~ DAS REQUEST (ITEMIZE) (12)	DATE SHIPPED (13)	DATA REC'D.
1. Asbestos - OSHA method ID191 MAY 1988 RECEIVED	Av. Env. Chem	1	4/29/98	✓
		1		✓
		1		✓
		1		✓
		1		✓
				6-26-98 925 50

FINAL SAMPLING: YES ☐ NO ☐ FINAL SHIPPING DATE: _____

ORIGINAL (Red)

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
201 W. Preston Street
Baltimore, MD 21201
Ph: (410) 767 - 5839
Fax: (410) 333 - 5403

AIR QUALITY LABORATORY

DATA PACKAGE COVER SHEET

Bulk Asbestos Microscopic Analysis

Date of Report: June 19, 1998

Customer's Name: Roy F. Weston, Inc. (Contractor for USEPA, Region III)
Customer's Address: 5 Underwood Court, Delran, New Jersey 08075-1229
Ph: (609) 461-4003
Fax: (609) 461-4916

Requsition No: 117514 **Purchase Order No:** 92550

Analytical TDD No: 9804-L07 **DAS No:** R3430

EPA Region III Sample ID# DAS#/TAG#	DHMH Laboratory ID #
4300330S12/3-2244251	A680427
4300330WS3/3-2244252	A680428
4300331WS4/3-2244253	A680429
4300331WS5/3-2244254	A680430
4300331WSD/3-2244255	A680431

CYDV 7/8/98

Prince A. K. Kassim, Ph.D., Chief
Division of Environmental Chemistry

Yvonne Tai-Sen-Choy
Division Quality Assurance Officer

1A

ORIGINAL (Red)

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry

AIR QUALITY LABORATORY

NARRATIVE

Bulk Asbestos Microscopic Analysis Report

Purchase Order No: 92550; Analytical TDD No: 9804-L07

The first shipment of samples under the contract guidelines was received on April 30, 1998. Five samples were received. Two were soil samples assigned DHMH -LAB #s A680427, and A680428. Three solids were assigned A680429, A680430, and A680431. Sample A680427 was wet while the other four were dry. Seals on the shipping container were intact. Bottles were sealed with tape and tagged. They were placed in sealed plastic bags that were then packed with vermiculite.

EPA Method 600/M4-82-020 was used for the analysis. The only slight modification from the laboratory procedure was the warming of 3N HCl instead of treatment of the sample with HCl at room temperature. The warming of the sample was done to speed up the reaction involving carbonates and iron oxide. This acid digestion process was done to remove any coating from fibers. Worksheets (see attachment 9) are submitted showing the calculations used to determine the amount of asbestos present in each sample.

❒ The instruments used and their identification numbers are as follows:

- Olympus Stereo Microscope, State ID # 47373
- Bausch & Lomb Stereo Microscope, State ID # 7988
- Zeiss Polarized Light Microscope (PLM), State ID # 40609
- Olympus Polarized Light Microscope, State ID # 63475 .

❒ During the analysis of the samples the following problems were encountered:

- wet sample
- abundance of cellulose
- heavily coated fibers

❒ The solution implemented for each problem as outlined above are as follows:

- sample was dried using a heat lamp
- ashing was done
- acid dissolution.

Except for the warming of the acid, the processing of the samples was carried out in the manner described in the method.

1B

ORIGINAL

WESTON

5 Underwood Court, Deiran, New Jersey 08075-1229
609-461-4003 · 215-238-0338 · Fax 609-461-4916 609-461-4801

SITE ASSESSMENT/TECHNICAL ASSISTANCE EPA CONTRACT 68-S5-3002

April 28, 1998

STATE OF MARYLAND, DIV. OF ENV. CHEM. LAB
201 WEST PRESTON STREET
BALTIMORE, MARYLAND 21202
ATTN: PRINCE KASSIM

SUBJECT: Confirmation to Proceed with Analysis

Analytical TDD#	9804-L07
PO#	92550

Dear PRINCE KASSIM:

This letter grants your firm confirmation to proceed with the analysis of samples for Roy F. Weston, Inc. (WESTON®) on the behalf of our client, the U.S. Environmental Protection Agency. All work will be performed within the terms presented in this letter and on the Request for Bid Form. Method detection limits are those specified in the EPA test method(s) unless otherwise stated.

The date for our receipt of the complete hard copy of the analytical package with associated QA is 26 JUNE 1998. (We do not consider results via facsimile machines to be the complete data package). For delay not due to acts of God, a reduction in the total charge will be three percent for the first day, two percent for the second day, and an additional one percent for each additional day. (Weekends and WESTON-observed holidays are included in the turn-around time, but are not counted in determining the late penalty.)

The attached supplemental provisions (SATA 9/95) are to be applied and are binding pertaining to this agreement.

In regard to payment, WESTON's terms are net 45 from the day of invoice or receipt of the analytical package, whichever is later. If a late penalty must be invoked and your invoice does not include this penalty, a letter detailing the penalty will be written by WESTON for your information and our files which may result in delayed payment.

The following holidays are not considered delivery days, they are: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving, and Christmas. The turnaround time begins with the date and time of the delivery of the sample(s) to your laboratory. In the event the samples are delivered after 10:30 AM, the turnaround time will begin on the following day.

Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION
In Association with Foster Wheeler Environmental, Inc., Resource Applications, Inc., C.C. Johnson & Malhotra, P.C., and PRC Environmental Management, Inc.

ORIGINAL (Red)

CONFIRMATION TO PROCEED WITH ANALYSIS

DATE: April 28, 1998
LABORATORY NAME: State of Maryland, Div. of Env. Chem. Lab
P.O. No.: 92550

WRITTEN APPROVAL FOR SUBCONTRACTING ANY PORTION OF THIS WORK BY YOUR FIRM MUST BE GRANTED BY THE REGIONAL LABORATORY COORDINATOR ON BEHALF OR WESTON PRIOR TO THE PERFORMANCE OF ANY WORK STATED IN THE AGREEMENT.

The laboratory is responsible for disposal of samples and return of shipping coolers. WESTON will not dispose of any samples or pay additional shipping or freight costs.

If you have any questions or require additional information about this project, please contact a at (609) 461-4003 Ext. 205. Please have an authorized representative of your company sign the signature line below, indicating that State of Maryland, Div. of Env. Chem. Lab agrees to the terms set forth in this letter. This letter must be signed by a person empowered to bind the company. Please return a copy of the signed letter via fax to Weining Xu at (609) 461-4916.

Sincerely,

ROY F. WESTON, INC.

Weining Xu
Chemical Engineer

Authorized Laboratory Signature J. Michael Joseph

Position Director, Lab Adm.

Attachments: Completed Request for Bid Form
Supplemental Provisions (SATA 9/95)

2A

VESTON®

X PURCHASE
___ RENT/LEASE
___ REPAIR
___ BLANKET
___ BLANKET RELEASE RELEASE #___
BLANKET PO #___
___ OTHER _____

03-5527

MATERIALS/SERVICES REQUISITION

FORWARD TOP 3 COPIES TO DATA INPUT CLERK
RETAIN 4TH COPY FOR YOUR FILES

CAPITAL [ ] EXPENDABLE [X]

DATE: 27-Apr-98

REQUSITION NO.: 117514

PURCHASE ORDER NO.: 92550

ITEM NO.	VESTON CODE	SAMPLE MATRIX	ITEM DESCRIPTION		QUANTITY UNIT	ESTIMATED UNIT PRICE	ESTIMATED EXTENDED PRICE	RECOMMENDED SUPPLIER ADDRESS/CONTACT/PHONE
1	46150	Solid	for ASBESTOS	PLM(EPA 600/R-93/116)	6	$25.00	$150.00	
2		Soil	for ASBESTOS	PLM(EPA 600/R-93/116)	4	$25.00	$100.00	STATE OF MARYLAND,DHMH,DEC LAB 201 WEST PRESTON STREET BALTIMORE MD 21202-
			DELIVERABLES AS PER RFB AND EPA REGION III DAS SOW.					DELORES WILLIS (410) 767-5646
								DAS# R3430 SITE TDD# 9804-05 Analytical TDD# 9804-L07
				TOTAL REQUISITION COST:			$250.00	

	QUANTITY OF MATERIAL	100	[redacted]	11098-233-003	9375 -00
	DELIVER TO PERSON	MARIAN MURPHY	PRIME CONTRACT	68-S5-3002	
ITEM NO.	DELIVERY LOCATION	DELRAN, NJ 08075	SUBCONTRACT	N/A	
	DELIVERY LOCATION		[redacted]	000000	
	DELIVERY DATE	26-Jun-98	[redacted]	F02	
	AFE NUMBER		[redacted]	01-001055-47120-000	

PHONE: (609) 461 4003

REQUISITIONER: Ann Weaver

DATE: 27 April 1998

PD/PM/DM APPROVAL: Marian Murphy

DATE: 28 April 1998

DIVISION/REGIONAL APPROVAL: ___

DATE: ___

ORIGINAL

RFW 04-05-001/C-1/95

ORIGINAL (Red)

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
201 W. Preston Street
Baltimore, MD 21201
Ph: (410) 767 - 5839
Fax: (410) 333 - 5403

AIR QUALITY LABORATORY

DATA SUMMARY

Bulk Asbestos Microscopic Analysis Report

EPA LAB #	DHMH#	Analyte	*Pt. Ct. Av. Area %	**Visual Estimate Area %	
4300330S12/3-2244251	A680427	Chrysotile	✦SM+✱KH (1.6~~7~~+2.6)÷2=2.1	✦(SM) 5-10	✱(KH) 2-6
4300330WS3/3-224452	A680428	Chrysotile	(2.7+2.5)÷2=2.6	3-8	2-8
4300330WS4/3-224453	A680429	Chrysotile	(1.5+1.6)÷2=1.6	2-5	1-5
4300330WS5/3-224454	A680430	Chrysotile	(1.4+1.9)÷2=~~1.7~~ 1.6	3-6	2-6
4300330W~~8~~5D/3-224455	A680431	Chrysotile	(1.1~~8~~+1.4)÷2=1.3 1.2	2-8	1-5

Ga 7/6/98

DU 7/6/98

* Point counting done on the sample after ashing and acid dissolution.
** Visual estimate in area percent done on original sample.
✦ Test performed by Sara Monkman (SM).
✱ Test performed by Kalpana Hegde (KH).

10

ORIGINAL (Red)

Air Quality Laboratory

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680427

STEREOSCOPIC EXAMINATION

Homogeneous: X p.s.m. Non-Homogeneous: ✓ Color: reddish brown

Texture: granular (clay-like) + fibrous Remarks:

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: ? Crocidolite: Amosite: Other:

If layered, % asbestos: Layer 1 Layer 2

● *Sample Preparation:* lamp dried, ground 3 slides prepared ashed by Kalpana + acid washed with HCl (hot)

Used): 1.55(✓) 1.605( ) 1.68( ) Other( )

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.550	1.555	+	undulose	none	low	blue	magenta gold	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric (✓) for cellulose Point Counting (✓) for chrysotile

Asbestos Fibers	Layer 1	Layer 2	Total Vis. est.	Non Asbestos Fibers	Layer 1	Layer 2 wt%	Total
CHRYSOTILE		pf.ct. 1.6	5-10	ORGANIC twists, pits		18%	15-20
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL isotropic			<1
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE			75-85 o.s.m. 80-90	Analyst: S. Monteman			
81 22% CO_3^+ + quartz + Fe_2O_3				Date: 6/3/98			18

DHSHL-3102A 6/01

+ Red particulate appears to be a match for iron oxide (Fe_2O_3) pg. 477 Mellan

vial + tape + sample = 19.2002 g
vial + tape = 18.7469 g

ORIGINAL (Red)

Gravimetric Measurement: Crucible #1

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. 32.9035 g

Crucible wt. + top 28.6959 g

Sample wt. 4.2076 g

Crucible & residue wt. 32.1296 g

Residue wt. 3.4337 g

Residue Wt. / Sample wt. X 100 = 82 wt. % residue

100% - wt. % residue = 18 wt. % vol. sol. cellulose

B. Acid Dissolution

Filter wt. 0.0150 g

Sample wt. 0.4533 g

Filter & Residue wt. 0.1872 g

Residue wt. 0.1722 g

Residue wt. / Sample wt. X 100 = 38 wt. % residue x82 = 31%

100% - wt. % residue = 62 wt. % dis. sol. x82 = 51% CO_3

Hot HCl

Polarized- Light Microscopy: ***Point Count:*** 1K 1.1.M ***Scanning Option:*** 1-1

5C 1 45/

C	C	C	C	C	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
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2 50/

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3C 3G 3 44/

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2C 4 48/

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/	/	/	C	/	/	/	/	/	/

3C 5 47/

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/	/	/	/	/	/	/	/	/	C
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/	/	C	/	/	/	/	/	C	/
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6 50/

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3C 7 47/

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/	C	/	/	/	/	/	/	/	/
/	/	/	/	/	C	C	/	/	/

4C 8 46/

C	C	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
C	C	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, ____ = ____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, ____ = ____ fiber
/ = Nonfiber, ____ = ____, ____ = ____, ____ = ____

Calculations:

Percent = Points counted ÷ Total points X 100 = ________ %

component 1: chrysotile points counted: 20 ÷ total points: 400 X 100 = 5 % x.31 = 1.6
component 2: NFP points counted: 377 ÷ total points: 400 X 100 = 94.25 % x.31 = 29
component 3: glass points counted: 3 ÷ total points: 400 X 100 = 0.75 % x.31 = 0.2
component 4: ____ points counted: ____ ÷ total points: ____ X 100 = ____ %
component 5: ____ points counted: ____ ÷ total points: ____ X 100 = ____ %

ORIGINAL (Red)

Air Quality Laboratory

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A 680427

STEREOSCOPIC EXAMINATION

Homogeneous _____ Non-Homogeneous: ✓ Color: Red

Texture: Fibrous wet Cellulose Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* Needed drying Ashing & Acid washing

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°c

Morphology	Refractive Index ⊥ 620	Refractive Index ∥ 560	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
Wavy	1.549	1.553	+	undulose	None	L	Blue	magenta	Chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric (✓) Point Counting (✓)

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE			2 - 6	ORGANIC twisted tapered end.			16-20
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL Isotropic			<1
OTHERS				OTHERS:			
NON-FIBROUS PARTICULATE			27 ~~25~~ - 29 KH	Analyst: K. Hegde		Pt. Ct. 2.63 visual est. ~~4.00~~ KH 2-C	
SiO2 CaCO3			51 45-55	Date: 6/11/98			

DHSH-3102A 6/97

5/4/98 Crucible # 1

6/5/98 wt. of vial 18.7247 g

wt. of vial + sample 19.5489 g

ORIGINAL (Red)

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. ~~28.6959~~ 32.9035 g KH

Crucible wt. + top 28.6959 g

Sample wt. 4.2076 g

Crucible & residue wt. 32.1296 g

Residue wt. 3.4337 g

Residue Wt. / Sample wt. X 100 = 82 wt. % residue

100% - wt. % residue = 18 wt. % vol. sol.

Hot HCl

6/9/98 38% x 0.82 KH ~~26~~ 31%

62% x 0.82 51%

CO_3

Done by SM

B. Acid Dissolution

Filter wt. 0.0150 g

Sample wt. 0.8242 g

Filter & Residue wt. 0.6081 g

Residue wt. 0.5931 g

Residue wt. / Sample wt. X 100 = 72 wt. % residue 59%

100% - wt. % residue = 28 wt. % dis. sol. 23%

CO_3

Done by KH

Polarized- Light Microscopy: ***Point Count:*** | - | ***Scanning Option:*** | - |

1 C = 4 / = 46

/	/	/	/	/	/	/	/	/	C
/	/	/	/	/	C	C	/	/	C
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

2 C = 5 / = 45

/	/	/	/	/	/	C	/	C	/
/	/	/	/	/	/	/	/	C	C
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	C	/	/	/	/	/	/	/

3 C = 7 / = 43

C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
C	C	C	C	/	/	/	/	/	/
/	/	C	/	/	/	/	/	/	/
/	/	/	/	C	/	/	/	/	/

4 C = 7 / = 43

C	C	C	/	/	/	/	/	C	C
/	/	/	/	/	/	/	/	C	C
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

5 C = 3 / = 47

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	C
/	/	/	/	C	/	/	/	/	/
/	/	/	/	/	/	/	/	C	/
/	/	/	/	/	/	/	/	/	/

6 C = 2 / = 48

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	C	/	/	/	/	/	C	/
/	/	/	/	/	/	/	/	/	/

7 C = 6 / = 44

/	/	/	/	/	/	C	C	C	C
/	/	/	/	/	/	/	/	/	/
C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	C

8 C = 0 / = 50

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/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1:	Chrysotile	points counted: 34	÷ total points: 0.085	X 100 = 8.5 %	x 0.31	2.6
component 2:	Particulate	points counted: 366	÷ total points: 0.915	X 100 = 91.5 %	x 0.31	28.3
component 3:		points counted:	÷ total points:	X 100 =	%	
component 4:		points counted:	÷ total points:	X 100 =	%	
component 5:		points counted:	÷ total points:	X 100 =	%	

ORIGINAL (Red)

Air Quality Laboratory

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A 680428

STEREOSCOPIC EXAMINATION

Homogeneous: X.D.M. Non-Homogeneous: ✓ Color: dark red

Texture: coarse granular + fibrous Remarks:

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: ? Crocidolite: Amosite: Other:

If layered, % asbestos: Layer 1 Layer 2

● *Sample Preparation:* ground, 3 slides prepared, ashed & acid washed in Hot HCl by Kalpana

● *(Oil Used):* 1.55 (✓) 1.605 ( ) 1.68 ( ) Other ( )

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.549	1.553	+	undulose	None	low	blue	magenta	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) | Gravimetric (✓) for cellulose | Point Counting (✓) for chrysotile

Asbestos Fibers	Layer 1	Layer 2 pt. ct	Total 715 est	Non Asbestos Fibers	Layer 1	Layer 2 wt	Total
CHRYSOTILE		2.7	3-8	ORGANIC tweeto		16%	5-15
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL isotropic			<1
OTHERS				OTHERS:			
NON-FIBROUS PARTICULATE				Analyst: S. Monkman			
~~26% Co3O4 Fe2O3 52 quartz~~			75-85 ✓ ~~80-90~~	Date: 6/4/98 O.V.M			

DHMH-3102A 6/97

The red particulate appears to be a matrix fine iron oxide (Fe_2O_3) or 470 Melanite

Vial + Top + sample = 14.79589.
Vial + Top = 13.9763

Gravimetric Measurement: Crucible #1

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. 32.1835 g

Crucible wt. + top 28.8165 g

Sample wt. 3.3670 g

Crucible & residue wt. 31.6533 g

Residue wt. 2.8368 g

Residue Wt. / Sample wt. X 100 = 84 wt. % residue

100% - wt. % residue = 16 wt. % vol. sol. cellulose

B. Acid Dissolution

Filter wt. 0.0151 g

Sample wt. 0.8195 g

Filter & Residue wt. 0.3273 g

Residue wt. 0.3122 g

Residue wt. / Sample wt. X 100 = 38 wt. % residue wt. x 84% = 32%

100% - wt. % residue = 62 wt. % dis. sol. wt. x 84% = 52% CO_3

Hot HCl.
Done by KH

Polarized- Light Microscopy: **Point Count:** 1-1 A.V.M **Scanning Option:** 1-1

2C 1 48/	3C 2 47/	5C 3 45/	7C 4 43/
/ / / / / / / / / /	/ / / / / / / / / /	C C / / / / / C C /	/ / / / / / / / / /
/ / / / / / / / / /	/ / / / / / / C / /	/ / / / / / / / / /	/ / / / / C C / / /
/ / / / / / / / / C	/ / / / / / / / / /	/ / / / / / / / / /	/ / / / / / / C / /
C / / / / / / / / /	/ / / / C / / / / /	/ / / / / / / / / /	/ / C / / / / / / /
/ / / / / / / / / /	/ / / / C / / / / /	/ / / / / C / / / /	/ / C C C / / / / /

2C 5 48/	3C 6 47/	6C 7 44/	6C 8 44/
/ / / / / / / / / /	/ / / / / / / / / /	/ / / / / / / C / /	C C / / / / / / / /
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/ / / / / / / / / /	/ / / / / / C / / /	C / / / C / / / / /	C / / / / / / / / /
/ / / / / / / / / /	/ C / / / / / / / /	/ / / / / / / C C C	/ / / / / / / / / /

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____ %

component 1:	Chrysotile	points counted: 34	÷ total points: 400	X 100 = 8.5	%	x.32 = 27
component 2:	NFP	points counted: 366	÷ total points: 400	X 100 = 91.5	%	x.32 = 29
component 3:		points counted:	÷ total points:	X 100 =	%	
component 4:		points counted:	÷ total points:	X 100 =	%	
		points counted:	÷ total points:	X 100 =	%	

Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A 680428

STEREOSCOPIC EXAMINATION

Homogeneous _____ Non-Homogeneous: ✓ Color: Red, white

Texture: Fibrous & white grainer Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

Sample Preparation: Needed fshing & Acid washing

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	620 1.549	580 1.552	+	undulose	None	L	Blue	magenta	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric (✓) Point Counting ( )

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE			2 – 8	ORGANIC / moisture twisted, tapered end			10-20
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: K. Hegde			
52% CO3 28% Particulate/			75- 85	Date: 6/9/98			

pt ct → 2.48
visual estimate → 2-8

DHMH-3101A 6/97

7/9 ORIGINAL (Red) Crucible # 1 Hot HCl 6/8/98 wt. of vial 18.7155 g

wt. of vial 13.9763

wt. of vial + sample 14.7958

Gravimetric Measurement:

wt. of vial + sample 19.9019 g

Ashing (Weigh to 4 decimals)		B.	Acid Dissolution	
Crucible, top & sample wt.	32.1835 g	0.0150 KH	Filter wt.	0.0153 KH g
Crucible wt. + top	28.8165 g	0.8195	Sample wt.	1.1864 g
Sample wt.	3.3670 g	0.3273	Filter & Residue wt.	0.8284 g
Crucible & residue wt.	31.6533 g	0.3122	Residue wt.	0.8131 g
Residue wt.	2.8368 g	38% × 0.84 = 32%	Residue wt. / Sample wt. X 100 =	69 wt. % residue 58%
Residue Wt. / Sample wt. X 100 =	84 wt. % residue	62% × 0.84 = 52% CO_3	100% - wt. % residue =	31 wt. % dis. sol. 26% CO_3
100% - wt. % residue =	16 wt. % vol. sol. Cellulose	Done by KH	Done by KH	

Polarized- Light Microscopy: ***Point Count:*** | - | ***Scanning Option:*** | - |

1 C = 6 / = 44

C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	/	/	/	/
/	/	/	/	/	/	/	/	C	C
C	/	/	/	/	C	/	/	/	/

2 C = 6 / = 44

C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	C	/	/	/
/	/	/	C	C	/	/	/	/	/
/	/	/	C	/	/	/	/	/	/

3 C = 2 / = 48

/	/	/	/	/	/	/	C	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

4 C = 4 / = 46

/	/	/	/	/	/	/	C	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	C	C	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

5 C = 4 / = 46

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
C	C	/	/	/	C	C	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

6 C = 3 / = 47

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	C	C	C	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

7 C = 1 / = 49

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	C	/	/
/	/	/	/	/	/	/	/	/	/

8 C = 5 / = 45

/	/	/	/	/	/	/	/	/	/
/	/	/	/	C	C	/	/	/	/
C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	C	C	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1: Chrysotile	points counted: 31	÷ total points: 0.0775	X 100 = 7.75 %	×0.32 → 2.48%
component 2: particulate	points counted: 369	÷ total points: 0.9225	X 100 = 92.25 %	29.52
component 3:	points counted:	÷ total points:	X 100 = %	
component 4:	points counted:	÷ total points:	X 100 = %	
	points counted:	÷ total points:	X 100 = %	

Air Quality Laboratory

ORIGIN (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680429

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: brick red

Texture: rock-like - fibrous Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: ? Crocidolite: _____ If layered, % asbestos:

Amosite: _____ Other: _____ Layer 1 _____

Layer 2 _____

Sample Preparation: ground, 3 slides prepared, ashed, re-ground, acid washed in Hot HCl

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.549	1.553	+	undulose	None	low	blue	magenta	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) | Gravimetric (✓) for cellulose | Point Counting (✓) for chrysotile

Asbestos Fibers	Layer 1	Layer 2 pt. ct.	Total vis. est	Non Asbestos Fibers	Layer 1	Layer 2	Total wt.
CHRYSOTILE		1.5	2-5	ORGANIC tissue			21
AMOSITE				SYNTHETIC			(15-25)
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: S. Monteman			
66% CO_3 + quartz + Fe_2O_3			70-80	Date: 6/8/98			

DHMH-3102A 6/97

The red particulate appears to be a match for iron oxide (Fe_2O_3) pg. 477 McCrone Atlas II

ORIGINAL (Red)

Gravimetric Measurement: Crucible No. 4 | 6/9/98 wt. of vial 18.7151 g.
wt. of vial + sample 19.7315

sample vial + top 19.1020
vial + top 18.7261

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. 31.0749 g

Crucible wt. + top 28.4429 g

Sample wt. 2.6320 g

Crucible & residue wt. 30.5184 g

Residue wt. 2.0755 g

Residue Wt. / Sample wt. X 100 = 79 wt. % residue

100% - wt. % residue = 21 wt. % vol. sol. cellulose

0.0150g
0.3759
0.0764
0.0614
16x79=13%
84x79=66% CO_3

Hot Acid
5M

B. Acid Dissolution

Filter wt. 0.0152 g

Sample wt. 1.0164 g

Filter & Residue wt. 0.7314 g

Residue wt. 0.7162 g

Residue wt. / Sample wt. X 100 = 70 wt. % residue 55%

100% - wt. % residue = 30 wt. % dis. sol. 24%

Done by KH.

Polarized- Light Microscopy: ***Point Count:*** | ✓ | p.l.m. ***Scanning Option:*** | - |

6C — 1 — 44/

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	C	/	/	/
/	/	/	/	/	C	/	/	/	/
/	C	C	/	/	/	C	/	/	/

7C — 2 — 43/

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	C	C	/	/
/	/	C	C	/	/	/	/	/	/
C	/	/	/	/	C	C	/	/	/
/	/	/	/	/	/	/	/	/	/

7C — 3 — 43/

/	/	/	/	/	/	C	/	/	/
/	/	/	/	C	/	/	C	C	/
/	/	C	/	/	/	/	/	C	/
/	/	/	/	/	/	/	/	/	/
C	/	/	/	/	/	/	/	/	/

5C — 4 — 45

/	/	/	/	/	/	/	C	/	/
/	/	/	C	/	/	/	/	/	/
/	/	/	/	C	/	/	/	/	/
/	/	/	C	/	/	/	/	/	/
/	/	/	/	/	/	C	/	/	/

4C — 5 — 46/

/	/	C	/	/	C	/	/	/	/
/	/	/	/	/	/	/	/	/	C
C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

5C — 6 — 45/

C	C	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	C	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	C	C	/	/	/	/	/	/

3C — 7 — 47/

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	C	/	/	/	/	/
/	/	/	C	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	C

8C — 8 — 42/

C	/	/	/	/	/	/	/	C	/
C	C	C	/	/	/	/	C	C	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	C	/
/	/	/	/	/	/	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, ______ = ______ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, ______ = ______ fiber
/ = Nonfiber, ______ = ______, ______ = ______, ______ = ______

Calculations:

Percent = Points counted ÷ Total points X 100 = ______%

component 1: Chrysotile points counted: 45 ÷ total points: 400 X 100 = 11.25 % x.13 = 1.5
component 2: NFP points counted: 355 ÷ total points: ______ X 100 = 88.75 % x.13 = 11.
component 3: ______ points counted: ______ ÷ total points: ______ X 100 = ______ %
component 4: ______ points counted: ______ ÷ total points: ______ X 100 = ______ %
points counted: ______ ÷ total points: ______ X 100 = ______ %

ORIGINAL (Red)

Air Quality Laboratory

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680429

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: Brick red.

Texture: Fibrous, Granular Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* Needed grinding, Ashing & Acid wash.

● *(Oil Used):* .55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥ 620	Refractive Index ∥ 560	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
Wavy	1.549	1.553	+	Undulose	None.	L	Blue	magenta.	Chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric (✓) Point Counting ( )

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE		KH	1-8 KH	ORGANIC twisted & tapered end			15-25 21
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: K. Hegde		Pt. ct. → 1-63	
66% CO3 10% Parkwate			75-79 78 KH	Date: 6/12/98		visual estimate → 1-5	

DHSHI-3102A 6/97

Crucible #4.

Gravimetric Measurement:

19.1020 wt. of vial 18.7151 g.

18.7261 wt. of vial + sample 19.7315 g.

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt.	31.0749 g	0.0150 g.
Crucible wt. + top	28.4429 g	0.3759 g.
Sample wt.	2.6320 g	0.0764 g.
Crucible & residue wt.	30.5156 g	0.0614 g.
Residue wt.	2.0755 g	16 × 0.79 = 13%
Residue Wt. / Sample wt. X 100 =	79 wt. % residue	84 × 0.79 = 66% CO_3
100% - wt. % residue =	21 wt. % vol. sol. cellulose.	

Done by SM.

B. Acid Dissolution

Filter wt.	0.0152 g
Sample wt.	1.0164 g
Filter & Residue wt.	0.7314 g
Residue wt.	0.7162 g
Residue wt. / Sample wt. X 100 =	70 wt. % residue 55%
100% - wt. % residue =	30 wt. %.dis. sol. 24%

Done by KH.

Polarized- Light Microscopy: ***Point Count:*** 1 - 1 ***Scanning Option:*** 1 - 1

1 C = 10 / = 40

/	/	/	/	/	/	/	/	C	C
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	C	C	C	C	C	C	/	/	C
C	/	/	/	/	/	/	/	/	/

2 C = 3 / = 47

C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	/	/	/	/
/	/	C	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

3 C = 9 / = 41

/	/	/	/	/	/	/	/	C	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	C	C
C	C	C	C	/	C	C	/	/	/

4 C = 4 C = 46

C	C	C	C	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

5 C = 4 / = 46

/	/	/	/	/	/	/	/	/	/
/	/	/	C	C	C	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	C	/
/	/	/	/	/	/	/	/	/	/

6 C = 6 / = 44

C	C	C	C	C	/	/	/	/	/
/	/	/	C	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

7 C = 12 / = 38

C	C	/	/	/	/	/	/	C	C
/	/	/	/	/	/	/	/	/	/
C	/	/	/	/	C	C	/	/	/
/	/	/	/	/	/	C	C	/	C
C	/	/	/	/	/	/	/	/	C

8 C = 2 / = 48

C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	C	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____ %

component 1:	Chrysotile	points counted: 50	÷ total points: 0.125	X 100 =	12.5 %	× 0.13 = 1.63
component 2:	Particulate	points counted: 350	÷ total points: 0.875	X 100 =	87.5 %	11.37
component 3:		points counted:	÷ total points:	X 100 =	%	
component 4:		points counted:	÷ total points:	X 100 =	%	
			÷ total points:	X 100 =	%	

ORIGINAL (Red)

Air Quality Laboratory

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680430

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: brick red

Texture: rock-like Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: ? Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* ground, 3 slides made, ashed, re-ground, acid washed in Hot HCl

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.549	1.552	+	undulose	none	low	blue	magenta	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% (✓) Gravimetric (for cellulose) (✓) Point Counting (for chrysotile by EH.)

Asbestos Fibers	Layer 1 Pt. ct.	Layer 2 Pt. ct.	Total No. ct.	Non Asbestos Fibers	Layer 1	Layer 2	Total wt.
CHRYSOTILE	1.4	1.89	3-6	ORGANIC			27
AMOSITE	Sm	KH		SYNTHETIC			25-35
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: S. Markman			
55% CO_3 + Fe_2O_3 quartz & mica			60-70	Date: 6/8/98			

DHMH-3102A 6/97

This red particulate appears to be a match for iron oxide (Fe_2O_3) pg. 477 McCrone Atlas II

ORIGINAL (Red)

wt. of VHD sample = 19.6343g
wt of meal = 18.7154g.

Gravimetric Measurement: Crucible #2

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. 32.7493 g

Crucible wt. + top 28.6076 g

Sample wt. 4.1417 g

Crucible & residue wt. 31.6376 g

Residue wt. 3.0300 g

Residue Wt. / Sample wt. X 100 = 73 wt. % residue

100% - wt. % residue = 27 wt. % vol. sol cellulose

B. Acid Dissolution

Filter wt. 0.0150 g

Sample wt. 0.9189 g

Filter & Residue wt. 0.2325 g

Residue wt. 0.2175 g

Residue wt. / Sample wt. X 100 = 24 wt. % residue X.73 = 18

100% - wt. % residue = 76 wt. % dis. sol. X.73 = 55

C03

Hot acid washed by Kalpana

Polarized- Light Microscopy: **Point Count:** |✓| **Scanning Option:** |-|

2C 1 48/										3C 2 47/										6C 3 44/										3C 4 47/									
/	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	C	C	/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	/	C	/	/
/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/	/	C	/	C	/	/	/	/	C	/	/	/	/	/	/	C	/	/	/	/	/	C	/	/	/

4C 5 46/										8C 6 42/										7 50/										6C 8 44/									
C	/	/	C	/	/	/	/	/	/	/	/	/	C	/	/	/	C	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
/	/	C	C	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	/	/
/	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	C	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	C	/	/	/	C	C	C	/	

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____ %

component 1:	Chrysotile	points counted: 32	÷ total points: 400	X 100 = 8	% X.18 = 1.4
component 2:	N.F.P.	points counted: 368	÷ total points: 400	X 100 = 92	% X.18 = 17
component 3:		points counted:	÷ total points:	X 100 =	%
component 4:		points counted:	÷ total points:	X 100 =	%
			÷ total points:	X 100 =	%

Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680430

STEREOSCOPIC EXAMINATION

Homogeneous _____ Non-Homogeneous: ✓ Color: Red

Texture: Fibrous wet, granular Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* Needed lamp drying, Ashing & Acid wash.

● *(Oil Used):* SSI ( ) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
	620	560 KH							
Wavy	1.549	1.555 ~~1.553~~ KH	+	Undulose	None	L	Blue	magenta	Chrysotile.

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric (✓) Point Counting (✓)

Asbestos Fibers	Layer 1	Layer 2 pt. ct	Total 2-6 KH	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE		1.89	~~2-6~~ KH	ORGANIC twisted & tapered end			20-2 ~~34~~-28 KH
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: K. Hegde		pt. ct → 1.89%	
14% Particulate 55% CO3			65-75 ~~69~~ KH	Date: 6/10/98		visual estimate → 2-6%	

DHSHI-3102A 6/97

ORIGINAL (Red) Crucible # 2. 6/19/90 HCl 18.7154 g. wt. of vial

19.6343 g. wt. of vial + sample

17.8153 g

18.6169 g.

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)		B. Acid Dissolution	
Crucible, top & sample wt.	32.7493 g	0.0150 g.	Filter wt. 0.0153 g
Crucible wt. + top	28.6076 g	0.9189 g.	Sample wt. 0.8016 g
Sample wt.	4.1417 g	0.2325 g.	Filter & Residue wt. 0.3609 g
Crucible & residue wt.	31.6376 g	0.2175	Residue wt. 0.3456 g
Residue wt.	3.0300 g	24 x 0.73 = 18%	Residue wt. / Sample wt. X 100 = 43 % residue wt. 31%
Residue Wt. / Sample wt. X 100 =	73 % residue wt.	76 x 0.73 = 55%	100% - wt. % residue = 57 % dis. sol. wt. 42%
100% - wt. % residue =	27 % vol. sol. wt.	Done by KH	Done by KH

Polarized- Light Microscopy: ***Point Count:*** | - | ***Scanning Option:*** | - |

1 C = 12 / = 38

/	/	C	/	/	C	C	/	C	/
/	C	C	C	C	C	C	/	/	/
/	/	/	/	/	/	/	/	/	/
C	C	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

2 C = 4 / = 46

/	/	/	/	/	/	/	/	C	C
/	/	/	/	/	/	/	/	/	/
C	/	/	/	/	/	/	/	/	/
/	/	C	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

3 C = 12 / = 38

/	/	/	/	/	C	C	C	C	C
C	/	/	/	/	/	/	/	/	/
C	/	/	/	C	/	/	/	/	/
/	/	/	C	C	C	C	/	/	/
/	/	/	/	/	/	/	/	/	/

4 C = 1 / = 49

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	C	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

5 C = 3 / = 47

/	/	/	/	/	/	C	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	C	/	/	/	/	/	/

6 C = 4 / = 46

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
C	/	/	C	/	C	/	C	/	/
/	/	/	/	/	/	/	/	/	/

7 C = 3 / = 47

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	C	C	C	/	/	/	/
/	/	/	/	/	/	/	/	/	/

8 C = 3 / = 47

/	/	/	/	/	/	/	/	/	/
/	/	/	/	C	C	C	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1: Chrysotile	points counted: 42	÷ total points: 0.105	X 100 = 10.5 %	x 0.18	= 1.89
component 2: particulate	points counted: 358	÷ total points: 0.895	X 100 = 89.5 %	x 0.18	16.11
component 3: _____	points counted: _____	÷ total points: _____	X 100 = _____ %		
component 4: _____	points counted: _____	÷ total points: _____	X 100 = _____ %		
5	points counted:	÷ total points: _____	X 100 = _____ %		

Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680431

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: brick red

Texture: rocks-like Remarks: _____

● ***Estimated Asbestos Fibers Present and Percentages:***

Chrysotile: ? Crocidolite: _____ If layered, % asbestos:

Amosite: _____ Other: _____ Layer 1 _____

Layer 2 _____

● ***Sample Preparation:*** ground + 3 slides made, ashed, ground + acid washed in Hot HCl

Oil Used): 1.55 ✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.549	1.553	+	undulose	none	low	blue	magenta	chrysotile

● ***Quantitation Method:*** Visual Estimation (✓ Area% (✓) Volume% ( ) | Gravimetric (✓) for cellulose | Point Counting (✓) for chrysotile by KH.

Asbestos Fibers	Layer 1	Layer 2 Pt. Ct.	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total Pt.
CHRYSOTILE		1.13	✓ 2-8	ORGANIC twist			25-35 28
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS:			
NON-FIBROUS PARTICULATE			65-75	Analyst: S. Monkman			
Carbonates 62% mica quartz Fe_2O_3 61/C17			~~60-70~~	Date: 6/8/98			

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DHSMH-3102A

The red particulate appears to be a match for iron oxide (Fe_2O_3) pg 477 McCrone atlas II

ORIGINAL (Red)

Gravimetric Measurement: Crucible No. 1

vial + top + sample = 19.0448
vial + top = 18.7206 g

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. 31.0886 g

Crucible wt. + top 28.6973 g

Sample wt. 2.3913 g

Crucible & residue wt. 30.4187 g

Residue wt. 1.7214 g

Residue Wt. / Sample wt. X 100 = 72 wt. % residue

100% - wt. % residue = 28 wt. % vol. sol. cellulose

B. Acid Dissolution

Filter wt. 0.0153 g

Sample wt. 0.3742 g

Filter & Residue wt. 0.0671 g

Residue wt. 0.0518 g

Residue wt. / Sample wt. X 100 = 14 wt. % residue X.72 = 10

100% - wt. % residue = 86 wt. % dis. sol. X.72 = 62%

Hot HCl

CO_3
Fe_2O_3

Polarized- Light Microscopy: ***Point Count:*** 14 ***Scanning Option:*** 1-1

3C 1 42/	5C 2 45/	8C 3 42/	8C 4 42/
/ACA////C	/AAA//////	/AAA/C///C/	/AC////////C
/////////C	CA//C/////	/CCC////////	CC///C/C/C/
CC////////	///////////	/C////C////	/////C////
///C////////	////////C	//C////////	////////C//
////CC////	C//C////////	//////////	//////////

2C 5 48/	2C 6 48/	4C 7 46/	8C 8 42/
/C////////	////////////	////////////	////////C/
//////////	////////////	///CC/////	C//////////C
////C////	//C////////	////////////	////////////
////////////	////////C//	//////CC//	//C////////
////////////	////////////	////////////	////CCCC//

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____ %

component 1:	chrysotile	points counted: 45	÷ total points: 400	X 100 = 11.25	% X.10 = 1.13
component 2:	NFP	points counted: 355	÷ total points: 400	X 100 = 88.75	% X.10 = 8.9
component 3:		points counted:	÷ total points:	X 100 =	%
component 4:		points counted:	÷ total points:	X 100 =	%
		points counted:	÷ total points:	X 100 =	%

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Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: A680431

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: Red.

Texture: Rock-like Fibrous Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* Needed grinding Ashing & Acid washing

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
Wavy	600 1.550	560 1.553	+	Undulose	None	L	Blue	magenta	Chrysotile.

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric (✓) Point Counting (✓)

Asbestos Fibers	Layer 1	Layer 2 pt. ct.	Total KH 1-5	Non Asbestos Fibers	Layer 1	Layer 2	Total 25-29
CHRYSOTILE		1-33	1-5 KH	ORGANIC twisted, tapered end.			28
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: K. Hegde		pt. ct. → 1.35%	
KH 62% CO3 78% particulate			65-75	Date: 6/10/98		visual estimate → 1-5%	

DHSHI-3102A 6/97

ORIGINAL

(Red) Crucible #1

Hot HCl

Cont. of vial + Sample 19.0948 g.

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. 31.0886 g

Crucible wt. + top 28.6973 g

Sample wt. 2.3913 g

Crucible & residue wt. 30.4187 g

Residue wt. 1.7214 g

Residue Wt. / Sample wt. X 100 = 72 wt. % residue

100% - wt. % residue = 28 wt. % vol. sol.

Cellulose

Done by sm.

B. Acid Dissolution

Filter wt. 0.0153 g

Sample wt. 0.3742 g

Filter & Residue wt. 0.0671 g

Residue wt. 0.0518 g

Residue wt. / Sample wt. X 100 = 14 wt. % residue 10%

100% - wt. % residue = 86 wt. % dis. sol. 62% CO3.

Done by sm.

Polarized- Light Microscopy: **Point Count:** | - | **Scanning Option:** | - |

1 C = 11 / = 39

/	/	/	/	C	C	C	C	/	/
/	C	C	C	/	/	/	C	C	C
C	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

2 C = 9 / = 41

/	/	/	/	/	/	/	C	/	/
/	/	/	C	/	/	/	/	/	C
/	/	/	/	C	/	/	/	/	/
C	C	C	/	/	/	/	/	/	/
/	/	/	/	/	/	/	C	C	/

3 C = 8 / = 42

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	C	C
C	C	C	/	/	/	/	/	/	/
/	C	/	/	/	/	/	C	C	/
/	/	/	/	/	/	/	/	/	/

4 C = ~~8~~ 9 KH / = 42

/	/	/	/	/	/	/	/	C	C
C	C	C	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	C	/
/	/	/	/	/	C	C	C	/	/

5 C = 3 / = 47

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	C	C	C	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

6 C = 4 / = 46

C	C	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	C	/	/
/	/	/	/	/	C	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/

7 C = 8 / = 42

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	C	/
C	C	/	/	/	/	/	/	/	/
/	/	c	/	/	/	/	/	/	c
C	/	/	/	/	/	/	C	C	/

8 C = 2 / = 48

/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/
/	/	/	C	C	/	/	/	/	/

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____ %

component 1:	Chrysotile	points counted:	54	÷ total points:	0.1350	X 100 =	13.50 % X 0.10 1.35 KH
component 2:	particulate	points counted:	347	÷ total points:	0.8675	X 100 =	86.75 % X 0.10 8.68
component 3:		points counted:		÷ total points:		X 100 =	%
component 4:		points counted:		÷ total points:		X 100 =	%
5:		points counted:		÷ total points:		X 100 =	%

ORIGINAL (Red)

Air Quality Laboratory

WORKSHEET FOR BULK ASBESTOS

Laboratory No: C-2

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: grey

Texture: fluffy, fibrous Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: 30 Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

Slide Preparation: _____

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Birefr	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.549	1.553	+	undulose	none	low	blue	magenta	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric ( ) Point Counting ( )

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE			25-35	ORGANIC			
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL isotropic			25-35
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: S. Moulaman			
			65-45	Date: 6/11/98			

DHMH-3102A 6/97

ORIGINAL (Red)

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. _____ g

Crucible wt. + top _____ g

Sample wt. _____ g

Crucible & residue wt. _____ g

Residue wt. _____ g

$\frac{\text{Residue Wt.}}{\text{Sample wt.}} \times 100 =$ _____ wt. % residue

100% - wt. % residue = _____ wt. % vol. sol.

B. Acid Dissolution

Filter wt. _____ g

Sample wt. _____ g

Filter & Residue wt. _____ g

Residue wt. _____ g

$\frac{\text{Residue wt.}}{\text{Sample wt.}} \times 100 =$ _____ wt. % residue

100% - wt. % residue = _____ wt. % dis. sol.

Polarized- Light Microscopy: ***Point Count:*** | - | ***Scanning Option:*** | - |

1 *2* *3* *4*

5 *6* *7* *8*

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 2: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 3: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 4: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 5: _____ points counted: _____ ÷ total points: _____ X 100 = _____%

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Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: C-2

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: Grey/off white.

Texture: Fibrous Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* _____

● *(Oil Used):* : :(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°c

Morphology	Refractive Index ⊥ 620	Refractive Index ∥ 560	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
Wavy	1.549	1.553	+	undulose	None	L	Blue	Magenta	Chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric ( ) Point Counting ( )

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE			25-35	ORGANIC			1-5
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			20-30
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE			40-44	Analyst: K. Hegde			
				Date: 6/11/98			

DHMH-3102A 6/97

40

(Red)

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. _____ g

Crucible wt. + top _____ g

Sample wt. _____ g

Crucible & residue wt. _____ g

Residue wt. _____ g

Residue Wt. / Sample wt. X 100 = _____ wt. % residue

100% - wt. % residue = _____ wt. % vol. sol.

B. Acid Dissolution

Filter wt. _____ g

Sample wt. _____ g

Filter & Residue wt. _____ g

Residue wt. _____ g

Residue wt. / Sample wt. X 100 = _____ wt. % residue

100% - wt. % residue = _____ wt. % dis. sol.

Polarized- Light Microscopy: *Point Count:* | - | *Scanning Option:* | - |

1 2 3 4

5 6 7 8

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____ Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____ fiber
/ = Nonfiber, _____ = _____, _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 2: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 3: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 4: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 5: _____ points counted: _____ ÷ total points: _____ X 100 = _____%

Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: C-5

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: tan / white

Texture: granular a a few fibers Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: ✓ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* _____

● *(Oil Used):* 1.551 (✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°C

Morphology	Refractive Index ⊥	Refractive Index ∥	Elong Sign	Extin	Pleochroism/ Color	Bire	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
wavy	1.549	1.553	+	undulose	none	low	blue	magenta	chrysotile

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric ( ) Point Counting ( )

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE			3-6	ORGANIC			
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL			
OTHERS				OTHERS			
NON-FIBROUS PARTICULATE				Analyst: D. Monteman			
Perlite			94-97	Date: 6/11/98			

DHSHL-3102A 6/97

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ORIGINAL
(Red)

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. _____ g

Crucible wt. + top _____ g

Sample wt. _____ g

Crucible & residue wt. _____ g

Residue wt. _____ g

Residue Wt. / Sample wt. X 100 = _____ wt. % residue

100% - wt. % residue = _____ wt. % vol. sol

B. Acid Dissolution

Filter wt. _____ g

Sample wt. _____ g

Filter & Residue wt. _____ g

Residue wt. _____ g

Residue wt. / Sample wt. X 100 = _____ wt. % residue

100% - wt. % residue = _____ wt. % dis. sol.

Polarized- Light Microscopy: *Point Count:* | - | *Scanning Option:* | - |

1 *2* *3* *4*

5 *6* *7* *8*

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____fiber
/ = Nonfiber, _____ = _____ _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1: _____ points counted: _____ ÷ total points: _____ X 100 = _____ %
component 2: _____ points counted: _____ ÷ total points: _____ X 100 = _____ %
component 3: _____ points counted: _____ ÷ total points: _____ X 100 = _____ %
component 4: _____ points counted: _____ ÷ total points: _____ X 100 = _____ %
component 5: _____ points counted: _____ ÷ total points: _____ X 100 = _____ %

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Air Quality Laboratory

ORIGINAL (Red)

WORKSHEET FOR BULK ASBESTOS

Laboratory No: C-5

STEREOSCOPIC EXAMINATION

Homogeneous ✓ Non-Homogeneous: _____ Color: off white/Grey.

Texture: Fibrous Remarks: _____

● *Estimated Asbestos Fibers Present and Percentages:*

Chrysotile: _____ Crocidolite: _____ If layered, % asbestos:
Amosite: _____ Other: _____ Layer 1 _____
Layer 2 _____

● *Sample Preparation:* _____

● *(Oil Used):* 1.55(✓) 1.605( ) 1.68( ) Other( ) _____

IDENTIFICATION BY PLM EPA METHOD 600

ROOM TEMP: 23°c.

Morphology	Refractive Index ⊥ 600	Refractive Index ∥ 560	Elong Sign	Extin	Pleochroism/ Color	Birefr	Dispersion Staining ⊥	Dispersion Colors ∥	Identity
Wavy	1.550	1.553	+	Undulose	None	L	Blue	magenta	Chrysotile.

● *Quantitation Method:* Visual Estimation (✓) Area% (✓) Volume% ( ) Gravimetric ( ) Point Counting ( )

Asbestos Fibers	Layer 1	Layer 2	Total	Non Asbestos Fibers	Layer 1	Layer 2	Total
CHRYSOTILE			1-5	ORGANIC twisted, tapered end.			1-10
AMOSITE				SYNTHETIC			
CROCIDOLITE				GLASS WOOL/ROCK WOOL Isotropic.			15-25
OTHERS				OTHERS:			
NON-FIBROUS PARTICULATE			75-80	Analyst: K. Hegde			
				Date: 6/11/98			

DHMH-3102A 6/97

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ORIGINAL
(Red)

Gravimetric Measurement:

A. Ashing (Weigh to 4 decimals)

Crucible, top & sample wt. _____ g

Crucible wt. + top _____ g

Sample wt. _____ g

Crucible & residue wt. _____ g

Residue wt. _____ g

Residue Wt. X 100 = _____ wt.
Sample wt. % residue

100% - wt. % residue = _____ wt.
% vol. sol.

B. Acid Dissolution

Filter wt. _____ g

Sample wt. _____ g

Filter & Residue wt. _____ g

Residue wt. _____ g

Residue wt. X 100 = _____ wt.
Sample wt. % residue

100% - wt. % residue = _____ wt.
% dis. sol.

Polarized- Light Microscopy: *Point Count:* | - | *Scanning Option:* | - |

1 2 3 4

5 6 7 8

C = Chrysotile, A = Amosite, D = Crocidolite, _____ = _____Asbestos
G = Fibrous glass, L = Cellulose, W = Wollastonite, _____ = _____fiber
/ = Nonfiber, _____ = _____ _____ = _____, _____ = _____

Calculations:

Percent = Points counted ÷ Total points X 100 = _____%

component 1: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 2: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 3: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 4: _____ points counted: _____ ÷ total points: _____ X 100 = _____%
component 5: _____ points counted: _____ ÷ total points: _____ X 100 = _____%

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ORIGINAL (Red)

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
201 W. Preston Street
Baltimore, MD 21201
Ph: (410) 767 - 5839
Fax: (410) 333 - 5403

AIR QUALITY LABORATORY

QC DATA SUMMARY

Bulk Asbestos Microscopic Analysis Report

ID #	DHMH #	Analyte	Pt. Ct. Av. Area %	Refernce Value Wt. %
QC NVLAPM11994	C-5	3-6 % (SM)/1-5 % (KH) Chrysotile	None	4
QC NVLAPM11993	C-2	25-35% (SM)/25-35%(KH) Chrysotile	None	35
A-24 QC BLANK (6/3)	A680425	None (SM)	None	None
-24 QC BLANK (6/9)	A680425	None (KH)	None	None
6/3,6/5,6/9,6/10,6/11)	1.55 RI	None (SM & KH)	None	None

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ORIGINAL (Red)

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

16394 25 230 B

LAB. NO. _____

AIR QUALITY LABORATORY
BULK ASBESTOS MICROSCOPIC ANALYSIS

COUNTY _____ DATE COLLECTED _____

SOURCE OF SAMPLE Ref sample

SUBMITTED BY D. Willis SAMPLE IDEN. NO.: A-24

NATURE OF MATERIAL QC Blank

CHAIN OF CUSTODY SAMPLE POSSESSION

FROM _____ (NAME/DATE/TIME) TO _____ (NAME/DATE/TIME)

FROM _____ (NAME/DATE/TIME) TO _____ (NAME/DATE/TIME)

FROM _____ (NAME/DATE/TIME) TO _____ (NAME/DATE/TIME)

ANALYSIS DESIRED: Asbestos

RESULTS: No asbestos observed

SAMPLE COLOR: white LAYERED: YES( ) NO (✓)

ASBESTOS FIBERS	PERCENT	NON-ASBESTOS FIBERS	PERCENT
CHRYSOTILE		ORGANIC	
ASBITE		SYNTHETIC	
CROCIDOLITE		GLASS WOOL/ROCK WOOL	
OTHER		OTHERS:	

NON-FIBROUS PARTICULATE

ANALYTICAL METHOD: EPA 600/M4-82-020

SUBMIT RESULTS TO: _____

DATE COMPLETED 5/14/98

ANALYST K. Hegde, S. Monkman
YTSD 5/27/98

DATE RECEIVED _____

RESULTS ONLY VALID FOR SAMPLE RECEIVED

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